

## 4.3 GREENHOUSE GAS EMISSIONS

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### 4.3.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) discusses the existing global, national, and statewide conditions related to greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the proposed UC Merced 2020 LRDP (2020 LRDP or proposed project). In addition, the section provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions.

The project is located within the air basin that is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Data used to prepare this section were taken from various sources, including the San Joaquin Valley Air Pollution Control District's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*, and the District Policy for Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency published in 2009, *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) published in 2015, and technical analyses conducted for the project. The technical documents are presented in **Appendix 4.1** of this SEIR.

### 4.3.2 Environmental Setting

#### *Background*

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (US EPA 2013). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system

during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007);
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets. Along most of the California coast, the average values for future sea level rise are projected to be approximately 6 inches by 2030, 12 inches by 2050, and 36 inches by 2100 (NRC 2012);
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);
- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (Cal EPA 2006);
- Increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006);
- Increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006); and
- Summer warming projections in the first 30 years of the 21st century ranging from about 0.5 to 2 °C (0.9 to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 to 5.8 °C (2.7 to 10.5 °F) (Cal EPA 2006).

The natural process through which heat is retained in the troposphere<sup>1</sup> is called the "greenhouse effect." Various gases in the Earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere as short-wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth's surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short-wave solar radiation but absorb outgoing long wave radiation.

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<sup>1</sup> The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6 to 7 miles).

As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

### *Greenhouse Gases*

State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO<sub>2</sub>) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO<sub>2</sub> emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems. CO<sub>2</sub> comprises over 80 percent of GHG emissions in California (Cal EPA 2014).
- **Methane** (CH<sub>4</sub>) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment. Methane makes up 8.3 percent of all GHGs, and mobile sources and general fuel combustion represent 0.69 percent of overall methane emissions (Cal EPA 2014).
- **Nitrous Oxide** (N<sub>2</sub>O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 12 percent of N<sub>2</sub>O emissions (US EIA 2011). N<sub>2</sub>O emissions from motor vehicles generally occur directly from operation of vehicles.
- **Hydrofluorocarbons** (HFCs) are one of several high global warming potential (GWP) gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.
- **Perfluorocarbons** (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs from motor vehicles are generally negligible.
- **Sulfur Hexafluoride** (SF<sub>6</sub>) is another high GWP gas that is not naturally occurring and is generated in a variety of industrial processes. Emissions of SF<sub>6</sub> from motor vehicles are generally negligible.

While water vapor and carbon dioxide (CO<sub>2</sub>) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. 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-emit long-wave radiation over a specific period. The GWP of a gas is determined using CO<sub>2</sub> as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007).<sup>2</sup> For example, a gas with a GWP of 10 is 10 times more potent than CO<sub>2</sub> over 100 years. The use of GWP allows GHG emissions to be reported using CO<sub>2</sub> as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as “carbon dioxide equivalents” (CO<sub>2</sub>e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the

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<sup>2</sup> All Global Warming Potentials are given as 100-year values.

same climate change impacts as 10 metric tons of CO<sub>2</sub>. As illustrated in **Table 4.3-1, Global Warming Potential of Greenhouse Gases**, the other GHGs are less abundant but have higher GWP than CO<sub>2</sub>. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO<sub>2</sub>, denoted as CO<sub>2e</sub>. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO<sub>2</sub> were being emitted. High GWP gases such as HFCs, PFCs, and SF<sub>6</sub> are the most heat-absorbent.

**Table 4.3-1  
Global Warming Potential of Greenhouse Gases**

Greenhouse Gas	Global Warming Potential Factor (100-Year)
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	25
Nitrous Oxide (N <sub>2</sub> O)	298
Perfluorocarbons (PFCs)	7,390-12,200
Hydrofluorocarbons (HFCs)	124-14,800
Sulfur Hexafluoride (SF <sub>6</sub> )	22,800

*Source: Southern California Association of Governments, Draft Program EIR for 2016 RTP/SCS. November 24, 2015.*

*Note: Global warming potential measures how much heat a GHG traps in the atmosphere, in this case, over a 100-year period.*

### ***GHG Emissions Classification***

To achieve consistency in reporting across different geographies, the GHG Protocol established by the World Research Institute, developed a GHG emissions classification system that classifies GHG emissions into three categories based on the nature and source of the emissions. This classification system is listed in the University of California Sustainable Practices Policy and is used by the University to gather data on its annual GHG emissions for reporting to the California Climate Action Registry.

- Scope 1 GHG emissions include direct emissions that are emitted on the project site/facility and are associated with on-site combustion of natural gas, fuel use in vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF<sub>6</sub>).
- Scope 2 GHG emissions include indirect emissions associated with the consumption of purchased energy from off-site sources. Scope 2 electricity emissions reflect emissions from all energy used at the electricity-generating power plant, but exclude transmission and distribution losses, which are reported under Scope 3.

- Scope 3 GHG emissions include indirect emissions not covered in Scope 2, including GHG emissions from employee commuting, business air and ground travel, electricity transmission and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal.

These definitions of Scope 1, 2 and 3 emissions are used at UC Merced to gather and report GHG emissions data annually.

Note that CEQA requires an evaluation of direct and indirect emissions. With the exception of business air and ground travel, all of the Scope 1, 2, and 3 emission sources listed above must be addressed in a CEQA document. In addition, CEQA requires that the estimate of a project's emissions include emissions from the supply, treatment, and distribution of water used by the project.

### *UC Merced GHG Emissions*

As required by University policy, since 2009, UC Merced has been estimating and reporting its Scope 1, 2, and Scope 3 (commuting only) emissions to the California Climate Action Registry. **Table 4.3-2, UC Merced Reported GHG Emissions**, below presents the reported emissions through 2017. Although the campus has been growing in the number of buildings, and its population (students and employees) has more than doubled since 2009, as the table shows, the campus's GHG emissions have not been growing – the emissions have remained generally flat and have been declining since 2015 with the implementation of measures by UC Merced to reduce GHG emissions.

**Table 4.3-2**  
**UC Merced Reported GHG Emissions (in MTCO<sub>2e</sub>)**

<b>Emission Type</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Scope 1	3,432	3,379	3,604	4,363	3,281	4,234	3,951	3,614	4,045
Scope 2	5,277	3,389	3,752	5,227	5,432	5,705	4,162	5,457	2,740
Scope 3	4,246	4,681	4,927	3,328	3,328	3,885	3,412	2,890	2,895
Total	12,955	11,449	12,283	12,918	12,041	13,824	11,525	11,961	9,680
Campus Population	4,345	5,397	6,402	6,976	7,420	7,590	8,052	8,715	9,417

*Source: UC Merced 2018.*

## **4.3.3 Regulatory Considerations**

### *International Laws and Regulations*

#### **Kyoto Protocol**

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global

climate change. In 1992, the United States (the “U.S.”) joined other countries around the world in signing the United Nations’ Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG emissions in the U.S. The plan currently consists of more than 50 voluntary programs for member nations to adopt. The Kyoto Protocol (the “Protocol”) is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Notably, while the U.S. is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol’s commitments. The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The major distinction between the Protocol and the UNFCCC is that while the UNFCCC encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.”

On December 12, 2015, a Conference of the Parties to the UNFCCC and the 11<sup>th</sup> session of the Kyoto Protocol negotiated an agreement in Paris that would keep the rise of temperature below 2 degrees Celsius. While 186 countries published their action plans detailing how they plan to reduce their GHG emissions, these reductions would still result in up to 3 degrees Celsius of global warming. The Paris agreement asks all countries to review their plans every five years from 2020, acknowledges that \$100 billion is needed each year to enable countries to adapt to climate change. The agreement was signed into law on April 22, 2016. However, in May 2017, President Donald Trump announced that the U.S. would withdraw from the agreement.

### **The Western Regional Climate Action Initiative**

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states, including California, and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region’s electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated that this would require 2007 levels to be reduced worldwide between 50 percent and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board’s (CARB) planned cap and-trade program, discussed below, is also intended to link California and the other member states and provinces.

### ***Federal Rules and Regulations***

The U.S. EPA has historically not regulated GHG emissions because it determined the Clean Air Act did not authorize it to regulate emissions that addressed climate change. In 2007, the U.S. Supreme Court found that GHG emissions could be considered within the Clean Air Act's definition of a pollutant (*Massachusetts v. EPA et al*, 2007). In December 2009, U.S. EPA issued an endangerment finding for GHG emissions under the Clean Air Act, setting the stage for future regulation. In September 2009, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA announced a joint rule that would tie fuel economy to GHG emission reduction requirements.

In June 2013, President Obama announced a Climate Action Plan that calls for a number of initiatives, including funding \$8 billion in advanced fossil energy efficiency projects, calls for federal agencies to develop new emission standards for power plants, invests in renewable energy sources, calling for adaptation programs, and leading international efforts to address climate change. There have been numerous executive actions, proposed and finalized agency regulations, investment strategies, budget requests, and international bilateral agreements. This includes a final rule for the Clean Power Plan issued in August 2015, which has been challenged in court and the current administration has proposed rolling the rule back.

### **Vehicle Standards**

Other regulations have been adopted to address vehicle standards, including the U.S. EPA and the NHTSA joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011 (NHSTA 2009).
- On May 7, 2010, the U.S. EPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (US EPA 2010).
- On August 9, 2011, U.S. EPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles (US EPA and NHTSA 2011).
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking (NHSTA 2012).

### **Energy Independence and Security Act**

Among other key measures, the Energy Independence and Security Act (EISA) would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

While superseded by NHTSA and U.S. EPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of “green jobs.”

### ***State Rules and Regulations***

#### **Assembly Bill 1493**

In September 2002, AB 1493 (Chapter 200, Statutes of 2002) (referred to as Pavley I) was enacted, requiring the development and adoption of regulations to achieve “the maximum feasible reduction of greenhouse gases” emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the state by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as “LEV (Low Emission Vehicle) III GHG” will cover 2017 to 2025 (13 Cal. Code Regs. Section 1900 *et seq.*). Fleet average emission standards were to reach a 22 percent reduction by 2012 and 30 percent by 2016.

#### **Executive Order S-3-05**

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05, which set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The California Environmental Protection Agency (Cal EPA) formed a Climate Action Team (CAT) that recommended strategies that can be implemented by state agencies to meet GHG emissions targets. The Team reported several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order (CAT 2006). Furthermore, the report provided to Governor Schwarzenegger in 2006 indicated that smart land use and increased transit availability should be a priority in the State of California (CAT 2006). According to the California Climate Action Team, smart land use is an umbrella term for strategies that integrate transportation and land-use decisions. Such

strategies generally encourage jobs/housing proximity, promote transit-oriented development (TOD), and encourage high-density residential/commercial development along transit corridors. These strategies develop more efficient land-use patterns within each jurisdiction or region to match population increases, workforce, and socioeconomic needs for the full spectrum of the population.

#### **Executive Order B-30-15**

On April 29, 2015, Governor Brown issued an executive order setting a Statewide GHG reduction target of 40 percent below 1990 levels by 2030. This action aligns the State's GHG targets with those set in October 2014 by the European Union and is intended to help the State meet its target of reducing GHG emissions 80 percent below 1990 levels by 2050. The measure calls on State agencies to implement measures accordingly and directs the CARB to update the Climate Change Scoping Plan.

#### **Assembly Bill 32**

In September 2006, AB 32 was signed into law by Governor Arnold Schwarzenegger, focusing on achieving GHG emissions equivalent to statewide levels in 1990 by 2020. It mandates that the CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

CARB developed an AB 32 Scoping Plan that contains strategies to achieve the 2020 emissions cap. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in October 2008 (2008 Scoping Plan). The 2008 Scoping Plan proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce the state's dependence on oil, diversify the state's energy sources, save energy, create new jobs, and enhance public health. It accommodated the State's projected population growth. Moreover, it expressly encouraged called for coordinated planning of growth, including the location of dense residential projects near transportation infrastructure, including public transit.

On May 22, 2014, CARB approved its first update to the AB 32 Scoping Plan, recalculating 1990 GHG emissions using IPCC Fourth Assessment Report (AR4) released in 2007. It states that based on the AR4 global warming potentials, the 427 million metric tons of CO<sub>2</sub>e (MMTCO<sub>2</sub>e) 1990 emissions level would be slightly higher than identified in the original Scoping Plan, at 431 MMTCO<sub>2</sub>e. Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the FED and updated 1990 emissions levels identified in the draft first update to the Scoping Plan, achieving the 1990 emission level would require a reduction of 76 MMTCO<sub>2</sub>e or a reduction by approximately 15.3 percent (down from 28.4 percent) to achieve in 2020 emissions levels in the BAU condition. CARB's First Update "lays the

foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050,” and many of the emission reduction strategies recommended by CARB would serve to reduce the project’s post-2020 emissions level to the extent applicable by law by focusing on reductions from several sectors (CARB 2014).

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

#### **Cap-and-Trade Program**

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed “covered entities”) by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32’s emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and declines over time, achieving GHG emission reductions throughout the program’s duration.

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California’s GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects’ electricity usage are covered by the Cap-and-Trade Program.

On July 25, 2017, the Governor signed AB 398 into law, extending the Cap-and-Trade Program to 2030. AB 398 calls for half of emissions offsets to be generated in California and prohibits CARB and air districts from regulating CO<sub>2</sub> from sources under the Cap-and-Trade program.

#### **Senate Bill 1368**

Senate Bill (SB) 1368 requires the California Public Utilities Commission and the California Energy Commission to establish GHG emissions performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the state.

#### **SB 97 & CEQA Guidelines**

In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97), requiring the Governor’s Office of Planning and Research (OPR) to prepare and transmit new *State CEQA Guidelines* for the

mitigation of GHG emissions or the effects of GHG emissions. In response to SB 97, the California Natural Resources Agency (CNRA) adopted amendments to the *State CEQA Guidelines* that require evaluation of GHG emissions or the effects of GHG emissions. The amendments, in Section 15064.4, provide that:

- (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project.
- (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
  - (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
  - (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
  - (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions.

The amendments also add Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions. Generally, this *State CEQA Guidelines* section requires lead agencies to consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of GHG emissions. Potential measures to mitigate the significant effects of GHG emissions are identified, including those outlined in Appendix F, Energy Conservation, of the *State CEQA Guidelines*.

### **State Bill 375**

On September 30, 2008, SB 375 was instituted to help achieve AB 32 goals through regulation of cars and light trucks. SB 375 aligns three policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve GHG emissions reductions targets for the transportation sector. It establishes a process for CARB to develop GHG emissions reductions targets for each region (as opposed to individual local governments or households). SB 375 also requires Metropolitan Planning Organizations (MPOs) to prepare a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP) that guides growth while taking into account the transportation, housing, environmental, and economic needs of the region. SB 375 uses CEQA streamlining as an incentive to encourage residential projects, which help achieve AB 32 goals to reduce GHG emissions.

### **Executive Order B-30-15**

In April 2015, Governor Brown signed Executive Order B-30-15 that provides the state a mid-term target. The executive order establishes a target for the state to reduce its GHG emissions such that the state's 2030 emissions are 40 percent of the 1990 emissions. According to the state, California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. The new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, established by Executive Order S-3-05.

### **Executive Order S-13-08**

On April 29, 2015, Governor Brown issued Executive Order B-30-15. Therein, the governor directed the following:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 (subsequently codified in SB 32).
- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of CO<sub>2</sub> equivalent.

### **Senate Bill 350**

On October 7, 2015, Senate Bill 350: Clean Energy and Pollution Reduction Act (SB 350) was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. Building off of AB 32, SB 350 established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set ambitious 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing greenhouse gas emissions. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

### **Senate Bill 32 (SB 32) and AB 197**

On September 8, 2016, California signed into law Senate Bill 32 (SB 32), which adds Section 38566 to the Health and Safety Code and requires a commitment to reducing statewide GHG emissions by 2020 to 1990 levels and by 2030 to 40 percent less than 1990 levels. SB 32 was passed with companion legislation

AB 197, which provides greater legislative oversight of CARB's GHG regulatory programs, requires CARB to account for the social costs of GHG emissions, and establishes a legislative preference for direct reductions of GHG emissions.

As noted above, in November 2017, CARB adopted the 2017 Scoping Plan, which outlines the proposed framework of action for achieving California's SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels.<sup>3</sup> The 2030 target is intended to ensure that California remains on track to achieve the goal set forth by E.O. B-30-15 to reduce statewide GHG emissions by 2050 to 80 percent below 1990 levels.

The 2017 Scoping Plan identifies key sectors of the implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 MMTCO<sub>2e</sub>, and that further commitments will need to be made to achieve an additional reduction of 50 MMTCO<sub>2e</sub> beyond current policies and programs. Key elements of the 2017 Scoping Plan include a proposed 20 percent reduction in GHG emissions from refineries and an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2050 limit set forth by E.O. B-30-15. For the transportations sector, the 2017 Scoping Plan indicates that while most of the GHG reductions will come from technologies and low carbon fuels, a reduction in the growth of vehicle miles traveled (VMT) is also needed. The 2017 Scoping Plan indicates that stronger SB 375 GHG reduction targets will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions that will be needed. It notes that here is a gap between what SB 375 can provide and what is needed to meet the State's 2030 and 2050 goals. The 2017 Scoping Plan recommends that local governments consider policies to reduce VMT, including: "land use and community design that reduces VMT; transit-oriented development; street design policies that prioritize transit, biking, and walking; and increasing low carbon mobility choices, including improved access to viable and affordable public transportation and active transportation opportunities."

#### **Title 24 Energy Efficiency Standards**

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

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<sup>3</sup> CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

### **California Green Building Standards**

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations, is commonly referred to as the *CALGreen* Code. *CALGreen* was added to Title 24 to represent base standards for reducing water use, recycling construction waste, and reducing polluting materials in new buildings. In contrast, Title 24 focuses on promoting more energy-efficient buildings and considers the building envelope, heating and cooling, water heating, and lighting restrictions. The current 2016 *CALGreen* Code became effective January 1, 2017.

### ***Regional Plans and Policies***

#### **San Joaquin Valley Air Pollution Control District (SJVAPCD)**

The SJVAPCD is a public health agency that was developed to manage air quality for the eight counties in California's Central Valley. The counties include: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and a portion of Kern. The SJVAPCD is comprised of one representative from each county, one governor-appointed Health and Science member and one Physician, and five Valley city representatives. Plans and policies set forth by SJVAPCD are summarized below.

#### **SJVAPCD Climate Change Action Plan**

In November 2008, the SJVAPCD adopted the Climate Change Action Plan (CCAP). The CCAP contains the following goals and actions:

- Develop GHG significance thresholds to address CEQA projects with GHG emission increases.
- Develop the San Joaquin Valley Carbon Exchange for banking and trading GHG reductions.
- Authorize use of the SJVAPCD's existing inventory reporting system to allow use for GHG reporting required by AB 32 regulations.
- Develop and administer GHG reduction agreements to mitigate proposed emission increases from new projects.
- Support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted areas.

In an attempt to minimize GHG emissions within the air district, the CCAP directed the Air Pollution Control Officer (APCO) to develop guidance documents regarding GHG emissions under CEQA. Other items designated to the APCO include exploring the potential of developing a GHG banking program, enhancing the current emissions inventory, and administering voluntary GHG reduction agreements.

The CCAP discusses current regulations regarding GHGs and presents multiple methodologies for addressing GHG impacts.

### **Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA**

In late 2009, the SJVAPCD adopted the “Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA,” and the policy “District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency,” providing further direction to CEQA analysis within the jurisdiction of SJVAPCD. As GHG quantification was still relatively new and inadequate, the policy was an early step in tying project-specific GHG emissions to global climatic change. It surmised that project-specific emissions do have a cumulative effect on global climate change and mitigation is necessary to minimize a project’s contributions to climate change.

The SJVAPCD’s guidance allows for a fairly streamlined process of determining if project-specific GHG emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and must have a certified final CEQA document.

When CEQA does apply to a project, the lead agency must evaluate the project against performance-based standards and would require the adoption of design elements, known as a Best Performance Standard (BPS), to reduce GHG emissions.

According to SJVAPCD guidance, quantification of GHG emissions would be required for all projects for which the lead agency has determined that an environmental impact report is required, regardless of whether the project incorporates BPS.

For stationary source permitting projects, BPS means, “The most stringent of the identified alternatives for control of GHG emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class.” The SJVAPCD has identified BPS for the following sources: boilers; dryers and dehydrators; oil and gas extraction, storage, transportation, and refining operations; cogeneration; gasoline dispensing facilities; volatile organic compound control technology; and steam generators. For development projects, BPS means, “Any combination of identified GHG emission reduction measures, including project design elements and land use decisions that reduce project-specific GHG emission reductions by at least 29 percent.”

### **SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI)**

The GAMAQI was first developed in 2002 to provide technical guidance for the review of air quality impacts resulting from projects within the SJVAPCD. The GAMAQI serves as an advisory document for agencies preparing air quality sections of environmental documents and allows for the uniform analysis of project impacts. The document was later revised in 2012 and 2014, and most recently, in March 2015, to reflect changes in regulations and methodologies. Chapter 4 of the newest version provides an introduction to common GHGs and the importance of evaluating them as air pollutants. The GAMAQI also details how to evaluate potential GHG impacts, despite no one project being large enough to generate emissions substantial enough to change the global climate. The GAMAQI notes that the *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA, and the District Policy for Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*, adopted in December 2009 continue to be the relevant policy document to address GHG emissions under CEQA.

### **San Joaquin Valley Carbon Exchange**

The CCAP authorized the APCO to develop procedures for a voluntary GHG reduction banking system. The system, the San Joaquin Valley Carbon Exchange, allowed the SJVAPCD to quantify, verify, and track voluntary GHG emissions reductions within the Valley. A team of representatives from land use, agricultural and industry agencies, as well as environmental groups and other interested parties met with the public to create a mechanism to register and quantify GHG emissions reductions.

### **Rule 2301**

Despite the creation of the San Joaquin Valley Carbon Exchange, the SJVAPCD also incorporated a method to register voluntary GHG emission reductions into its existing Rule 2301 - Emission Reduction Credit Banking. In 2012, the rule was amended to include the following:

- Provide an administrative mechanism for sources to bank voluntary GHG emission reductions for later use.
- Provide an administrative mechanism for sources to transfer banked GHG emission reductions to others for any use.
- Define eligibility standards, quantitative procedures, and administrative practices to ensure that banked GHG emission reductions are real, permanent, quantifiable, surplus, and enforceable.

## *Local Plans and Policies*

### **University of California Sustainable Practices Policy**

The University of California Sustainable Practices Policy (Sustainability Policy), most recently updated in January 30, 2018, is a system-wide commitment to minimize the University's impact on the environment and reduce its dependence on non-renewable energy sources. The Sustainability Policy states that "The University of California is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices."

The Sustainability Policy establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems. Portions of the policy applicable to the proposed project are listed below:

#### *Green Building Design*

- All new building projects shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in the Sustainability Policy, Table 1 of Section V.A.3. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3, whenever possible within the constraints of program needs and standard budget parameters.
- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g. natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall provide a justification as described in Section V.A.4.

#### *Clean Energy*

In support of the climate neutrality goals outlined in Section C of this policy, the University of California is committed to reducing its GHG emissions by reducing energy use and switching to clean energy supplies.<sup>4</sup>

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<sup>4</sup> Although the UC system is anticipated to have 100% renewable electricity by 2025, UC Merced is expected to have 100% renewable electricity by 2020. <https://www.solarreviews.com/news/uc-merced-to-power-campus-with-50-percent-solar-plans-for-100-percent-renewable-energy-by-2020-062717/>

- **Energy Efficiency:** Each campus and medical center will implement energy efficiency actions in buildings and infrastructure systems to reduce their energy use intensity by at least 2 percent year over year.
- **On-campus Electricity:** Campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals.
- **Off-campus Electricity:** By 2025, the University will rely on 100 percent clean electricity supplies. Locations served directly by UC's own Electricity Services Provider will implement clean-electricity supplies starting in 2017 and transition to clean-electricity supplies by 2021.
- **On-site Combustion:** By 2025, at least 40 percent of the fuel used for on-site combustion will be low-carbon biogas.

#### *Climate Protection*

Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:

- Climate neutrality from Scope 1 and 2 sources by 2025<sup>5</sup>
- Climate neutrality from specific Scope 3 sources (as defined by the American College and University Presidents' Climate Commitment (ACUPCC) by 2050 or sooner

And at minimum, meet the following intermediate goal in pursuit of climate neutrality:

- Reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006

#### *Sustainable Transportation*

Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.

- By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50% of all new light-duty vehicle acquisitions.

The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.

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<sup>5</sup> For definitions of Scopes 1, 2 and 3 emissions, see GHG Emissions Classification under **Section 4.3.2** above.

- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10% relative to its 2015 SOV commute rates;
- By 2050, each location shall strive to have no more 40% of its employees and no more than 30% of all employees and students commuting to the location by SOV.

Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.

- By 2025, each location shall strive to have at least 4.5% of commuter vehicles be ZEV.
- By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.

Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

#### ***Recycling and Waste Management***

The University's goal for diverting municipal solid waste from landfills is as follows:

- 50 percent as of June 30, 2008
- 75 percent as of June 30, 2012
- Ultimate goal of zero waste by 2020

#### **UC Carbon Neutrality Initiative**

In November 2013, the UC President announced the UC Carbon Neutrality Initiative, which commits the University to achieving climate neutrality from Scope 1 and 2 sources by 2025 and climate neutrality from specific Scope 3 sources by 2050 or sooner. Scope 1 emission sources include direct emissions from sources owned or controlled by the University, while Scope 2 sources include indirect emissions from purchased electricity and purchased cogeneration for heating or cooling. The specific Scope 3 sources include emissions from campus commutes and business air travel. These goals have been incorporated into the updated Sustainability Policy presented above.

#### **American College and University Presidents Climate Commitment**

The University of California has also signed the American College and University Presidents Climate Commitment (ACUPCC). Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon

as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the U.S. Green Building Council’s LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution’s electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution’s endowment is invested; and adopting measures to reduce waste.

**UC Merced Sustainability Strategic Plan 2017-2022**

In 2017, UC Merced released a Sustainability Strategic Plan to describe its approach to achieving its sustainability goals. The ambitious central focus of the plan is the achievement of zero net energy usage, zero landfill waste, and zero net greenhouse gas emissions by 2020. Not only does the plan provide campus principles related to sustainability, but it also provides insight about the specific actions that will allow UC Merced to maintain its principles and meet its goals, even as the campus rapidly expands. Many of the actions laid out in the plan indirectly benefit GHG reduction efforts but the action items listed below focus specifically on GHG reduction on the campus.

Goal Transportation: Increase alternative modes of transportation usage among campus constituency and reduce the carbon footprint of transportation, parking, and fleet services.

Action 3 Greenhouse Gas (GHG) Reduction: Develop GHG emission reduction goals for campus fleet.

Goal Climate Protection: Achieve carbon neutrality by 2020.

Action 2 Renewables: Utilize renewable power options to mitigate and reduce greenhouse gas impact.

**UC Merced Climate Action Plan**

The first UC Merced Climate Action Plan (CAP) was adopted in 2009 to promote two long-term campus goals: (1) to reach zero net energy by 2020; and (2) to be climate neutral, with respect to on- and off-campus emissions. In 2018, UC Merced developed an updated CAP which builds on the previous CAP and extends out to 2025. The 2018 CAP notes that UC Merced’s’ approach to mitigating its climate effects is to:

- Save as much energy as is economically feasible
- Generate from on-site renewable sources as much energy as is consumed annually (net zero energy)
- Continue participating in the University's Wholesale Power Program which will bring the campus 97 percent clean energy through the grid by 2020
- Offset remaining GHG emissions, prioritizing on-site and regional offsets (climate neutrality)

The 2018 CAP describes the current energy saving infrastructure at the campus, which consists of central cooling, thermal energy storage, and central heating for primary academic buildings, and notes that UC Merced intends to continue this basic strategy to provide heating and cooling to future campus development. Regarding new building design, the 2018 CAP notes that UC Merced has committed to energy efficient design (that all new buildings will be designed to consume half the energy and demand of other University buildings in California, surpass Title 24 by 20 percent, and achieve all LEED credits for optimizing energy efficiency). UC Merced also implements a number of programs to inform and sensitize building occupants to energy consumption and conservation and implements a building maintenance program to optimize building operations. UC Merced is also pursuing a small number of building energy efficiency projects to further reduce energy use.

In view of its goal to achieve Net Zero Energy by 2020 for on-campus facilities, UC Merced developed a 1 megawatt (MW) solar photovoltaic array. The array produces about 12 percent of the total annual campus electricity consumed and 22 percent of the peak load. A second 4.2 MW solar array project was completed and became operational in January 2019. UC Merced is also pursuing a landfill gas-to-energy project with Merced County Regional Waste Management Authority whereby landfill gas that is currently burnt off at the Highway 59 landfill would be piped to the campus and used in microturbines to generate electricity and for hot water generation that would serve a portion of the campus; the project would allow UC Merced to discontinue its use of three hot water boilers that operate on natural gas. UC Merced is one of 10 campuses that is provided electricity by the University under its Wholesale Power Program (WPP).<sup>6</sup> In furtherance of its commitment to be net zero by 2020, by 2021, 100 percent of the electricity provided to the campus via the grid under the WPP will be clean renewable energy. Finally, the Campus is implementing a number of transportation demand management (TDM) programs to minimize transportation-related emissions. The existing and future TDM programs are described below.

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<sup>6</sup> University of California. January 26, 2018. *Sustainability wins for UC, California in 2017*. Available online at: <https://www.universityofcalifornia.edu/news/sustainability-wins-uc-california-2017>.

### UC Merced Transportation Demand Management Program

The Campus implements a number of TDM measures to minimize vehicle trips and associated air emissions, including GHG emissions. Existing and future TDM measures are listed below.

#### *Existing TDM programs*

- Subsidized transit
- Ridesharing and Carsharing opportunities
- Carpool and vanpool incentives
- Emergency Ride Home Program (for employees)
- Bicycle incentives
- Marketing/Educational campaigns focused on alternative transportation options
- Increased the number of clean air commuter permits for eligible carpools to promote ridesharing
- Secured grants to fund purchase of fuel efficient and low emission fleet vehicles
- Electric charging stations in the North Bowl, LeGrand and Library Lots
- Annual surveying of campus community commuting patterns
- Information table at both New Student Orientations (NSO) and New Employee Orientations (NEO)
- ZipCar self-service, on-demand car sharing & Zimride rideshare and commute programs

#### *Programs under development*

- Bicycle program
- Refinement of marketing and advertising campaign of "UC Merced Commuter Club" to increase participation in alternative transportation initiatives
- Increase the number of electric charging stations for electric carts

#### *Future Goals*

- Expansion of hybrid and/or battery-operated fleet
- Reduction of Single Occupancy Vehicle (SOC) Vehicle Miles Traveled (VMT) rates through aggressive marketing and development of incentives to participate in alternative transportation programs (i.e. message boards, departmental competitions)

- Adapt a clean-fleet procurement policy
- Standardize fleet ordering cycles
- Zero-emission vehicle incentives

#### 4.3.4 Impacts and Mitigation Measures

##### *Significance Criteria*

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, impacts related to GHG emissions would be significant if implementation of the 2020 LRDP 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.

The *State CEQA Guidelines* include Section 15064.4, which states that, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

As discussed above, the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* sets forth the approach and thresholds that may be used by lead agencies to evaluate a project's GHG impact. The Guidance notes that "Projects not implementing BPS would require quantification of project specific GHG emissions and demonstration that project specific GHG emissions would be reduced or mitigated by at least 29 percent compared to Business as Usual (BAU), including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in ARB's AB 32 Scoping Plan. Projects achieving at least a 29 percent GHG emission reduction compared to BAU would be determined to have a less than significant

individual and cumulative impact for GHG. In light of the *Center for Biological Diversity et al. v California Department of Fish and Wildlife, the Newhall Land and Farming Company* (Newhall Ranch) court ruling<sup>7</sup> and the more recent *Golden Door Properties v County of San Diego* court ruling,<sup>8</sup> the SJVAPCD thresholds of significance cannot be justifiably used to evaluate the proposed project's impacts, because the 29 percent below (BAU threshold is based on the ARB's statewide assessment and does not include project- or area-specific criteria. Consequently, the threshold set forth by the SJVAPCD is not used in this analysis.

Instead, using emission reduction goals set forth in AB 32 and SB 32 and UC Merced's 2005 GHG emissions as baseline, campus-specific thresholds were developed. Two approaches were used: the first one involving a total emissions threshold, and the second one involving an efficiency threshold based on per capita emissions.

### Total Emissions Threshold

As set forth in **Table 4.3-3** below, according to AB 32 and SB 32, the state's 2020 emissions must be reduced to be equal to 1990 emissions, and by 2030 to be 40 percent below 1990 emissions. These cannot be applied directly to UC Merced as the campus did not become operational until 2005. To estimate the 2020 target emissions for UC Merced, the campus' 2005 emissions were reduced by 15 percent. This was done based on the statewide guidance that in order to ensure that 2020 emissions equal 1990 emissions, between 1990 and 2020, the state's emissions must be reduced by about 30 percent. From that it follows that between 2005 and 2020, a 15 percent reduction must be achieved to attain the 2020 target.

**Table 4.3-3  
State GHG Reduction Targets and Campus Thresholds**

	1990	2005	2020	2030
State Targets from AB 32 and SB 32	NA	NA	Equal to 1990 emissions	40 percent less than 2020 emissions
Campus Total Emissions Targets	NA	6,469 MTCO <sub>2e</sub> /year	5,498 MTCO <sub>2e</sub> /year	3,299 MTCO <sub>2e</sub> /year

Source: *Impact Sciences and Barati Consulting 2019.*

<sup>7</sup> Center for Biological Diversity et al. vs. California Department of Fish and Wildlife, the Newhall Land and Farming Company (November 30, 2015, Case No. S217763)

<sup>8</sup> In *Golden Door Properties v. County of San Diego*, the court ruled that the efficiency threshold developed by the San Diego Air Pollution Control District (SDAPCD) is not an appropriate threshold because SDAPCD used only state data to develop its efficiency threshold of 4.9 MTCO<sub>2e</sub> per service person per year. Instead SDAPCD should use local data from the air district to determine the San Diego specific efficiency threshold. Therefore, the SDAPCD efficiency threshold cannot be used to determine if projects would meet state GHG reduction targets.

Having calculated the 2020 target for the campus, that number was reduced by 40 percent to arrive at the 2030 target for the campus, which is 3,299 MTCO<sub>2e</sub>/year. This target level, rounded to 3,300 MTCO<sub>2e</sub>/year, is used as a threshold in this SEIR to evaluate whether the increased campus emissions with the implementation of the 2020 LRDP would result in a significant GHG impact.

### **Per Capita Threshold**

Similarly, a per capita rate or efficiency factor was calculated for the campus. Using the campus' 2005 GHG emissions and the campus population at that time, a per capita emissions rate or efficiency factor of 4.78 MTCO<sub>2e</sub> per capita/year was calculated for 2005. Next, the calculated 2005 efficiency factor was reduced by 15 percent to obtain the 2020 efficiency factor. Finally, an efficiency factor for 2030 was calculated by reducing the calculated 2020 efficiency factor by 40 percent. A target rate of 2.44 MTCO<sub>2e</sub> per capita/year was developed for 2030.

### ***Issues Not Discussed Further***

All of the CEQA checklist items listed above are addressed in the analysis below.

### ***Methodology***

As noted above, *State CEQA Guidelines* require that the impact from a project's GHG emissions, emitted directly or indirectly, be evaluated. Direct emissions are those that are emitted on a project site whereas indirect emissions are those that are emitted off-site, such as those associated with vehicular traffic, electricity generation, etc. The Office of Planning and Research has noted that lead agencies "should make a good-faith effort, based on available information, to calculate, model, or estimate... GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities" (OPR 2017). Therefore, direct and indirect emissions were calculated for full development of the campus by 2030 under the 2020 LRDP. Construction emissions were also calculated. The methodology used to estimate operational and construction emissions is described below.

### **Operational Emissions**

The 2020 LRDP is a comprehensive land use plan to guide physical development at UC Merced through 2030. The 2020 LRDP describes a development program of approximately 1.83 million gross square feet of new building space through 2030. The 2020 LRDP also estimates and reports the daily population that is expected to be present on the campus in 2030. According to the 2020 LRDP, a daily population of 11,280 persons is projected for the campus in 2030. Implementation of the 2020 LRDP would result in the

construction of new buildings, a growth in campus programs and population, and an associated increase in GHG emissions.

Since 2009, UC Merced has been routinely estimating and reporting Scope 1, Scope 2, and Scope 3 (commuting only) emissions to the California Climate Action Registry each year. These reported emissions were obtained from UC Merced and used to estimate the historical (2005) and the future 2020 and 2030 GHG emissions that would result from UC Merced operations. Year 2005 emissions were estimated as this was the first year of campus operation and is the baseline that is used in the analysis to establish future GHG emissions targets for the campus that are consistent with AB 32 and SB 32 goals. Year 2020 emissions were estimated to show the campus's progress towards the AB 32 and SB 32 targets, and year 2030 emissions were estimated as they represent the campus's total emissions at full development of the campus under the 2020 LRDP.

***Scope 1 Emissions (Area Sources, Fleet Vehicles, and Fugitive Emissions)***

Scope 1 emissions include emissions that are emitted on the site of a project or property and result from combustion of fossil fuels in on-site equipment and vehicles, as well as fugitive emissions. At UC Merced, on-site emissions are mostly the result of natural gas combustion in the campus central plant and the campus dining center, and from combustion of fuel in campus fleet vehicles (note that there could be negligible emissions from other area sources that were not included in this assessment).

UC Merced's total Scope 1 emissions for the years 2009 through 2017 were obtained from the UC Merced Energy, Engineering & Sustainability Office (Campus Sustainability Office). Scope 1 GHG emissions from natural gas combustion were computed by the Campus Sustainability Office based on the amount of natural gas used on the campus each year and an emission factor of 0.00530 MTCO<sub>2e</sub> /therm. The campus' fleet emissions were calculated by inputting gallons of gas equivalent used by fuel type. For each year of analysis, i.e., 2005, 2020, and 2030, Scope 1 emissions were estimated by deriving a per capita rate for the study year based on the average growth in per capita emissions obtained from the reported Scope 1 emissions for years 2009 through 2017 and multiplying the rate with the total population for that year.

***Scope 2 Emissions (Electricity)***

Scope 2 emissions for the years 2009 through 2017 were obtained from the Sustainability Office. Historically, the Sustainability Office computed GHG emissions that would result from the campus' use of electricity by multiplying the campus' average annual electricity consumption with an emissions factors from U.S. EPA and/or PG&E. Because all of the purchased electricity that is used on the campus is purchased under the University's WPP and contains a high percentage of renewables, to estimate year

2017 Scope 2 emissions, the Sustainability Office used an emission factor of 0.000224 MTCO<sub>2</sub>e/kWh provided by the University.

For each year of analysis, i.e., 2005, 2020, and 2030, Scope 2 emissions were estimated by deriving a per capita rate for the study year based on the average growth in per capita emissions obtained from the reported Scope 2 emissions for years 2009 through 2017 and multiplying the rate with the total population for that year.

### ***Scope 3 Emissions***

#### *Commuting*

Scope 3 commuting emissions for the year 2009 through 2017 were obtained from the Sustainability Office. The Sustainability Office computes Scope 3 emissions associated with student, faculty and staff travel by estimating the miles driven based on zip code data of campus population with registered parking permits and an emission factor of 0.000420 MTCO<sub>2</sub>e/mile. Similar to Scopes 1 and 2, Scope 3 emissions were estimated by applying the average growth in per capita emissions obtained from the reported Scope 3 emissions for years 2009 through 2017 and interpolating emissions for 2005. However, commuting emissions for 2020 and 2030 were calculated using the per capita emissions rate derived from 2017 commuting emissions. This is conservative as per capita commuting emissions will continue to decrease due to fuel efficiency, ZEV vehicles, and other improvements.

#### *Water*

Historic water use data was provided by UC Merced for the years 2012 to 2015. The average growth in water use was derived from this data. Using the campus populations for years 2005, 2020 and 2030 and the average growth in water use, the water use for 2005, 2020, and 2030 was calculated. Emissions were then estimated by applying the U.S. EPA eGRID emission factor for water to the water use estimates.<sup>9</sup>

#### *Wastewater and Solid Waste*

Existing wastewater GHG emissions were calculated using existing wastewater generation data for the campus for 2016 and the formulas provided by the California Air Resources Board Local Government Operations Protocol for quantifying GHG emissions. As UC Merced was able to provide only one year of wastewater data (2016), an average growth in wastewater generation could not be derived. So, the per capita rate for 2016 was applied to the other years of analysis as a static factor to an increasing

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<sup>9</sup> U.S. EPA. 2012. *eGRID 2012 Version 1.0*. May.

population, which results in increased emissions. This provides a conservative estimate of wastewater emissions.

Solid waste emissions were calculated by applying per capita rates of solid waste and using the solid waste calculation methodology provided by the United Nations Framework Convention on Climate Change Clean Development Mechanism.

### **Construction Emissions**

GHG emissions due to construction under the 2020 LRDP were quantified using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model is considered by the SJVAPCD to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from development projects throughout California (CalEEMod 2018). As set forth in greater detail in **Section 4.1, Air Quality**, land use types and size, construction schedule, assumptions of construction equipment usage and truck trips, were input to CalEEMod. As construction of the ongoing UC Merced 2020 project would be completed in 2020, it is anticipated that new facilities under the 2020 LRDP would be constructed after 2020. Therefore, for purposes of estimating construction GHG emissions, it was assumed that campus facilities under the 2020 LRDP would be constructed between January 2021 and December 2030.

#### **4.3.5 LRDP Impacts and Mitigation Measures**

**LRDP Impact GHG-1: Implementation of the 2020 LRDP would generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment. (Significant; Less than Significant with Mitigation)**

#### ***Construction GHG Emissions***

Emissions associated with construction would occur throughout the timeframe of the 2020 LRDP from January 2021 to December 2030. Project construction activities would include site preparation, grading, building construction, pavement and asphalt installation, landscaping and hardscaping, and architectural coatings. Based on the results of CalEEMod modeling, approximately 6,118 MTCO<sub>2e</sub> of GHG emissions would be emitted during the approximately 10-year project construction period, which is about 612 MTCO<sub>2e</sub>/year. With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to result in substantial GHG emissions during construction.

Neither the University nor any of the air districts, including SJVAPCD, has set forth quantitative thresholds for the evaluation of construction-phase GHG emissions. Construction GHG estimates are presented for informational purposes only.

### *Operational GHG Emissions*

2020 LRDP Implementation of the 2020 LRDP would contribute to long-term cumulative increases in GHG emissions as a result of additional buildings and people on the campus. Sources of new emissions would include building heating, cooling and lighting systems, water use, wastewater generation, solid waste generation, as well as increases in traffic to the campus. These sources would represent the great majority of GHG emissions that would be produced in association with the proposed project, because the campus does not, and would not as part of the implementation of the 2020 LRDP, emit industrial or agricultural gases. Thus, the campus would generate little in the way of GHGs other than carbon dioxide. While certain research activities on the campus may involve the emission of other GHGs, these activities typically result in minimal GHG emissions.

**Table 4.3-3, Estimated UC Merced Operational GHG Emissions**, presents the historical (2005), existing (2017), and projected 2020 and 2030 GHG emissions for the campus. The 2020 and 2030 emissions reflect BAU growth of the campus under the 2020 LRDP and exclude measures that may be implemented to comply with the Sustainability Policy. The one exception is emissions from the use of electricity which are reported as zero emissions. This is accurate because after 2020, UC Merced's total electricity needs will be met by on-site generation of renewable energy and purchase of electricity from the grid that is 100 percent from renewable sources. As shown in **Table 4.3-4**, area sources and commuting are the top two sources of GHG emissions at the campus.

Compliance with the Sustainability Policy will have the effect of reducing UC Merced's total emissions. Further, the Campus' Sustainability Strategic Plan and the CAP, which are aligned with the Sustainability Policy, include numerous provisions that will substantially reduce the increase in the campus' GHG emissions, as the campus grows.

- The plans encourage use of transit and alternative transportation modes, which has helped and will continue to reduce transportation-related GHG emissions, relative to the emissions that would occur without these plans.

- Individual projects under the 2020 LRDP would implement GHG emission reduction strategies consistent with the applicable provisions of the Sustainability Policy, which include green building design, sustainable building operations, sustainable transportation, and sustainable water systems.<sup>10</sup>
- UC Merced will also implement other campus-wide energy saving programs.

Therefore, it is reasonable to assume that the increase in annual emissions due to LRDP implementation would be much lower than the numbers reported in **Table 4.3-4**.

**Table 4.3-4**  
**Estimated UC Merced Operational GHG Emissions (in MTCO<sub>2e</sub>)**

GHG Emissions Source	Historical 2005 Emissions	Existing 2017 Emissions	Future 2020 Emissions	Future 2030 Emissions
<b>Direct Sources</b>				
Scope 1 Area Sources <sup>a</sup> and Campus Fleet	1,341	4,045	4,044	3,160
Total Direct	1,341	4,045	4,044	3,160
<b>Indirect Sources</b>				
Scope 2 Electricity	2,519	2,740	0 <sup>c</sup>	0
Scope 3 Commuting	2,131	2,895	3,497	4,994
Scope 3 Water Supply <sup>b</sup>	349	53	34	8
Scope 3 Wastewater <sup>b</sup>	4	26	31	44
Scope 3 Solid Waste	126	721	817	944
Total Indirect	5,129	6,435	4,379	5,990
<b>All Sources</b>				
Total (direct and indirect)	6,469	10,479	10,712	10,137

Source: Impact Sciences and Barati Consulting 2019.

Notes:

- Area source emissions based on natural gas combustion on the campus.
- UC Merced also reports Scope 3 business air travel and Scope 3 business ground travel emissions, which are not included in this table as those emissions sources are not typically analyzed under CEQA. In contrast, the Campus does not report Scope 3 water supply wastewater and solid waste emissions; however, those emissions are included in this table since guidance put forth by the CARB states that GHG emissions from these sources should be included in the estimated GHG emissions under CEQA.
- By 2020, UC Merced and MCRWMA anticipate to complete a landfill gas to energy project that would involve the conveyance of treated landfill gas (methane) to the campus to operate three to four microturbines to generate electricity and hot water, while also allowing UC Merced to discontinue the use of three natural gas fired hot water boilers. Although combustion of methane in the microturbines would result in GHG emissions, overall the project would result in less GHG emissions than are currently produced at the landfill from the flaring of landfill gas (MCRWMA 2019).

**Table 4.3-5, Comparison of Projected Emissions to Thresholds**, below reports UC Merced historic, existing and projected 2020 and 2030 emissions both in terms of both total emissions as well as per capita emissions. It also reports UC Merced's 2030 targets both in terms of a total emissions target and a per capita target; these targets are used in this SEIR as thresholds of significance. As the table shows, the campus' per capita emissions in 2030 would be well below the per capita target for 2030. Note that the 2017 Scoping Plan encourages the use of per capita targets for purposes of planning for GHG reductions

<sup>10</sup> The UC Policy on Sustainable Practices is periodically updated and expanded. The current full text can be viewed on-line at <http://www.ucop.edu/ucophomc/coordrev/policy/PP032207ltr.pdf> or obtained through the University-wide Policy Office, Office of the President, 1111 Franklin Street, 12th Floor, Oakland, CA 94607.

and provides a per capita rate of 6.0 MTCO<sub>2e</sub>/capita for year 2030 (along with 2.0 MTCO<sub>2e</sub>/capita for 2050). The campus' per capita emissions in 2030 would be well below the Scoping Plan 2030 per capita rate as well as the UC Merced 2030 per capita target.

However, if the campus' total emissions in 2030 are compared to the corresponding total emissions target, the emissions would exceed the target. As **Table 4.3-5** shows, the campus' total emissions in 2030 would be about 10,137 MTCO<sub>2e</sub>/year. To be compliant with SB 32, the campus' 2030 emissions would need to be about 3,300 MTCO<sub>2e</sub>/year. As the campus' emissions would exceed this target, this represents a significant impact.

**Table 4.3-5  
Comparison of Projected Emissions to Thresholds**

GHG Emissions Source	Historic 2005 Emissions	Existing 2017 Emissions	2020 Emissions	Future 2030 Emissions
<b>Comparison to 2030 Threshold Based on Total Emissions (MTCO<sub>2e</sub>/year)</b>				
Total Emissions	6,469	10,479	10,712	10,137
UC Merced 2030 Total Emissions Target (based on AB 32 and SB 32)	-	-	-	3,300
Total Emissions Target Met?	-	-	-	NO
<b>Comparison to Thresholds Based on Per Capita Emissions (MTCO<sub>2e</sub>/service person/year)</b>				
Total Emissions	6,469	10,479	10,712	10,137
Total Campus Population	1,352	9,417	11,280	16,111
Per Capita Emissions	4.78	1.11	0.95	0.63
UC Merced 2030 Per Capita Target (based on AB 32 and SB 32)	-	-	-	2.44
Per Capita Target Met?	-	-	-	YES

Source: *Impact Sciences and Barati Consulting 2019.*

As discussed above, the Sustainability Policy requires every campus to achieve Climate neutrality from Scope 1 sources (such as campus heating and cooling systems and campus fleet) and 2 sources (purchased electricity) by 2025. Further, it states that campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals. With respect to off-campus electricity, the policy states that by 2025, the University will rely on 100 percent clean electricity supplies. Campuses served directly by the University's WPP began implementing clean-electricity supplies starting in 2017 and will transition to clean-electricity supplies by 2021. With regard to on-site combustion, the policy states that by 2025, at least 40 percent of the fuel used for on-site combustion will be low-carbon biogas. UC Merced will comply with the policy and is planning to install additional on-site renewable power generation sources such as solar arrays and by 2020, 100 percent of its off-campus electricity will be clean energy. As noted above, UC Merced is also planning to use landfill gas from the Merced County Highway 59 landfill to generate electricity and for water heating by 2020. The Campus has acknowledged that the hot water boilers in campus housing as well as in the

housing added under the 2020 Project will continue to be operated on natural gas and therefore, all of the existing Scope 1 emissions will not be eliminated. However, all new buildings constructed under the 2020 LRDP will be fully electric and hot water boilers will be either solar or electric. Therefore, UC Merced will not increase its Scope 1 emissions even as the campus grows. **Table 4.3-6** below reports the amount by which campus emissions would exceed the target in 2030 if only the Scope 2 emissions were eliminated and the amount of exceedance if both Scope 1 and Scope 2 emissions were eliminated.

**Table 4.3-6**  
**Exceedance of 2030 Target (in MTCO<sub>2</sub>e/year)**

GHG Emissions Source	2030 Emissions	2030 Emissions with Zero Scope 1 and 2 Emissions
Scope 1 Area Sources and Campus Fleet	3,160	0
Scope 2 Electricity	0	0
Scope 3 Commuting	4,994	4,994
Scope 3 Water Supply	8	8
Scope 3 Wastewater	44	44
Scope 3 Solid Waste	944	944
<b>Total</b>	<b>10,137</b>	<b>5,990</b>
Campus 2030 Emissions Target	3,300	3,300
Exceedance	6,837	2,690

Source: Impact Sciences and Barati Consulting 2019.

In both cases, the total emissions would exceed the targeted emission level of 3,300 MTCO<sub>2</sub>e/year, and the impact would be significant. To address this impact, **LRDP Mitigation Measure GHG-1a** is set forth below which requires UC Merced to implement additional measures to reduce its emissions, and if adequate reductions are not achieved, the mitigation measure requires UC Merced to purchase GHG offsets. UC Merced would also implement **LRDP Mitigation Measure AQ-2a**, which requires implementation of measures to reduce combustion emissions from a variety of sources, and **LRDP Mitigation Measure AQ-2b** to reduce mobile source emissions. Both measures would reduce GHG emissions. **LRDP Mitigation Measure GHG-1c** commits UC Merced to continue to evaluate and implement new technologies that would reduce its emissions.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to result in substantial GHG emissions during their operation.

**Mitigation Measures:**

**LRDP MM GHG-1a:** UC Merced shall set a goal to reduce or control the increase in its GHG emissions such that the total emissions do not exceed 3,300 MTCO<sub>2e</sub>/year by the end of the year 2030.

UC Merced shall monitor GHG emissions each year, monitor upcoming projects for their potential to increase the campus' GHG emissions, and implement project-specific and campus-wide GHG reduction measures to reduce the campus' GHG emissions in accordance with the 3,300 MTCO<sub>2e</sub>/year goal for 2030.

In the event that adequate reduction is not achieved by these measures, UC Merced shall purchase renewable energy credits, or other verifiable GHG offsets to keep the net emissions at or below 3,300 MTCO<sub>2e</sub>/year.

**LRDP MM GHG-1b:** UC Merced shall implement **LRDP Mitigation Measures AQ-2a and -2b**.

**LRDP MM GHG-1c:** UC Merced shall periodically review new technologies that can be implemented to further reduce the campus' GHG emissions.

**Significance after Mitigation:** As shown in **Table 4.3-6**, to achieve the 3,300 MTCO<sub>2e</sub>/year goal, UC Merced will need to reduce its 2030 emissions by about an amount ranging between about 2,690 and 6,837 MTCO<sub>2e</sub>/year which would not be a large reduction. Further, UC Merced has determined that it is feasible to purchase the required renewable energy credits and offsets. Therefore, with the implementation of **LRDP Mitigation Measures GHG-1a, 1b, and 1c**, the impact would be less than significant.

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**LRDP Impact GHG-2: Implementation of the 2020 LRDP would conflict with state law, UC Sustainable Practices Policy, and the UC Merced Climate Action Plan, adopted for the purpose of reducing the emissions of greenhouse gases. (Significant; Less than Significant with Mitigation)**

**State Laws**

AB 32 established the goal for the reduction of California's GHG emissions to 1990 levels by 2020. In 2015 and 2016, SB 350 and SB 32 were signed into law, establishing the state's mid-term target for 2030

emissions to be 40 percent below the 1990 emissions. In view of this mid-term target, as noted above, the 2017 Scoping Plan sets forth a target efficiency threshold of 6.0 MTCO<sub>2e</sub>/capita as applicable to plans through 2030. The analysis under **LRDP Impact GHG-1** above shows that with the implementation of the 2020 LRDP, on a per capita basis, the campus would emit 0.63 MTCO<sub>2e</sub>/capita/year in 2030. This is substantially below the state average rate of 6.0 MTCO<sub>2e</sub>/capita/year as well as the campus-specific rate of 2.44 MTCO<sub>2e</sub>/capita/year derived for the campus for compliance with SB 32. Furthermore, UC Merced would implement **LRDP Mitigation Measures GHG-1a, 1b, and 1c** to reduce its total emissions such that they are below 3,300 MTCO<sub>2e</sub>/year, a target emissions level that is 40 percent less than the campus' 2020 emissions target. Therefore, with mitigation, campus development under the 2020 LRDP, including small-scale projects developed on CMU, CBRSL or ROS lands, will not conflict with the state laws and regulations related to GHG emissions.

### ***UC Plans and Policies***

The 2020 LRDP is a projected development program for the Merced campus for the years 2020 through 2030. Under the plan, the campus is anticipated to add about 1.83 million square feet of building space by 2030. The campus population is projected to increase to about 17,400 persons by 2030. The addition of building space would increase the use of energy on the campus and the additional population would result in more persons commuting to the campus. Increased on-campus population would also increase water use, wastewater generation and solid waste generation. All of these changes would have the potential to increase the campus' GHG emissions. However, as under existing conditions, campus development under the 2020 LRDP would continue to be completed in a manner that it is compliant with the UC Sustainability Policy, UC Merced Sustainability Strategic Plan, and the UC Merced CAP. Campus projects under the 2020 LRDP will continue to achieve a minimum of a Silver rating under the LEED Green Building Rating System. UC Merced will continue to develop on-site renewable energy sources, procure clean energy, and obtain offsets as necessary, in compliance with **LRDP Mitigation Measure GHG-1a**. It would also continue to implement and expand TDM programs to minimize the increase in commuting and other emissions in compliance with **LRDP Mitigation Measures AQ-2a and -2b**, and evaluate and implement new technologies that reduce emissions, pursuant to **LRDP Mitigation Measure GHG-1c**. Therefore, with mitigation, implementation of the 2020 LRDP, including the small-scale projects that are less than 10,000 square feet in building space and/or 2 acres in ground disturbance, would not conflict with the UC Sustainability Policy or the UC Merced plans adopted to reduce GHG emissions.

### **Mitigation Measures:**

**LRDP MM GHG-2:** Implement **LRDP Mitigation Measures GHG-1a, 1b, and 1c**.

**Significance after Mitigation:** With mitigation, which includes purchase of offsets if needed, the impact would be reduced to a less than significant level.

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#### 4.3.6 Cumulative Impacts and Mitigation Measures

**Cumulative Impact C-GHG-1: Implementation of the 2020 LRDP would result in a significant cumulative GHG impact. (*Significant; Less than Significant with Mitigation*)**

As the impact from a project's GHG emissions is essentially a cumulative impact, and the methodologies and standards applied in the analysis presented above are designed to assess the cumulative significance of GHG emissions under the 2020 LRDP, the analysis presented above provides an adequate analysis of the cumulative impact related to GHG emissions from campus development under the 2020 LRDP. Based on the analysis under **LRDP Impact GHG-1**, the operational emissions from campus development under the 2020 LRDP would result in a significant cumulative impact.

**Mitigation Measures:**

**MM C-GHG-1:** Implement LRDP Mitigation Measures GHG-1a, 1b, and 1c.

**Significance after Mitigation:** With mitigation, which includes purchase of offsets if needed, the impact would be reduced to a less than significant level.

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