3.2 ENERGY

At the time the certified 2008 Campus Master Plan Update EIR was prepared, specific details related to energy use were not available and environmental impacts were evaluated to the extent possible given the level of project information available at the time. The 2008 EIR included a brief qualitative discussion of energy consumption in Chapter 5.0 as part of the analysis of the Master Plan's significant irreversible effects. The analysis disclosed that energy would be consumed as part of Master Plan implementation during both construction and operation, but would not be considered a wasteful use of resources. Consistent with the current CEQA standard of practice, this section provides a comprehensive, quantitative energy analysis of the current proposed project.

3.2.1 Environmental Setting

Electricity

California consumed approximately 257,268 megawatt hours of electricity in 2017 (U.S. Energy Information Administration 2019a). Approximately 41 percent of electricity was consumed by residential users and 41 percent by commercial users. Industrial users consumed approximately 17 percent of electricity and approximately 1 percent was used to power vehicles. Electricity in the project area is provided by the Southern California Edison (SCE), which serves approximately 180 cities in 15 counties across Central and Southern California. SCE's energy portfolio is made up of approximately 34 percent unspecified sources of power (i.e., electricity from transactions that are not traceable to specific generation sources), 32 percent renewables (wind, solar, eligible hydroelectric, and geothermal), 20 percent natural gas, 8 percent large hydroelectric, and 6 percent nuclear (Southern California Edison 2018). In 2015, SCE delivered approximately 87 billion kilowatt-hours (kWh) of electricity to its 50,000-square-mile service area; this is due, in part, to energy efficiency measures such as LED lightbulb adoption (Southern California Edison n.d.). Demand forecasts for the SCE service area anticipate that approximately 75 billion kilowatt hours of electricity will be used in 2020 (California Public Utilities Commission 2018).

Natural Gas

California consumed approximately 2,188.7 trillion British Thermal Units (btus) of natural gas in 2017 (U.S. Energy Information Administration 2019a). Approximately 37 percent of natural gas was consumed by industrial users, followed by 29 percent for electric power generation, 21 percent for residential, 12 percent for commercial, and 1 percent for vehicle fuel in 2017 (U.S. Energy Information Administration 2019b). Natural gas is currently provided to the project site by the Southern California Gas Company (SoCalGas). According to the 2018 California Gas Report, SoCalGas is expected to provide an average of 2,519,000,000 thousand btus (kBtu) per day by 2022. SoCalGas anticipates total gas demand to decline at an annual rate of 0.74 percent from 2018 to 2035. This decline in throughput demand can be attributed to modest economic growth, California Public Utilities Commission (CPUC) energy efficiency standards mandates and programs, tighter standards created by revised Title 24 Codes and Standards, renewable electricity goals, the decline in commercial and industrial demand, and conservation savings linked to Advanced Metering Infrastructure (California Gas and Electric Utilities 2018).

Petroleum

California was the fourth largest producer of crude oil among the 50 states in 2017, after Texas, North Dakota, and Alaska, and, as of January 2018, third in oil refining capacity after Texas and Louisiana. In 2018, California produced approximately 169,166 thousand barrels of crude oil

(U.S. Energy Information Administration 2018). In California, approximately 15.1 billion gallons of gasoline and 4.2 billion gallons of diesel, including off-road diesel were sold and consumed in 2015. Approximately 97 percent of all gasoline consumed in California is utilized by light-duty cars, pickup trucks, and sport utility vehicles. Nearly all heavy-duty trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction, and heavy-duty military vehicles have diesel engines (California Energy Commission n.d.).

3.2.2 Regulatory Setting

Federal

Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the Act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 *Federal Register* 62624–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law. In addition to setting increased Corporate Average Fuel Economy standards for motor vehicles, the EISA includes the following provisions related to energy efficiency:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Sections 301–325)
- Building Energy Efficiency (Sections 411–441)

This federal legislation requires ever-increasing levels of renewable fuels (the RFS) to replace petroleum. The United States Environmental Protection Agency is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States. As required under the Act, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the EISA, the RFS program was expanded in several key ways that lay the foundation for achieving significant reductions in greenhouse gas (GHG) emissions from the use of renewable fuels, reducing imported petroleum, and encouraging the development and expansion of the renewable fuels sector in the United States. The updated program is referred to as "RFS2" and includes the following:

- EISA expanded the RFS program to include diesel, in addition to gasoline.

- EISA increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion.

- EISA established new categories of renewable fuel, and set separate volume requirements for each one.

- EISA required the United States Environmental Protection Agency to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

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

State

Warren-Alquist Act

The California Legislature passed the Warren-Alquist Act in 1974. The Warren-Alquist Act created the California Energy Commission (CEC). The legislation also incorporated the following three key provisions designed to address the demand side of the energy equation:

- It directed the CEC to formulate and adopt the nation's first energy conservation standards for both buildings constructed and appliances sold in California.

- The Act removed the responsibility of electricity demand forecasting from the utilities, which had a financial interest in high-demand projections, and transferred it to a more impartial CEC.

- The CEC was directed to embark on an ambitious research and development program, with a particular focus on fostering what were characterized as non-conventional energy sources.

State of California Energy Action Plan

The CEC and CPUC approved the first State of California Energy Action Plan in 2003. The plan established shared goals and specific actions to ensure that adequate, reliable, and reasonably priced electrical power and natural gas supplies are provided, and identified policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers. In 2005, a second Energy Action Plan was adopted by the CEC and CPUC to reflect various policy changes and actions of the prior 2 years.

At the beginning of 2008, the CEC and CPUC determined that it was not necessary or productive to prepare a new energy action plan. This determination was based, in part, on a finding that the state's energy policies have been significantly influenced by the passage of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 (discussed below). Rather than produce a new energy action plan, the CEC and CPUC prepared an "update" that examines the state's ongoing actions in the context of global climate change.

Senate Bills 1078 (2002), 107 (2006), X1-2 (2011), 350 (2015), and 100 (2018)

Senate Bill (SB) 1078 established the California Renewables Portfolio Standard (RPS) Program and required that a retail seller of electricity purchase a specified minimum percentage of electricity generated by eligible renewable energy resources as defined in any given year,

culminating in a 20-percent standard by December 31, 2017. These retail sellers include electrical corporations, community choice aggregators, and electric service providers. The bill also required the CEC to certify eligible renewable energy resources, design and implement an accounting system to verify compliance with the RPS by retail sellers, and allocate and award supplemental energy payments to cover above-market costs of renewable energy. SB 107 (2006) accelerated the RPS established by SB 1078 by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010 (not 2017). Additionally, SB X1-2 (2011) requires all California utilities to generate 33 percent of their electricity from eligible renewable energy resources by 2020. Specifically, SB X1-2 sets a three-stage compliance period: by December 31, 2013, 20 percent had to come from renewables; by December 31, 2016, 25 percent had to come from renewables; and by December 31, 2020, 33 percent will come from renewables.

SB 350 (2015) expanded the RPS because it requires retail seller and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030, with interim goals of 40 percent by 2024 and 45 percent by 2027.

SB 100 (2018) accelerated and expanded the standards set forth in SB 350 by establishing that 44 percent of the total electricity sold to retail customers in California per year by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030 be secured from qualifying renewable energy sources. SB 100 also states that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100 percent of the retail sales of electricity to California. This bill requires that the achievement of 100 percent zero-carbon electricity resources does not increase the carbon emissions elsewhere in the western grid and that the achievement not be achieved through resource shuffling.

Consequently, utility energy generation from non-renewable resources is expected to be reduced based on implementation of the 60-percent RPS in 2030. Therefore, any project's reliance on non-renewable energy sources would also be reduced.

Assembly Bill 1007 (2005)

AB 1007 (2005) required the CEC to prepare a statewide plan to increase the use of alternative fuels in California (State Alternative Fuels Plan). The CEC prepared the plan in partnership with the California Air Resources Board (CARB) and in consultation with other state agencies, plus federal and local agencies. The State Alternative Fuels Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing significant degradation of public health and environmental quality.

Assembly Bill 32 (2006) and Senate Bill 32 (2016)

In 2006, the State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020. In 2016, the Legislature enacted SB 32, which extended the horizon year of the state's codified GHG reduction planning targets from 2020 to 2030, requiring California to reduce its GHG emissions to 40 percent below 1990 levels by 2030. In accordance with AB 32 and SB 32, CARB prepares scoping plans to guide the development of statewide policies and regulations for the reduction of GHG emissions. Many of the policy and regulatory concepts identified in the scoping plans focus on increasing energy efficiencies, using renewable resources, and reducing the consumption of petroleum-based fuels (such as gasoline and diesel). As such, the state's GHG emissions reduction planning framework creates co-benefits for energy-related resources.

California Building Standards

Part 6 of Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6 establishes energy efficiency standards for residential and non-residential buildings constructed in California to reduce energy demand and consumption. Part 6 is updated periodically to incorporate and consider new energy efficiency technologies and methodologies. The 2016 Title 24 building energy efficiency standards, which became effective on January 1, 2017, further reduce energy used in the state. In general, single-family homes built to the 2016 standards are anticipated to use approximately 28 percent less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5 percent less energy than those built to the 2013 standards. The 2016 Title 24 standards are the current applicable building energy efficiency standards, and became effective on January 1, 2017. The 2019 Title 24 standards will continue to improve upon the 2016 standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2019 standards will go into effect on January 1, 2020. Title 24 also includes Part 11, the California Green Building Standards (CalGreen). The CalGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The 2016 CalGreen standards became effective on January 1, 2017. The mandatory standards require the following:

- 20-percent mandatory reduction in indoor water use.
- 50-percent diversion of construction and demolition waste from landfills.
- Mandatory inspections of energy systems to ensure optimal working efficiency.

Integrated Energy Policy Report

The CEC is responsible for preparing integrated energy policy reports that identify emerging trends related to energy supply, demand, conservation, public health and safety, and maintenance of a healthy economy. The CEC's 2018 Integrated Energy Policy Report discusses the state's policy goals of decarbonizing buildings, doubling energy efficiency savings, and increasing flexibility in the electricity grid system to integrate more of renewable energy. Specific to the decarbonizing of building energy, the goal would be achieved by designing future commercial and residential buildings to source their energy almost entirely from electricity in place of natural gas. Regarding the increase in renewable energy flexibility, the goal would be achieved through increases in energy storage capacity within the state, increases in energy efficiency, and adjusting energy use to the time of day when the most amount of renewable energy is being generated. Over time as they are implemented, these policies and trends would serve to beneficially reduce the GHG emissions profile and energy consumption from projects.

State Vehicle Standards

In response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, AB 1493 was enacted in 2002. AB 1493 required CARB to set GHG emissions standards for passenger vehicles, light-duty trucks, and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emissions standards for motor vehicles manufactured in 2009 and all subsequent model years. The 2009-2012 standards resulted in a reduction in approximately 22 percent of GHG emissions compared to emissions from the 2002 fleet, and the 2013-2016 standards resulted in a reduction of approximately 30 percent.

In 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global-warming gases with requirements for greater numbers of zero-emissions vehicles into a single package of standards called Advanced Clean Cars. By 2025, when the rules would be fully implemented, new automobiles would emit 34 percent fewer global-warming gases and 75 percent fewer smog-forming emissions (CARB 2011). Although the focus of the state's vehicle standards is on the reduction of air pollutants and GHG emissions, one co-benefit of implementation of these standards is a reduced demand for petroleum-based fuels.

Sustainable Communities Strategy

The Sustainable Communities and Climate Protection Act of 2008, or SB 375, coordinates land use planning, regional transportation plans, and funding priorities to help California meet its GHG emissions reduction mandates established in AB 32. As codified in California Government Code Section 65080, SB 375 requires metropolitan planning organizations (e.g., the Southern California Association of Governments [SCAG]) to include a Sustainable Communities Strategy (SCS) in their Regional Transportation Plan (RTP). The main focus of the SCS is to plan for growth in a fashion that will ultimately reduce GHG emissions, but the strategy is also part of a bigger effort to address other development issues, including transit and vehicle miles traveled (VMT), which influence the consumption of petroleum-based fuels.

Local

Southern California Association of Governments

SCAG's first-ever SCS was included in the 2012-2035 RTP/SCS, which was adopted by SCAG in April 2012. The SCS goals and policies that reduce VMT (and result in corresponding decreases in transportation-related fuel consumption) focus on transportation and land use planning and include building infill projects, locating residents closer to where they work and play, and designing communities with access to high quality transit service. Subsequently, SCAG adopted the 2016-2040 RTP/SCS. The goals and policies of the 2016-2040 RTP/SCS are substantially the same as those in the 2012-2035 RTP/SCS.

SCAG's 2016-2040 RTP/SCS presents a long-term transportation vision through the year 2040 for the six-county region of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties. On April 7, 2016, the SCAG Regional Council adopted the 2016-2040 RTP/ SCS, the mission of which is "leadership, vision, and progress which promote economic growth, personal well-being, and livable communities for all Southern Californians." The 2016-2040 RTP/ SCS includes land use strategies that focus on urban infill growth and walkable, mixed-use communities in existing urbanized and opportunity areas. More mixed-use, walkable, and urban infill development would be expected to accommodate a higher proportion of growth in more energy-efficient housing types like townhomes, apartments, and smaller single-family homes, as well as more compact commercial buildings types. Furthermore, the 2016-2040 RTP/SCS includes transportation investments and land use strategies that encourage carpooling, increased transit use, active transportation opportunities, and promoting more walkable and mixed-use communities which would potentially help to offset passenger VMT.

3.2.3 Environmental Impact Analysis

3.2.3.1 Methodology

Appendix F of the CEQA Guidelines states that the goal of conserving energy implies the wise and efficient use of energy, to be achieved by decreasing overall per capita energy consumption; decreasing reliance on natural gas and oil; and increasing reliance on renewable energy resources. To assure energy implications are considered in project decisions, CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. Energy conservation implies that a project's cost effectiveness be reviewed in terms of energy requirements, not only dollar amount.

The air quality analysis prepared for the proposed project, included in Table 4-1 of Chapter 4, Other CEQA Topics, of this Supplemental EIR, includes a quantification of construction-related carbon dioxide equivalent (CO_2e) emissions using the California Emissions Estimator Model. These emissions were used to estimate construction energy from CO_2e emission factors derived for the CARB GHG emissions inventory. The 2018 Climate Registry indicates that for gasoline fuel, approximately 25.4 pounds of CO_2e are generated per gallon combusted, and for diesel fuel, approximately 29.8 pounds of CO_2e are generated per gallon combusted. The fuel consumption was estimated from the equipment and vehicles that would be employed in construction activities. Diesel engines are installed in heavy-duty off-road construction equipment and on-road haul trucks. Gasoline engines are typically found in passenger vehicles that would be used for construction worker daily commutes.

3.2.3.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the project would normally have a significant impact with respect to energy if it would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or,

- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

3.2.3.3 Impact Analysis

ENERGY-1: Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than Significant. The following analysis discusses short-term (construction) and long-term (operational) use of electricity, natural gas, and petroleum.

Electricity

Construction

Construction of the proposed project would require electricity for lighting, construction trailers, and operation of electrically powered hands tools. Electricity to the site would be provided by SCE and it is likely that most electrically powered equipment would connect to the grid. Consumption of

electricity for construction would be minimal and would cease after completion of the proposed project. Electricity use would be minimized to the extent feasible through incorporation of sustainability features and best management practices. Therefore, construction of the proposed project would result in a less than significant impact related to wasteful, inefficient, or unnecessary consumption of electricity.

Operation

The proposed project would be constructed as a Net Zero Energy (NZE) building in which 100 percent of the building's electricity needs on a net annual basis would be supplied by on-site renewable power generation. A total of approximately 400 solar PV panels would be installed on the roofs of the proposed HRL office building and commons building and central courtyard canopy to generate approximately 89 kilowatts of energy. In addition, the campus will seek full Living Building Challenge certification for the buildings, which is a performance-driven design standard for self-sufficient buildings that incorporates design elements that encourage a regenerative built environment, wherein a building generates more energy than it consumes. The proposed project would also seek to achieve a Leadership in Energy and Environmental Design (LEED) Platinum Rating, which is an internationally-recognized green building certification for buildings designed and built to be energy- and resource-efficient. Regardless of how much electricity is consumed on a daily or annual basis, project design features ensure that the proposed project would not result in wasteful, inefficient, or unnecessary consumption of electricity resources. Impacts would be less than significant.

Natural Gas

Construction

Construction activities typically do not require the consumption of natural gas to power equipment or heavy machinery. Natural gas that would be consumed during construction would be negligible and would not result in a significant drain on natural gas resources. Therefore, construction of the proposed project would result in a less than significant impact related to wasteful, inefficient, or unnecessary consumption of natural gas.

Operation

The proposed HRL office and commons buildings would be all electric, including heating, cooling, and hot water systems. The proposed project would not require natural gas consumption, and no natural gas would be used in the two buildings. Therefore, operation of the proposed project would result in no impact related to the wasteful, inefficient, or unnecessary consumption of natural gas.

Petroleum

Construction

Petroleum would be consumed during the demolition, excavation, and construction phases of the proposed project by heavy-duty equipment, which is usually diesel powered. Construction of the proposed project would result in an increased consumption of gasoline and diesel fuels associated with haul trucks, deliveries, and worker commute trips. Table 3.2-1 shows that a one-time expenditure of approximately 26,454 gallons of diesel fuel and 27,676 gallons of gasoline would be needed to construct the proposed project. Petroleum consumption during construction would be typical of urban infill projects and not excessive.

The proposed project would use best practices to eliminate the potential for the wasteful consumption of petroleum. Exported materials (e.g., demolition debris and soil hauling) would be disposed of at the closest facility that accepts such materials, and the proposed project would be required to comply with CARB's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes. Therefore, because petroleum use would be minimized to the extent feasible and represents a relatively small amount of fuel consumption, construction of the proposed project would result in a less than significant impact related to wasteful, inefficient, or unnecessary consumption of petroleum.

Table 3.2-1
Construction Petroleum Demand

Source	CO_2 (Metric Tons)	kg/CO_2/Gallon	Gallons
Diesel			
Equipment – Building Construction	185	10.21	18,119
Equipment – Road Construction	76	10.21	7,444
Trucks – Building Construction	6.8	10.21	666
Trucks – Road Construction	2.3	10.21	225
Total Diesel Consumption			26,454
Gasoline			
Worker Vehicles – Building Construction	218	8.78	24,829
Worker Vehicles – Road Construction	25	8.78	2,847
Total Gasoline Consumption			27,676

Note: Diesel and gasoline estimates for equipment and worker vehicles during building construction include the construction of the proposed HRL office building and proposed commons building.
Source: Terry A. Hayes Associates Inc. 2019.

Operation

Petroleum consumption during operation of the proposed project would be related to employee and student trips. The project proposes to demolish the existing 5,700-SF Hillside Office/ Commons building and construct two new buildings in its place: a two-story, 8,000-SF commons building and a single-story, 4,500-SF HRL office building. The net change in the number of employees and students utilizing the proposed project in relation to the existing Hillside Office/ Commons building would be negligible since the proposed HRL office and commons buildings would serve the same population the existing facility serves. Petroleum consumption would not substantially increase as a result of the proposed project. Additionally, as vehicle efficiency increases in future years, overall petroleum consumption will be reduced. Therefore, operation of the proposed project would result in a less than significant impact related to wasteful, inefficient, or unnecessary consumption of petroleum.

ENERGY-2: Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. There is no potential for the proposed project to interfere with plans for renewable energy or energy efficiency. The proposed project would seek to achieve an LEED Platinum Rating and the NZE design would supply 100 percent of energy needs on a net annual basis by on-site renewables. The design includes a total of 400 solar photovoltaic panels on the roofs of the two proposed buildings and the central courtyard canopy to generate approximately 89 kilowatts of energy in support of the NZE design. This would be in compliance with state and

local energy goals to increase renewable energy generation and energy efficiency. Therefore, the proposed project would result in no impact related to conflict of obstruction of a state or local plan for renewable energy or energy efficiency.

3.2.4 Mitigation Measures

No mitigation measures are required.

3.2.5 Level of Significance after Mitigation

No mitigation measures are required. The proposed project would result in less than significant impacts without mitigation.

3.2.6 Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with energy usage is SCE's electricity service area. Operation of the proposed project would not require the consumption of natural gas. Implementation of the proposed project when combined with cumulative development could increase electricity. However, state and local policies are increasingly requiring more efficient use of energy and all sectors of society are responding with more energy efficient devices that overall are anticipated to offset increased demand from increasing population. Furthermore, development emphasis on compact land use and growth patterns that facilitate transit and non-motorized transportation are anticipated to result in less energy consumption. While implementation of the proposed project could result in increased demand for energy, the impact to the energy resources would be negligible. The proposed project would incorporate energy efficient practices and would not result in wasteful or inefficient use of energy. Therefore, the proposed project would not make a cumulatively considerable contribution to impacts related to energy.