4.4 ENERGY CONSERVATION

This section discusses energy consumption and reviews the proposed Riverfront Project (Project) energy demand. Public and agency comments related to land use were received during the public scoping period in response to the Notice of Preparation (NOP). Issues raised in these comments include:

- California Coastal Commission (CCC) staff ask how the Project will generate its own renewable energy and effects on the region's overall energy use.
- A member of the public noted that energy calculations were not provided and that the Project is not installing solar panels. This commenter also recommended that night-time lighting control measures be incorporated into the Project.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the California Environmental Quality Act (CEQA) and/or are raised by responsible agencies, they are identified and addressed within this EIR. Public comments received during the public scoping period are included in Appendix A. It is noted that the Project does not include provision of renewable energy sources as part of the Project design.

4.4.1 Environmental Setting

Electricity and Natural Gas

Pacific Gas and Electric Company (PG&E) provides electrical and natural gas service to the City. Incorporated in California in 1905, PG&E is one of the largest combination natural gas and electric utilities in the United States. It currently provides service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east. The service area includes 106,681 circuit miles of electric distribution lines, 18,466 circuit miles of interconnected transmission lines. 42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines. PG&E and other utilities in the state are regulated by the California Public Utilities Commission (Pacific Gas and Electric Company 2020).

Monterey Bay Community Power (MBCP) was formed in March 2017 as a joint powers authority to provide locally controlled, 100% carbon-free electricity to residents and businesses in Monterey, San Benito and Santa Cruz Counties through the Community Choice Energy (CCE) model established by the State of California. The CCE model enables communities to choose clean-source power at a cost equivalent to PG&E while retaining PG&E's role in maintaining power lines and providing customer service. The CCE model helps ensure local economic vitality because surplus revenues that would normally flow to PG&E will stay in the community. MBCP started serving electricity to customers beginning spring 2018, with current PG&E customers automatically switched over. All "exit fees" charged by PG&E will be absorbed by MBCP at the time of

enrollment. Currently available PG&E programs, such as energy efficiency programs and CARE, will continue to be accessible by MBCP customers (Monterey Bay Community Power 2020).

According to the U.S. Energy Information Administration (EIA), California used approximately 257,268 gigawatt hours (GWh) of electricity in 2017 (EIA 2019a). Electricity usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. Due to the state's energy efficiency building standards and efficiency and conservation programs, California's electricity use per capita in the residential sector is lower than any other state except Hawaii (EIA, 2018).

PG&E customers consumed a total of 79,776 million of kilowatt hours (kWh) of electricity in 2018 (California Energy Commission [CEC] 2018a). In Santa Cruz County, PG&E reported an annual electrical consumption of approximately 1,207 million kWh in 2018, with 657 million kWh for non-residential use and 550 million kWh for residential use (CEC 2018b).

According to the EIA, California used approximately 2,110,829 million cubic feet of natural gas in 2017 (EIA 2019b). The majority of California's natural gas customers are residential and small commercial customers (core customers). These customers accounted for approximately 32% of the natural gas delivered by California utilities (CPUC 2019). Large consumers, such as electric generators and industrial customers (noncore customers), accounted for approximately 68% of the natural gas delivered by California utilities (CPUC 2019). CPUC regulates California natural gas rates and natural gas services, including in-state transportation over transmission and distribution pipeline systems, storage, procurement, metering, and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. California gas utilities may soon also begin receiving biogas into their pipeline systems (CPUC 2019).

PG&E customers consumed approximately 4,794 million therms of natural gas in 2018 (CEC 2018c). PG&E had delivered approximately 52 million therms to Santa Cruz County, with 21 million therms for non-residential use and 31 million therms for residential use (CEC 2018d).

Transportation-Related Energy Consumption

According to the EIA, California used approximately a total of 683 million barrels of petroleum in 2017, with the majority (585 million barrels) used for the transportation sector (EIA 2019c). This total annual consumption equates to a daily use of approximately 1.9 million barrels of petroleum. There are 42 U.S. gallons in a barrel, so California consumes approximately 78.6 million gallons of petroleum per day, adding up to an annual consumption of 28.7 billion gallons of petroleum. In California, petroleum fuels refined from crude oil are the dominant source of energy for transportation sources. Petroleum usage in California includes petroleum products such as motor gasoline, distillate fuel, liquefied petroleum gases, and jet fuel. California has implemented policies to improve vehicle efficiency and to support use of alternative transportation. As such,

the California Energy Commission (CEC) anticipates an overall decrease of gasoline demand in the state over the next decade.

Renewable Energy Resources

In 2014, California became the first state in the nation to get more than 5% of its utility-scale electricity generation from its solar resource (U.S. Energy Information Administration 2017) and in 2015, California ranked second in the nation in net electricity generation from all renewable energy resources other than hydroelectric and wind, and first as a producer of electricity from biomass, geothermal, and solar energy (Ibid.).

There are also over 2,000 residential solar photovoltaic (PV) systems and about 60 commercial solar PV systems that provide renewable electricity within the City. All residential, commercial, and industrial PG&E electricity accounts were opted into MBCP community choice energy program in 2018. Switching the City's overall electricity procurement to MBCP increased the proportion of electricity supplied from renewable sources from 30% (with PG&E) to 50% and eventually consumers may elect to pay a premium for electricity from 100% renewable sources.

Energy Efficiency and Conservation

Studies have demonstrated the value and cost-effectiveness of weather-stripping, replacing single pane windows, old appliances and lighting, and increasing insulation in reducing energy use and saving money. Significant energy and cost savings have already been achieved through the implementation of such measures throughout the City of Santa Cruz, although further savings could be achieved (City of Santa Cruz, October 2012). Over the past 15 years, the combined influences of energy efficiency rebate programs, a public education campaign, and significant increases in energy prices have led to a 22% reduction in energy use within Santa Cruz homes. While this drop in energy use is significant, home energy use in Santa Cruz is again on the rise, but still far below 1996 levels (Ibid.).

4.4.2 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 (NHTSA) 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 FR 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.

Safer Affordable Fuel-Efficient Vehicles Rule

In August 2018, the United States Environmental Protection Agency (EPA) and NHTSA proposed to amend certain fuel economy and greenhouse gas standards for passenger cars and light trucks and establish new standards for model years 2021 through 2026. Compared to maintaining the post-2020 standards now in place, the 2018 proposal would increase fuel consumption in the United States by about half a million barrels per day (2–3 % of total daily consumption, according to the Energy Information Administration) and would impact the global climate by 3/1000th of one degree Celsius by 2100 (EPA and NHTSA 2018). California and other states have stated their intent to challenge federal actions that would delay or eliminate GHG reduction measures and have committed to cooperating with other countries to implement global climate change initiatives.

On September 27, 2019, EPA and NHTSA published the "Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program." (84 Fed. Reg. 51,310), which became effective November 26, 2019. The Part One Rule revokes California's authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. On March 31, 2020, the EPA and NHTSA issued Part Two of the SAFE Rule, which will go into effect 60 days after being published in the Federal Register. The Part Two Rule sets CO_2 emissions standards and corporate average fuel economy standards for passenger vehicles and light duty trucks for model years 2021 through 2026. This issue is evolving as California and 22 other states, as well as the District of Columbia and four cities, filed suit against the EPA and a petition for reconsideration of the rule on November 26, 2019. The litigation is not expected to be resolved for at least several months.

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 other 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 (EPA 2017). The EPA 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 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 gallons in 2008 to 36 billion gallons by 2022.
- EISA established new categories of renewable fuel, and set separate volume requirements for each one.
- EISA required the EPA 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 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% standard by December 31, 2017. These retail sellers include electrical corporations, community choice aggregators, and electric service providers. The bill relatedly 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% 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% 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% had to come from renewables; by December 31, 2016, 25% had to come from renewables; and by December 31, 2020, 33% will come from renewables.

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

SB 100 (2018) accelerated and expanded the standards set forth in SB 350 by establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% 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% of the retail sales of electricity to California. This bill requires that the achievement of 100% 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% 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 a 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% 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 focused 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 and are currently applicable, reduce energy used in the state as compared to the previous standards.

The 2019 Title 24 standards were approved and adopted by the California Building Standards Commission in December 2018. The 2019 standards will become effective January 1, 2020. The standards would require that all low-rise residential buildings shall have a photovoltaic system meeting the minimum qualification requirements such that annual electrical output equal to or greater than the dwelling's annual electrical usage. Notably, net energy metering rules limit residential rooftop solar generation to produce no more electricity than the home is expected to consume on an annual basis. Single-family homes built with the 2019 standards will use about 7% less energy due to energy efficiency measures versus those built under the 2016 standards, while new nonresidential buildings will use about 30% less energy (CEC, 2018e).

Title 24 also includes Part 11, the California's 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% mandatory reduction in indoor water use
- 50% 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 (CEC 2018f). Specifically, for the decarbonizing of building energy, the goal would be achieved by designing future commercial and residential buildings to have their energy sourced 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 these policies and trends would serve to beneficially reduce the Project's GHG emissions profile and energy consumption as they are implemented.

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 the state board 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% of GHG emissions compared to emissions from the 2002 fleet, and the 2013–2016 standards resulted in a reduction of approximately 30%. 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. However, as described in Section 4.6.1, EPA's SAFE Vehicles Rule Part One, adopted in November 2019, revokes California's authority to set its own GHG emissions standards.

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 (MPOs) 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

In 2007, Santa Cruz became one of the first municipalities in the nation to require new construction to include the adoption of environmentally superior building materials and designs. Builders in Santa Cruz now use best practices for their construction projects that enhance building energy efficiency and water conservation as well as to improve air quality, waste reduction and recycling, and erosion and runoff control. The Green Building Program currently includes residential and commercial development Reviews conducted as part of the preparation of the City's Climate Action Plan (CAP) indicate that an "award-winning" home under the City's Green Building Program produces a home that is more efficient than standard homes built in 2008 and almost twice as efficient as homes built in 1990 (City of Santa Cruz, October 2012).

The Association of Monterey Bay Area Governments (AMBAG) Energy Watch Program is a partnership between AMBAG and PG&E, which seeks to reduce energy use in the Monterey Bay region by providing the resources listed below to eligible PG&E customers.

- energy assessments and audits
- direct installation of energy efficient equipment
- technical assistance and financial incentives for energy efficient retrofits in municipal buildings
- energy efficiency seminars and training courses in the region.
- information on other PG&E energy efficiency programs and services

AMBAG is the MPO for the Project region, which includes Monterey, San Benito, and Santa Cruz counties. In 2008, AMBAG adopted the Monterey Bay Regional Energy Plan, which provides a framework that local cities and counties can adopt or use as guidelines to reduce energy use (AMBAG, 2008). Also, AMBAG adopted the Monterey Bay 2040 Moving Forward – 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy (2040 MTP/SCS), the implementation of which is anticipated to achieve a 4 percent per capita reduction and nearly 7 percent per capita reduction in GHG emissions from passenger vehicles by 2020 and 2035, respectively (AMBAG, 2018). The 2040 MTP/SCS outlines the region's proposed transportation network, emphasizing multimodal system enhancements, system preservation, and improved

access to high quality transit, as well as land use development that complements this transportation network (AMBAG 2018). These transportation strategies would reduce VMT and associated petroleum fuels.

4.4.3 Impacts and Mitigation Measures

Standards of Significance

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines (including Appendix G), City of Santa Cruz plans, policies, and/or guidelines, and agency and professional standards, a project impact would be considered significant if the project would:

ENER-1 Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy, or

ENER-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Analytical Method

The California Emission Estimator Model (CalEEMod Version 2016.3.2) was used to estimate potential Project-generated GHG emissions during construction, which were then used to estimate energy consumption. Construction of the Project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. The estimated GHGs were back-calculated based on carbon content (i.e., kilogram CO_2 per gallon) in order to estimate fuel usage during Project construction. The conversion factor for gasoline is 8.78 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.21 kilograms per metric ton CO_2 per gallon (The Climate Registry 2018).

During Project operations, activities that would consume energy would include electricity and natural gas use for building operations, electricity for water and wastewater conveyance, and petroleum consumption from on-road vehicle trips. Energy consumption associated with the existing land uses to be demolished was also estimated in order to determine the net increase in energy usage.

Energy use calculations for construction and operations are provided in Appendix D.

Impacts and Mitigation Measures

Impact ENER-1: The Project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy. This is considered is a *less-than-significan*t impact.

Implementation of the Project would increase the demand for electricity and natural gas at the Project site and petroleum consumption in the region during construction and operation.

Electricity

Construction Use. Temporary electric power for as-necessary lighting and electronic equipment (such as computers inside temporary construction trailers and heating, ventilation, and air conditioning) would be provided by PG&E. Electrically powered hand-tools would also be used during construction. The vast majority of the energy used during construction would be from petroleum. The electricity used for such activities would be temporary and negligible; therefore, impacts would be *less than significant*.

Operational Use. The operational phase would require electricity for multiple purposes including building heating and cooling, lighting, appliances, electronics, and for water and wastewater conveyance. Default values for electricity consumption were applied to the existing uses to be demolished and the land uses to be developed under the Project. Table 4.4-1 presents the net increase in electricity demand for the Project.

Table 4.4-1: Estimated Electrical Demand – Operation

Scenario	Estimated Electrical Demand (kWh per year)
Existing Land Uses to be Demolished	254,308
Proposed Project	1,580,013
Net Increase in Demand (Project - Existing)	1,325,705

Source: Appendix D.
Notes: kWh = kilowatt-hour.

As shown in Table 4.4-1, the Project is estimated to have a total net increase in electrical demand of 1,325,705 kWh per year (or 1.33 million kWh per year) for facility usage and water/wastewater conveyance. This estimate is conservative since CalEEMod includes energy estimates per the 2016 Title 24 standards, whereas the Project would be required to be built in accordance with the current Title 24 standards (2019 standards at a minimum) at the time of construction and CALGreen. In comparison, for Santa Cruz County, electricity demand in 2018 was 1,207 million kWh (CEC 2018b). Therefore, due to the limited amount of electricity use for the Project compared to Santa Cruz County consumption and the increase in efficiency of new buildings constructed under current building code regulations, the amount of energy the Project is projected to use would not be considered wasteful. Impacts related to operational electricity use would be *less than significant*.

Natural Gas

Construction Use. Natural gas is not anticipated to be required during construction of the Project. Fuels used for construction equipment and vehicles would primarily consist of diesel and gasoline,

which are discussed under "Petroleum." Any minor amounts of natural gas that may be consumed as a result of Project construction would be temporary and negligible and would not be considered a wasteful use; therefore, impacts would be *less than significant*.

Operational Use. Natural gas consumption during operation would be required for various purposes, including building heating and cooling. For building consumption, default natural gas generation rates in CalEEMod for the existing land uses to be demolished and the proposed land uses under the Project were used. Table 4.4-2 presents the net increase in natural gas demand for the Project.

Table 4.4-2: Estimated Natural Gas Demand – Operation

Scenario	Estimated Natural Gas Demand (kBtu per Year)
Existing Land Uses to be Demolished	547,857
Proposed Project	4,028,751
Net Increase in Demand (Project - Existing)	3,480,894

Source: Appendix D.
Notes: kBtu = thousand British thermal units.

As shown in Table 2, the Project is estimated to have a total net increase in natural gas demand of 3,480,894 thousand British thermal units (kBtu) per year. For comparison, in 2018, PG&E had delivered approximately 52 million therms[1] (5.2 billion kBtu) to Santa Cruz County (CEC 2018d). This estimate is conservative since CalEEMod includes energy estimates per the 2016 Title 24, Part 6 standards, whereas the Project would be required to be built in accordance with the current Title 24 standards (2019 standards at a minimum) at the time of construction. Title 24, Part 11, contains additional energy measures that are applicable to the Project under CALGreen. Prior to Project approval, the applicant would ensure that the Project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Therefore, due to the limited amount of natural gas use for the Project compared to Santa Cruz County consumption, and the increase in efficiency of buildings constructed under current building code regulations, the amount of natural gas the Project is projected to use would not be considered wasteful.. Impacts related to operational natural gas use would be *less than significant*.

Petroleum

Construction Use. Petroleum would be consumed throughout construction of the Project. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, and VMT associated with the transportation of construction materials and construction worker commutes would also result in petroleum consumption. Heavy-duty construction equipment associated with construction activities would rely on diesel fuel, as would vendor trucks involved in transporting construction materials to the Project site. Construction

[1] One therm is equal to 100,000 Btu or 100 kBtu.

workers would travel to and from the Project site throughout the duration of construction. It is assumed in this analysis that construction workers' vehicles would be gasoline-powered.

There are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than that used for comparable activities, or equipment that would not conform to current emissions standards (and related fuel efficiencies).

Heavy-duty construction equipment of various types would be used during each phase of construction. CalEEMod was used to estimate construction equipment usage based primarily on model default assumptions, and results are included in Appendix A. Based on that analysis, over all phases of construction, diesel-fueled construction equipment would run for an estimated 11,332 hours, as summarized in Table 4.4-3.

Fuel consumption from construction equipment was estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. The conversion factor for gasoline is 8.78 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.21 kilograms per metric ton CO_2 per gallon (The Climate Registry 2018). The estimated diesel fuel use from construction equipment is shown in Table 4.4-4.

Table 4.4-3: Hours of Operation for Construction Equipment

Phase	Hours of Equipment Use
Demolition	800
Site Preparation	46
Grading	76
Building Construction	10,000
Paving	350
Architectural Coating	60
Total	11,332

Source: Appendix D.

Table 4.4-4: Construction Equipment Diesel Demand

Phase	Pieces of Equipment	Equipment CO_2 (MT)	kg CO_2/Gallon	Gallons
Demolition	5	21.07	10.21	2,063.44
Site Preparation	3	1.51	10.21	148.16
Grading	3	2.48	10.21	242.62
Building Construction	7	181.55	10.21	17,781.35
Paving	5	5.88	10.21	576.15
Architectural Coating	1	1.28	10.21	125.03
			Total	20,936.75

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Fuel consumption from worker, vendor, and haul truck trips was estimated by converting the total CO_2 emissions from the construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline fueled, whereas vendor and haul trucks are assumed to be diesel fueled. The estimated fuel use for worker vehicles, vendor trucks, and haul trucks are presented in Table 4.4-5, Table 4.4-6, and Table 4.4-7, respectively.

As shown in Tables 4.4-4 through 4.4-7, the Project is estimated to consume approximately 49,972 gallons of petroleum during the construction phase. By comparison, approximately 19.3 billion gallons of petroleum would be consumed in California over the course of the Project's construction phase based on the California daily petroleum consumption estimate of approximately 78.6 million gallons per day (EIA 2019c). Overall, because petroleum use during construction would be temporary and relatively minimal, and would not be wasteful or inefficient, impacts would be *less than significant*.

Table 4.4-5: Construction Worker Vehicle Gasoline Demand

Phase	Trips	Vehicle CO_2 (MT)	kg CO_2/Gallon	Gallons
Demolition	260	0.95	8.78	108.01
Site Preparation	10	0.04	8.78	4.16
Grading	20	0.07	8.78	8.14
Building Construction	29,200	103.66	8.78	11,806.26
Paving	100	0.36	8.78	40.43
Architectural Coating	290	1.03	8.78	117.26
			Total	12,084.26

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Table 4.4-6: Construction Vendor Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon	Gallons
Demolition	0	0.00	10.21	0.00
Site Preparation	0	0.00	10.21	0.00
Grading	0	0.00	10.21	0.00
Building Construction	5,400	69.85	10.21	6,841.79
Paving	0	0.00	10.21	0.00
Architectural Coating	0	0.00	10.21	0.00
			Total	6,841.79

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Table 4.4-7: Construction Haul Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon	Gallons
Demolition	143	5.62	10.21	550.82
Site Preparation	438	17.23	10.21	1,687.13
Grading	2,062	80.36	10.21	7,871.17
Building Construction	0	0.00	10.21	0.00
Paving	0	0.00	10.21	0.00
Architectural Coating	0	0.00	10.21	0.00
			Total	10,109.12

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Operational Use. The fuel consumption resulting from the Project's operational phase would be attributable to residents, employees, and customers traveling to and from the Project site. Petroleum fuel consumption associated with motor vehicles traveling to and from the Project site during operation is a function of VMT. Similar to construction worker and vendor trips, fuel consumption for operation was estimated by converting the total CO_2 emissions from the existing land uses to be demolished and proposed land uses under the Project to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Based on the Countywide proportion of gasoline and diesel on-road vehicle generated CO_2 in EMFAC2014 and the default fleet mix in CalEEMod, the vehicles associated with Project operations were assumed to be approximately 94% gasoline powered and 6% diesel powered. The estimated net increase in fuel use from Project operational mobile sources are shown in Tables 4.4-8 and 4.4-9.

Table 4.4-8: Operations - Gasoline Consumption

Fuel	Vehicle MT CO_2	kg CO_2/Gallon[a]	Gallons
Existing Land Uses to be Demolished	323.48	8.78	36,842.83
Proposed Project	1,036.62	8.78	118,066.20
		Net Increase (Project - Existing)	81,223.37

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Table 4.4-9: Project Operations - Diesel Consumption

Fuel	Vehicle MT CO_2	kg CO_2/Gallon[a]	Gallons
Existing Land Uses to be Demolished	20.51	10.21	2,009.20
Proposed Project	65.18	10.21	6,383.79
		Net Increase (Project - Existing)	4,374.59

Source: Appendix D.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Mobile sources from the Project would result in an approximate net increase of 85,598 gallons of petroleum consumed per year at buildout. By comparison, California as a whole consumes approximately 28.7 billion gallons of petroleum per year (EIA 2019c). It should be noted that over the lifetime of the Project, the fuel efficiency of the vehicles being used by the residents, employees, and customers is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the Project site during operation would decrease over time. As described in Section 4.6.2, there are numerous regulations in place that require and encourage increased fuel efficiency.

In summary, although according to the model, the Project would see an increase in petroleum use during operation, the use is a small fraction of the statewide use, and due to efficiency increases, will diminish over time. Given these considerations, the petroleum consumption associated with the Project would not be considered inefficient or wasteful and therefore would result in a *less than significant* impact.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact ENER-2: The Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. This is considered is a *less-than-significan*t impact.

Title 24 of the California Code of Regulations contains energy efficiency standards for residential and non-residential buildings based on a state mandate to reduce California's energy demand. Specifically, Title 24 addresses a number of energy efficiency measures that impact energy used for lighting, water heating, heating, and air conditioning, including the energy impact of the building envelope such as windows, doors, wall/floor/ceiling assemblies, and roofs.

Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. Part 11 of Title 24 also includes the CALGreen standards, which established mandatory minimum environmental performance standards for new construction projects. The Project would comply with Title 24, Part 6 and Part 11, per state regulations. Based on the foregoing, the proposed Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; therefore, impacts during construction and operation of the proposed Project would be less than significant.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.