APPENDIX F

Energy Background Information

Energy Impact Assessment for Dana Reserve Specific Plan

ENERGY IMPACT ASSESSMENT

FOR

DANA RESERVE SPECIFIC PLAN

NIPOMO, CA

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LIST OF COMMON TERMS & ACRONYMS

°F	Fahrenheit
3CE	Central Coast Community Energy
AB	Assembly Bill
AFV	Alternative Fuel Vehicle
APS	Alternative Planning Strategy
ARB	California Air Resource Board
BSC	Building Standards Commission
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CBC	California Building Code
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO_2	Carbon Dioxide
CPUC	California Public Utilities Commission
EAP	Energy Action Plan
EMFAC	Emissions Factor
EO	Executive Order
EPAct	Energy Policy Act
GHG	Greenhouse Gas
kBTU	Kilo British Thermal Units
kWh	Kilowatt Hour
MMBTU	Million British Thermal Units
mpg	Miles per Gallon
MPO	Metropolitan Planning Organization
NHSTA	National Highway Traffic Safety Administration
PG&E	Pacific Gas and Electric
RME	Resources Management Element
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SAF	State Alternative Fuel
SB	Senate Bill
SBCAPCD	Santa Barbara County Air Pollution Control District
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SoCalGas	Southern California Gas Company
U.S. DOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle Mile Traveled

INTRODUCTION

This report provides an analysis of potential energy impacts associated with the proposed development of the Dana Reserve. This report also provides a summary of existing conditions in the project area and the applicable regulatory framework pertaining to energy.

PROPOSED PROJECT SUMMARY

The proposed Dana Reserve Specific Plan will provide a combination of land uses that include residential uses, flex commercial uses, open space, trails, and a public neighborhood park within an approximately 300-acre specific plan area. The plan will include 1,291 residential dwelling units (comprised of 833 single-family units and 458 multi-family units), between 110,000-203,00 square feet of commercial space, and 49.8 acres of open space for recreation. The project site is located in the southern portion of San Luis Obispo County, this property is immediately north of the Urban Reserve Line of the Nipomo community. It is bounded by Willow Road and Cherokee Place to the north, existing residential ranchettes to the south and west and U.S. Highway 101 to the east. The proposed Dana Reserve Specific Plan is depicted in Figure 1.

ENERGY FUNDAMENTALS

Energy use is typically associated with transportation, construction, and the operation of land uses. Transportation energy use is generally categorized by direct and indirect energy. Direct energy relates to energy consumption by vehicle propulsion. Indirect energy relates to the long-term indirect energy consumption of equipment, such as maintenance activities. Energy is also consumed by construction and routine operation and maintenance of land use. Construction energy relates to a direct one-time energy expenditure primarily associated with the consumption of fuel use to operate construction equipment. Energy-related to land use is normally associated with direct energy consumption for heating, ventilation, and air conditioning of buildings.

EXISTING SETTING

The project is located in Nipomo, an unincorporated town within San Luis Obispo County. The project area experiences a hot-summer Mediterranean climate, with an annual normal precipitation of approximately 16.10 inches. Temperatures in the project area range from an average minimum of approximately 38.7 degrees Fahrenheit (°F), in January, to an average maximum of 75.4°F, in September (WRCC 2021).

Energy Resources

Energy sources for the Nipomo are served primarily by Pacific Gas & Electric (PG&E), Central Coast Community Energy (3CE), and Southern California Gas Company (SoCalGas). Energy resources consist largely of natural gas, nuclear, fossil fuels, hydropower, solar, and wind. The primary use of energy sources is for electricity to operate buildings.

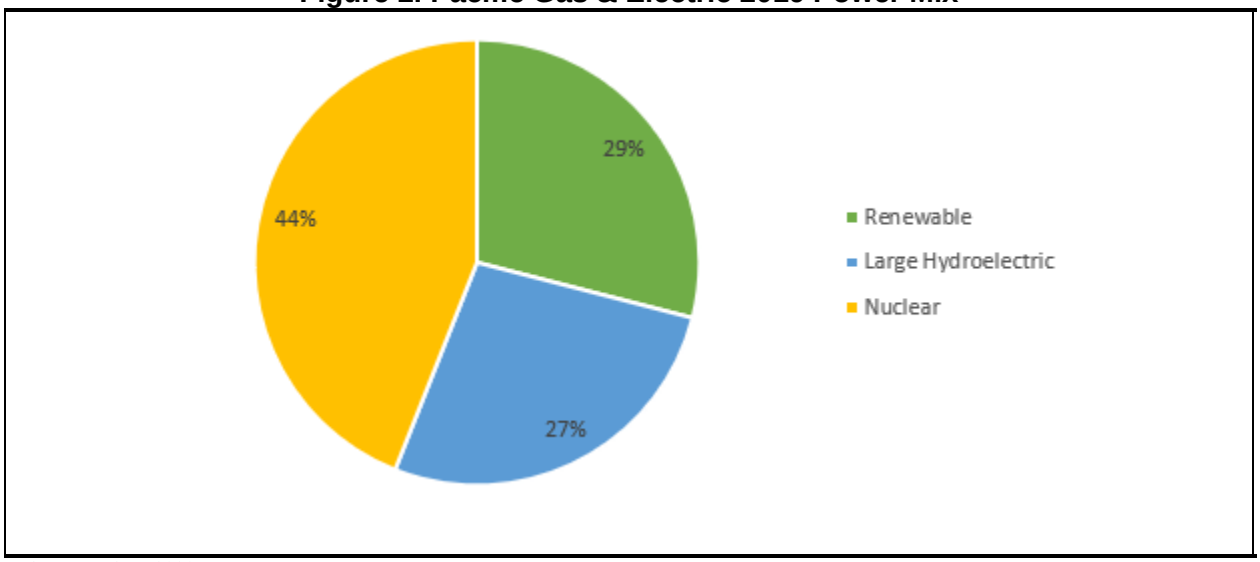
Electricity

Pacific Gas & Electric

The breakdown of PG&E's power mix is shown in Figure 3. As shown, PG&E energy generation was supplied from approximately 29 percent of renewable energy sources (i.e., biomass and waste, geothermal, small hydroelectric, solar, and wind), 27 percent of large hydroelectric sources, and 44 percent of nuclear sources. Participation in PG&E as an electricity provider is mandatory.

Figure 1 . Proposed Dana Reserve Specific Plan

Figure 2. Pacific Gas & Electric 2019 Power Mix



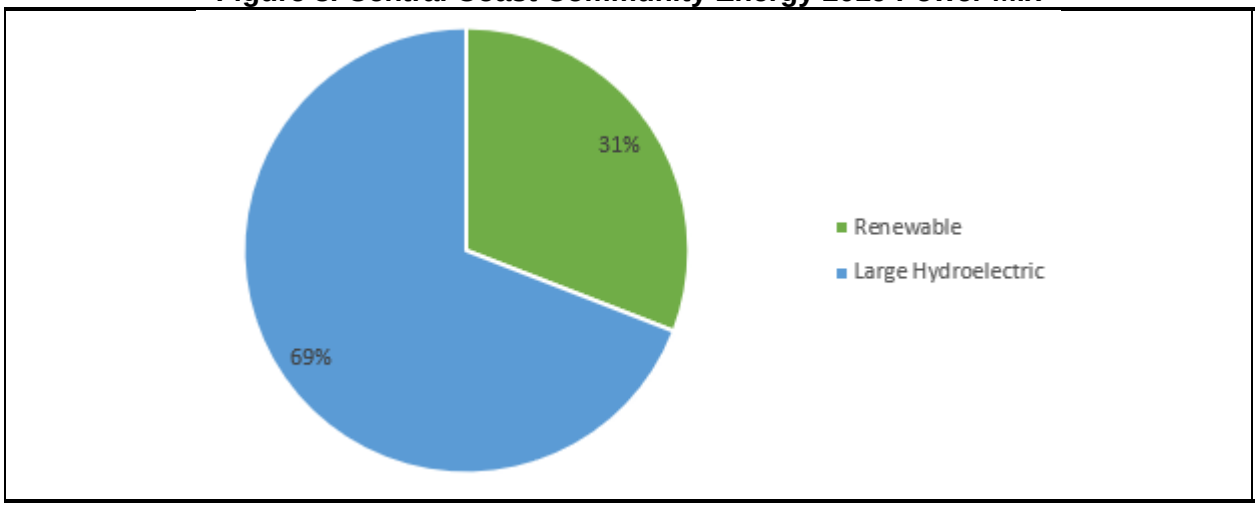
Source: PG&E 2020a

Central Coast Community Energy

3CE is a locally-controlled public agency supplying clean and renewable electricity for residents and businesses in Monterey, San Benito, parts of San Luis Obispo, Santa Barbara, and Santa Cruz Counties. 3CE is based on a local energy model called Community Choice Energy that partners with the local utility (i.e., PG&E) which continues to provide consolidated billing, electricity transmission and distribution, customer service, and grid maintenance services. 3CE provides customers with a choice for clean and renewable energy, and community reinvestment through rate benefits and local GHG reducing energy programs for residential, commercial, and agricultural customers. Participation in 3CE as an electricity provider is voluntary (3CE 2021).

The breakdown of 3CE power mix is shown in Figure 4. As shown, 3CE energy generation was supplied from approximately 31 percent of renewable energy sources (i.e., biomass and waste, geothermal, small hydroelectric, solar, and wind) and 69 percent of large hydroelectric sources.

Figure 3. Central Coast Community Energy 2019 Power Mix



Source: 3CE 2020

Natural Gas

Natural gas services in Nipomo are purchased from PG&E and SoCalGas. PG&E's natural gas system encompasses approximately 70,000 square miles in Northern and Central California. Natural gas throughput provided by PG&E totals approximately 2.6 billion cubic feet per day (PG&E 2020b). SoCalGas's natural gas system encompasses approximately 20,000 square miles in Southern California (SoCalGas 2020). Natural gas throughput provided by SoCalGas totals approximately 2.8 billion cubic feet per day (SoCalGas 2013).

Regulatory Framework

Federal

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

In October 2012, the United States Environmental Protection Agency (U.S. EPA) and National Highway Traffic Safety Administration (NHSTA), on behalf of the United States Department of Transportation (U.S. DOT), issued final rules to further reduce greenhouse gas (GHG) emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond. NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel

economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO_2) per mile for the fleet of cars and light-duty trucks by the model year 2025.

In January 2017, U.S. EPA Administrator Gina McCarthy signed a Final Determination to maintain the current GHG emissions standards for the model year 2022-2025 vehicles. However, on March 15, 2017, U.S. EPA Administrator Scott Pruitt and U.S. DOT Secretary Elaine Chao announced that U.S. EPA intends to reconsider the Final Determination. On April 2, 2018, U.S. EPA Administrator Scott Pruitt officially withdrew the January 2017 Final Determination, citing information that suggests that these current standards may be too stringent due to changes in key assumptions since the January 2017 Determination. According to the U.S. EPA, these key assumptions include gasoline prices and overly optimistic consumer acceptance of advanced technology vehicles. The April 2, 2018, notice is not U.S. EPA's final agency action. The U.S. EPA intends to initiate rulemaking to adopt new standards. Until that rulemaking has been completed, the current standards remain in effect. (U.S. EPA 2017, U.S. EPA 2018).

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the United States would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the NHSTA, which is part of the U.S. DOT, is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 mpg. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined based on each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The CAFE program, administered by U.S. EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the U.S. DOT is authorized to assess penalties for noncompliance.

Energy Policy Act of 1992

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the Act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

State

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act established a state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Public Utilities Commission (CPUC) regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

Assembly Bill 32: Climate Change Scoping Plan and Update

In October 2008, ARB published its Climate Change Proposed Scoping Plan, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The initial Scoping Plan was first approved by ARB on December 11, 2008, and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reach the 2050 goals (ARB 2014). The most recent update released by ARB is the 2017 Climate Change Scoping Plan, which was released in November 2017. The measures identified in the 2017 Climate Change Scoping Plan have the co-benefit of increasing energy efficiency and reducing California's dependency on fossil fuels.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statues of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels (SAF) Plan in partnership with ARB and in consultation with other state, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce GHG emissions, and increase in-state production of biofuels without causing significant degradation of public health and environmental quality.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resource Board (ARB) prepared and adopted a joint agency report in 2003, Reducing California's Petroleum Dependence. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicle miles traveled (VMT) (ARB 2003). Further, in response to the CEC's 2003 and 2005 Integrated Energy Policy Reports, Governor Davis directed CEC to take the lead in developing a long-term plan to increase alternative fuel use. A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand by 2020.

Senate Bill 350: Clean Energy and Pollution Prevention Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires a doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan (RTP). ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

Senate Bill 1078: California Renewables Portfolio Standard Program

Senate Bill (SB) 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum of 20 percent of their supply from renewable sources by 2017. This SB will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order (EO) S-14-08, which set the Renewables Portfolio Standard (RPS) target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. EO S-14-08 was later superseded by EO S-21-09 on September 15, 2009. EO S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State to come from renewable energy by 2020. Statute SB X1-2 superseded this EO in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020. The State's Clean Energy Standards, adopted in 2018, require the state's utilities to generate 100 percent clean electricity by 2045 and to increase the States RPS requirements to 60 percent by 2030 (refer to SB 100).

Senate Bill 100

SB 100 was signed by Governor Jerry Brown on September 10, 2018. SB 100 sets a goal of phasing out all fossil fuels from the state's electricity sector by 2045. SB 100 increases to 60 percent, from 50 percent, how much of California's electricity portfolio must come from renewables by 2030. It establishes a further goal to have an electric grid that is entirely powered by clean energy by 2045, which could include other carbon-free sources, like nuclear power, that are not renewable.

Senate Bill 32 and Assembly Bill 197 of 2016

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target. Achievement of these goals will have the co-benefit of increasing energy efficiency and reducing California's dependency on fossil fuels.

Executive Order S-06-06

EO S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The EO also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- increase environmentally- and economically-sustainable energy production from organic waste;
- encourage the development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the state; and
- reduce fire danger, improve air and water quality, and reduce waste.

In 2019, 2.87 percent of the total electrical system power in California was derived from biomass (CEC 2020).

Executive Order B-48-18: Zero Emission Vehicles

In January 2018, Governor Brown signed EO B-48-18 which required all State entities to work with the private sector to put at least 5-million zero-emission vehicles on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 zero-emissions chargers by 2025. In addition, State entities are also required to continue to partner with local and regional governments to streamline the installation of zero-emission vehicle infrastructure. Additionally, all State entities are to support and recommend policies and actions to expand infrastructure in homes, through the Low-Carbon Fuel Standard.

Energy Action Plan

The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The State's three major energy policy agencies (CEC, CPUC, and the Consumer Power and Conservation Financing Authority [established under deregulation and now defunct]) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs. It was the first time that energy policy agencies formally collaborated to define a common vision and set of strategies to address California's future energy needs and emphasize the importance of the impacts of energy policy on the California environment.

In the October 2005 EAP II, CEC and CPUC updated their energy policy vision by adding some important dimensions to the policy areas included in the original EAP, such as the emerging importance of climate change, transportation-related energy issues, and research and development activities. The CEC adopted an update to the EAP II in February 2008 that supplements the earlier EAPs and examines the State's ongoing actions in the context of global climate change.

California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The CBC is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards, are contained in the CBC, and regulate the construction of new buildings and improvements. Whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

The 2019 Building Energy Efficiency Standards (2019 Standards), previously adopted in May 2018, addressed four key areas: smart residential photovoltaic systems, updated thermal envelope standards (preventing heat transfer from the interior to the exterior and vice versa), residential and nonresidential ventilation requirements, and non-residential lighting requirements. The 2019 Standards required new residential and non-residential construction; as well as major alterations to existing structures, to include electric vehicle (EV)-capable parking spaces which have electrical panel capacity and conduit to accommodate future installation. In addition, the 2019 Standards also required the installation of solar photovoltaic (PV) systems for low-rise residential dwellings, defined as single-family dwellings and multi-family dwellings up to three-stories in height. The solar PV systems are to be sized based on the buildings annual electricity demand, the building square footage, and the climate zone within which the home is located. However, under the *2019 Building Energy Efficiency Standards,* homes may still rely on other energy sources, such as natural gas. Compliance with the *2019 Building Energy Efficiency Standards,* including the solar PV system mandate, residential dwellings will use approximately 50 to 53 percent less energy than those under the 2016 standards. Actual reduction will vary depending on various factors (e.g., building orientation, sun exposure). Non-residential buildings will use about 30 percent less energy due mainly to lighting upgrades (CEC 2018).

The recently updated 2022 Building Energy Efficiency Standards (2022 Standards), which were approved in December 2021, encourages efficient electric heat pumps, establishes electric-ready requirements when

natural gas is installed and to support the future installation of battery storage, and further expands solar photovoltaic and battery storage standards. The 2022 Standards extend solar PV system requirements, as well as battery storage capabilities for select land uses, including high-rise multi-family and non-residential land uses, such as office buildings, schools, restaurants, warehouses, theaters, grocery stores, and more. Depending on the land use and other factors, solar systems should be sized to meet targets of up to 60 percent of the structure's loads. These new solar requirements will become effective January 1, 2023 and contribute to California's goal of reaching net-zero carbon footprint by 2045 (CEC 2022).

Advanced Clean Cars Program

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

Local

County of San Luis Obispo General Plan Conservation Element

The County of San Luis Obispo General Plan contains a Conservation Element (San Luis Obispo County 2010). The Element is a comprehensive long-range planning document that sets forth goals, policies, and actions to address the conservation and preservation of public services, air quality, vegetation and wildlife, mineral resources, and visual resources, historic and archeological resources, as well as energy. Applicable energy policies include, but are not limited to:

- Policy E 3.1: Ensure that new and existing development incorporates renewable energy sources such as solar, passive building, wind, and thermal energy. Reduce reliance on non-sustainable energy sources to the extent possible using available technology and sustainable design techniques, materials, and resources.
- Policy E 3.2: Require the use of energy-efficient equipment in all new development, including but not limited to Energy Star appliances, high-energy efficiency equipment, heat recovery equipment, and building energy management systems.
- Policy E 4.1: Integrate green building practices into the design, construction, management, renovation, operations, and demolition of buildings, including publicly funded affordable housing projects, through the development review and building permitting process.

IMPACT ANALYSIS

Thresholds of Significance

In accordance with Appendix F and G of the California Environmental Quality Act (CEQA) Guidelines, energy use impacts associated with the proposed project would be considered significant if it would:

a) Result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation; or

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

The CEQA Guidelines, Appendix F, requires environmental analyses to include a discussion of potential energy impacts associated with a proposed project. Where necessary, CEQA requires that mitigation measures be incorporated to reduce the inefficient, wasteful or unnecessary consumption of energy. The State CEQA Guidelines, however, do not establish criteria that define inefficient, wasteful or unnecessary consumption. Compliance with the State's building standards for energy efficiency would result in decreased energy consumption for proposed buildings. However, compliance with building codes may not adequately address all potential energy impacts associated with project construction and operation. As a result, this analysis includes an evaluation of electricity and natural gas usage requirements associated with future development, as well as, energy requirements associated with the use of on-road and off-road vehicles. The degree to which the proposed project would comply with existing energy standards, as well as, applicable regulatory requirements and policies related to energy conservation was also taken into consideration for the evaluation of project-related energy impacts.

Methodology

Construction Impacts

Regarding energy use (e.g., fuel use) during construction, it is assumed that only diesel fuel would be used in construction equipment. On-road vehicles for hauling materials and worker commute trips assumed a mix of diesel and gasoline fuel use. Construction schedules, equipment numbers, horsepower ratings, and load factors were used to calculate construction-related fuel use, based on default assumptions contained in the California Emissions Estimator Model (CalEEMod), version 2020.4.0. Diesel fuel use was estimated based on a factor of 0.05 gallons of diesel fuel per horsepower-hour derived from the South Coast Air Quality Management District's (SCAQMD) CEQA Air Quality Handbook (SCAQMD 1993). Energy uses were quantified for demolition, site preparation, grading, building construction, paving, and architectural coating of the project. Construction of Residential units will begin in 2023 and end in 2030, construction of the Commercial & Educational land uses will begin in 2024 and end in 2029 and construction of the Hotel will begin and end in 2026.

Operational Impacts

The long-term operation of the proposed project would require electricity and natural gas usage for lighting, water conveyance, and landscaping maintenance equipment. Indirect energy use would include solid waste removal. Project operation would include the consumption of diesel and gasoline fuel from on-road vehicles. Building energy use was estimated using CalEEMod, version 2020.4.0. With continued improvements in building energy efficiencies, energy use in future years would be less. Transportation fuel-use estimates were calculated by applying average fuel usage rates per vehicle mile to VMT associated with the proposed project. Annual energy usage was quantified based on CalEEMod default assumptions for PG&E, including compliance with renewable portfolio standards. Average fuel usage rates by vehicle class, fuel type (e.g., diesel, gasoline, electric, and natural gas), and calendar year were obtained from San Luis Obispo County's emissions inventory that's derived from ARB's Emissions Factors (EMFAC) 2021, version 1.0.1 (ARB 2021).

Project Impacts and Mitigation Measures

Impact E-A. Would the project result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?

Implementation of the proposed project would increase electricity, diesel, gasoline, and natural gas consumption associated with construction activities, as well as long-term operational activities. Energy consumption associated with short-term construction and long-term operational activities are discussed in greater detail, as follows:

Construction-Related Energy Consumption

Energy consumption would occur during construction, including fuel use associated with the on-site operation of off-road equipment and vehicles traveling to and from the construction site. Table 1 summarizes

the levels of energy consumption associated with project construction. As depicted, the operation of off-road construction equipment would use an estimated total of 520,373 gallons. On-road vehicles would use an estimated total of 86,878 gallons of gasoline and 33,837 gallons of diesel for Phase 1. On-road vehicles would use an estimated total of 750,947 gallons of gasoline and 81,653 gallons of diesel. In total, construction fuel use would equate to approximately 176,644 million British thermal units (MMBTU). Construction equipment use and associated energy consumption would be typical of that commonly associated with the construction of new land uses. In addition, mitigation measures have been incorporated as part of the air quality analysis that would reduce construction-related fuel use, including the use of newer and alternatively-fueled vehicles and equipment. Idling of heavy-duty diesel construction equipment and trucks would be limited to five minutes in accordance with San Luis Obispo Air Pollution Control District (SLOAPCD) requirements. Energy use associated with construction of the proposed project would be temporary and would not be anticipated to result in the need for additional capacity, nor would construction be anticipated to result in increased peak-period demands for electricity. As a result, project construction would not be anticipated to require the use of construction equipment that would be less energy efficient than those commonly used for the construction of similar facilities. As a result, the construction of the proposed project would not result in an inefficient, wasteful, or unnecessary consumption of energy. As a result, impacts are considered **less than significant**.

Table 1. Construction Energy Consumption

Source	Total Fuel Use (gallons)	Total MMBTU
Phase 1		
Off-Road Equipment Use (Diesel)	520,373	71,489
On-Road Vehicles (Gasoline)	780,947	93,937
On-Road Vehicles (Diesel)	81,653	11,218
	Total:	176,644

MMBTU = Million British thermal units
Fuel use was calculated based, in part, on construction schedules, default equipment uses, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project.
Refer to Appendix A for modeling assumptions and results.

Operational Mobile-Source Energy Consumption

Operational mobile-source energy consumption would be primarily associated with truck trips to and from the project. Energy use associated with commute trips are discussed in greater detail, as follows:

Table 2 summarizes the annual fuel use at build-out. As noted in Table 2, the vehicle trips associated with the proposed land uses would consume an annual estimated 247,367 gallons of diesel and 1,309,276 gallons of gasoline for operation in year 2030. The development of increasingly efficient automobile engines would result in increased energy efficiency and energy conservation. Various air quality mitigation measures have been included that would reduce long-term mobile source emissions, including incorporation of measures to reduce vehicle miles traveled, such as incorporation of site design features that would promote pedestrian connectivity, bicycle and transit use. The proposed project would not result in increased fuel usage that would be considered unnecessary, inefficient, or wasteful. This impact would be considered **less than significant**.

Table 2. Operational Fuel Consumption[1]

Source	Annual Fuel Use (gallons)	Annual MMBTU
Source		
Mobile Fuel (Diesel) - Residential	174,307	23,946
Mobile Fuel (Gasoline) - Residential	922,580	110,973
Mobile Fuel (Diesel) - Commercial & Educational	60,820	8,356
Mobile Fuel (Gasoline) - Commercial & Educational	321,914	38,722
Mobile Fuel (Diesel) - Hotel	12,240	1,681
Mobile Fuel (Gasoline) - Hotel	64,782	7,792
	Total:	191,471

MMBTU = Million British thermal units
1. Assumes a build-out year of 2030.
Fuel use was calculated based, in part, on project trip generation rates derived from the traffic analysis for the project (CCTC 2021)
Refer to Appendix A for modeling assumptions and results.

Operational Building-Use Energy Consumption

The proposed project would result in increased electricity and natural gas consumption associated with the long-term operation of the planned land uses. Estimated electricity and natural gas consumption associated with the proposed facilities are summarized in Table 3. As depicted, operation would result in the annual consumption of approximately 7,061,239 kilowatt hours (kWh) of electricity, 325,170 kWh of water, and 33,489,670 kilo British thermal units (kBTU) of natural gas. In total, the proposed facilities would consume an annual total of approximately 58,692 MMBTU at buildout. The development of increasingly efficient building fixtures would result in increased energy efficiency and energy conservation. The project would be subject to energy conservation requirements in the CEC (Title 24, Part 6, of the California Code of Regulations, California's Energy Efficiency Standards for Residential and Nonresidential Buildings) and the California Green Building Standards Code (CALGreen) (Title 24, Part 11 of the California Code of Regulations). In addition, various mitigation measures have been included as part of the air quality analysis prepared for this project what would further reduce energy use. Proposed single-family residential dwellings would also be required to incorporate solar photovoltaic systems, per current building code requirements. On average, the incorporation of solar PV systems would reduce on-site electricity use by approximately 70 percent (PG&E 2022). Adherence to Title 24 requirements and applicable GHG mitigation measures would further reduce energy use during project construction and operation and would further promote the use of energy from renewable sources. Such measures include, but are not limited to, the prohibited installation of natural gas to serve residential development, use of energy efficient appliances, future participation in Central Coast Community Energy as the electricity provider (if/when the option becomes available), and implementation of various waste recycling and water-conservation measures. For these reasons, the project would not result in wasteful and inefficient use of non-renewable resources due to building operation. This impact would be considered **less than significant**.

Table 3. Operational Electricity, Water, and Natural Gas Consumption

Source	Annual Energy Use	Annual MMBTU
Phase 1 - 2024		
Electricity (kWh)	7,061,239	24,093
Water (kWh)	325,170	1,109
Natural Gas Use (kBTU)	33,489,670	33,490
	Total:	58,692
MMBTU = Million British thermal units; kWh = Kilowatt hour; kBTU = Kilo British thermal unit		

Impact E-B. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The project would be required to be in full compliance with the CBC, including applicable green building standards and building energy efficiency standards. Furthermore, the proposed project would comply with the County's General Plan. The County's General Plan and Conservation Element ensures the conservation and preservation of energy resources by increasing the energy efficiency of buildings, appliances, and buildings to the use of alternative forms of energy. The project would not conflict with other goals and policies set forth in the general plan pertaining to renewable energy and energy efficiency. Furthermore, implementation of applicable air quality mitigation measures would ensure that the proposed project meets or exceeds building code requirements related to building energy efficiency. Therefore, the proposed project would not conflict with state or local plans for renewable energy or energy efficiency, this impact would be considered **less than significant**.

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APPENDIX A

Energy Modeling

Energy Use Summary Operational Year 2030 Mitigated

Construction Energy Use

	Gallons	Annual MMBTU
Off-Road Equipment Fuel (Diesel)	520,373	71,489
On-Road Vehicle Fuel (Gasoline)	780,947	93,937
On-Road Vehicle Fuel (Diesel)	81,653	11,218
	Total:	176,644

Operational Fuel Use

Source	Gallons	Annual MMBTU
Mobile Fuel (Diesel) - Residential	174,307	23,946
Mobile Fuel (Gasoline) - Residential	922,580	110,973
Mobile Fuel (Diesel) - Commercial & Educational	60,820	8,356
Mobile Fuel (Gasoline) - Commercial & Educational	321,914	38,722
Mobile Fuel (Diesel) - Hotel	12,240	1,681
Mobile Fuel (Gasoline) - Hotel	64,782	7,792
	Total:	191,471

Operational Electricity & Natural Gas Use

	Annual Energy	Annual MMBTU
Electricity (kWh/yr, MMBTU)	7,061,239	24,093
Water Use, Treatment & Conveyance (kWh/Yr, MMBTU)	325,170	1,109
Natural Gas (kBTU/yr, MMBTU)	33,489,670	33,490
	Total:	58,692

Construction Equipment Fuel Use

OFF-ROAD EQUIPMENT FUEL USE

Primary Construction Activity	Activity Duration (Days)	Equipment Type	Size (hp)	Number of Pieces	Hours of Daily Use/Piece of Equipment	Total Days of Use	Load Factor	Fuel Usage Rate (g/bhph)	Total Fuel Diesel (Gallons)
Demolition - Residential	108	Concrete Saw	81	1	8	108	0.73	0.05	2554
		Excavators	158	3	8	108	0.38	0.05	7781
		Rubber Tired Dozers	247	2	8	108	0.4	0.05	8536
Site Prep - Residential	108	Rubber Tired Dozers	247	3	8	108	0.4	0.05	12804
		Tractors/Loaders/Backhoes	97	4	8	108	0.37	0.05	6202
Grading - Residential	130	Excavators	158	2	8	130	0.38	0.05	6244
		Graders	187	1	8	130	0.41	0.05	3987
		Rubber Tired Dozers	247	1	8	130	0.4	0.05	5138
		Tractors/Loaders/Backhoes	97	2	8	130	0.37	0.05	3733
		Scrapers	367	2	8	130	0.48	0.05	18321
Construction - Residential	1545	Cranes	231	1	7	1545	0.29	0.05	36225
		Forklifts	89	3	8	1545	0.2	0.05	33001
		Generator Sets	84	1	8	1545	0.74	0.05	38415
		Tractors/Loaders/Backhoes	97	3	7	1545	0.37	0.05	58223
		Welders	46	1	8	1545	0.45	0.05	12793
Arch Coating - Residential	1516	Air Compressor	78	1	6	1516	0.48	0.05	17028
Paving - Residential	220	Pavers	130	2	8	220	0.42	0.05	9610
		Paving Equipment	132	2	8	220	0.36	0.05	8364
		Rollers	80	2	8	220	0.38	0.05	5350
Building Construction - Commercial	1540	Cranes	231	1	7	1540	0.29	0.05	36108
		Forklifts	89	3	8	1540	0.2	0.05	32894
		Generator Sets	84	1	8	1540	0.74	0.05	38291
		Tractors/Loaders/Backhoes	97	3	7	1540	0.37	0.05	58034
		Welders	46	1	8	1540	0.45	0.05	12751
Arch Coating - Commercial	1500	Air Compressors	78	1	6	1500	0.48	0.05	16848
Paving - Commercial	20	Pavers	130	2	8	20	0.42	0.05	874
		Paving Equipment	132	2	8	20	0.36	0.05	760
		Rollers	80	2	8	20	0.38	0.05	486
Building Construction - Hotel	230	Cranes	231	1	7	230	0.29	0.05	5393
		Forklifts	89	3	8	230	0.2	0.05	4913
		Generator Sets	84	1	8	230	0.74	0.05	5719
		Tractors/Loaders/Backhoes	97	3	7	230	0.37	0.05	8667
		Welders	46	1	8	230	0.45	0.05	1904
Arch Coating - Hotel	18	Air Compressors	78	1	6	18	0.48	0.05	202
Paving - Hotel	18	Pavers	130	2	8	18	0.42	0.05	786
		Paving Equipment	132	2	8	18	0.36	0.05	684
		Cement & Mortar Mixers	9	2	6	18	0.56	0.05	54
		Tractors/Loaders/Backhoes	97	1	8	18	0.37	0.05	258
		Rollers	80	2	8	18	0.38	0.05	438

Equipment usage assumptions based on default assumptions contained in CalEEMod.

Total Diesel Fuel Use (Gallons):	520373
Number of Construction Years:	8
Average Diesel Fuel Use/Year:	65047
BTU/Gallon:	137381
BTU:	71489345666
MMBTU:	71489

Construction Fuel Use - On-Road Vehicles

Residential	Demolition	Sire Prep	Grading	Construction	Architectural Coating	Paving	Total	LDA	LDT1	LDT2	MDV	HDV
Days	108	108	130	1545	1516	220						
Worker Trips	15	18	20	739	148	15						
Miles/Trip	13	13	13	13	13	13						
Total VMT	21060	25272	33800	14842815	2916784	42900	17882631	5960877	5960877	5960877	0	0
Vendor Trips	0	0	0	154	0	0						
Miles/Trip	5	5	5	5	5	5						
Total VMT	0	0	0	1189650	0	0	1189650	0	0	0	1189650	0
Haul Trips	0	0	0	0	0	0						
Miles/Trip	20	20	20	20	20	20						
Total VMT	0	0	0	0	0	0	0	0	0	0	0	0

Commercial & Educational	Construction	Architectural Coating	Paving	Total	LDA	LDT1	LDT2	MDV	HDV
Days	1540	1500	20						
Worker Trips	145	46	15						
Miles/Trip	13	13	13						
Total VMT	2902900	897000	3900	3803800	1267933.333	1267933.333	1267933.333	0	0
Vendor Trips	103	0	0						
Miles/Trip	5	5	5						
Total VMT	793100	0	0	793100	0	0	0	793100	0
Haul Trips	0	0	0						
Miles/Trip	20	20	20						
Total VMT	0	0	0	0	0	0	0	0	0

Hotel	Construction	Architectural Coating	Paving	Total	LDA	LDT1	LDT2	MDV	HDV
Days	230	18	18						
Worker Trips	25	5	20						
Miles/Trip	13	13	13						
Total VMT	74750	1170	4680	80600	26866.66667	26866.66667	26866.66667	0	0
Vendor Trips	10	0	0						
Miles/Trip	5	5	5						
Total VMT	11500	0	0	11500	0	0	0	11500	0
Haul Trips	0	0	0						
Miles/Trip	20	20	20						
Total VMT	0	0	0	0	0	0	0	0	0

	Annual VMT	Gallons/Mile*	Gallons	BTU/gallon**			BTU	MMBTU
HDT	0	0.15561021	0	137381			0	0.00
LDA	7255677	0.03071408	222851	120286			26805909669	26805.91
LDT1	7255677	0.03824357	277483	120286			33377314787	33377.31
LDT2	7255677	0.03867487	280612	120286			33753738369	33753.74
MDV	1994250	0.04094445	81653	137381			11217635787	11217.64

**Gallons per mile based on year 2030 conditions for San Luis Obispo County. Derived from Emfac2021 (v1.0.1) Emissions Inventory.*

***Energy coefficient derived from US EIA.*

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

EMFAC2021 Fuel Rate Calculation	Fuel Consumption (1000		VMT (Miles/Day)**				
	Diesel	Gasoline	Diesel	Gasoline			TOTAL
LDA	0.292441302	124.9137733	12893.87861	4066987.165			
LDT1	0.000482818	14.76657951	12.53401984	386119.3244			
LDT2	0.342784081	95.90087373	11410.61277	2479668.975			
MDV	1.448096452	73.20946115	35367.3425	1536771.466			
HDT***	4.994284569	0.00907047	32094.83796	37.21737838			
Total	7.078089222	308.7997582	91779.20586	8469584.148			8561363.354
Percent of Total			1.07%	98.93%			
LDA-Miles/Gallon	44.09048427	32.55835651					
LDA-Gallons/Mile	0.022680631	0.030714081					
LDT1-Miles/Gallon	25.9601397	26.14818985					
LDT1-Gallons/Mile	0.038520594	0.038243565					
LDT2-Miles/Gallon	33.28804751	25.85658377					
LDT2-Gallons/Mile	0.030040813	0.038674869					
MDV-Miles/Gallon	24.42333344	20.99143255					
MDV-Gallons/Mile	0.040944452	0.047638483					
HDT-Miles/Gallon	6.426313423	0.000243716					
HDT-Gallons/Mile	0.155610213	4103.136521					

**Fuel consumptions derived from EMFAC2021 (v1.0.1) for year 20230 conditIons.*

***VMT derived from EMFAC2021 (v1.0.1) for year 2030 conditons.*

****HDT diesel engine T7 CAIRP construction, T7 single construction, T7 tractor construction. HDT gasoline engine T7IS.*

Fuel consumption and VMT based on the San Luis Obispo County.

Operational Fuel Use - Proposed Project Year 2030 Mitigated

LAND USE	Total Annual VMT
Residential	25,715,062
Commercial & Educational	8,972,707
Hotel	1,805,675
Total	36,493,444

Residential	VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
Diesel	1739975	0.10017764	174307	137381	23946408255	23946.41
Gasoline	23975087	0.03848078	922580	120286	110973476858	110973.48
Commercial	**VMT**	**Gallons/Mile***	**Gallons**	**BTU/gallon****	**BTU**	**MMBTU**
Diesel	607126	0.10017764	60820	137381	8355574059	8355.57
Gasoline	8365581	0.03848078	321914	120286	38721761302	38721.76
Hotel	**VMT**	**Gallons/Mile***	**Gallons**	**BTU/gallon****	**BTU**	**MMBTU**
Diesel	122179	0.10017764	12240	137381	1681482655	1681.48
Gasoline	1683496	0.03848078	64782	120286	7792399366	7792.40
Total	**VMT**		**Gallons**		**BTU**	**MMBTU**
	36493444		1157707		191471102495	191471.10

**Gallons per mile based on year 2030 conditions for San Luis Obispo County. Derived from Emfac2021 (v1.0.1) Emissions Inventory.*

**Energy coefficient derived from US EIA.

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

EMFAC2017 Fuel Rate Calculation	Fuel Consumption (1000		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	
All Other Buses	0.258555512		2298.914477		
LDA	0.292441302	124.9137733	12893.87861	4066987.165	
LDT1	0.000482818	14.76657951	12.53401984	386119.3244	
LDT2	0.342784081	95.90087373	11410.61277	2479668.975	
LHD1	11.38251486	18.29888583	181039.8123	182904.1597	
LHD2	5.962138203	2.494852104	78770.55625	22220.33412	
MCY		0.97873604		39148.39963	
MDV	1.448096452	73.20946115	35367.3425	1536771.466	
MH	0.567003846	1.917648121	5325.133214	8466.658705	
Motor Coach	0.432778927		2531.507111		
PTO	1.122905262		5914.767936		
OBUS		0.929618707		4510.040117	
SBUS	0.584517078	0.333296083	4960.570754	3302.562495	
T6 CAIRP heavy	0.035931858		376.3269033		
T6 CAIRP small	0.009912918		92.81875019		
T6 instate heavy	2.54816783		22874.55138		
T6 instate small	8.509179867		74814.70747		
T6 OOS heavy	0.048745227		524.1760885		
T6 OOS small	0.01211547		119.7878815		
T6 Public	0.786308765		6392.761483		
T6 utility	0.126545548		1157.087197		
T6TS		2.589001305		12908.94257	
T7 CAIRP	5.503206752		37094.61879		
T7 NNOOS	6.678283539		47846.86069		
T7 NOOS	2.506949985		17381.91459		
T7 other port	1.54033134		9995.931192		
T7 Public	1.479706388		8109.449171		
T7 Single	4.812582412		29164.33169		
T7 SWCV	1.386799877		3672.195409		
T7 tractor	4.667064543		30025.56341		
T7 utility	0.113985129		681.0547425		
T7IS		0.00907047		37.21737838	
UBUS	0.412824089	0.140446118	3751.535472	1117.622559	
Total	63.57285988	336.4822425	634601.3023	8744162.868	9378764.17
Percent of Total			6.77%	93.23%	
Miles/Gallon	9.982267646	25.98699653			
Gallons/Mile	0.100177639	0.038480784			

VMT = Vehicle miles traveled

Fuel consumption and VMT based on the San Luis Obispo County.

*Fuel consumptions derived from EMFAC2021 (v1.0.1) for year 2030 conditons.

**VMT derived from EMFAC2021 (v1.0.1) for year 2030 conditons.

Operational Electricity & Natural Gas Use Year 2030 Mitigated

	kWh/yr	MWh/Yr	BTU/kWh*	BTU	MMBTU
Electricity	7061239	7061	3412	24092947468	24093

*Energy coefficient derived from US EIA.
https://www.eia.gov/energyexplained/index.php?page=about_energy_units

	kBTU/yr			BTU	MMBTU
Natural Gas	33489670			33489670000	33490

*Energy coefficient derived from US EIA.
https://www.eia.gov/energyexplained/index.php?page=about_energy_units

Water Energy Use Year 2030 Mitigated

	WATER USE*	ELECTRIC INTENSITY		ANNUAL ELECTRIC USE (kWh/Yr)		
	MGAL/YR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	TOTAL
ANNUAL INDOOR WATER USE	92.90576	3500		325170		325,170
ANNUAL OUTDOOR WATER USE	0.00		0		0	

*Based on estimated water use derived from CalEEMod.

**Energy coefficient derived from US EIA.

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

BTU/kWh**	3412
BTU:	1109480586
MMBTU:	1109.48