# State Center Community College District
# First Responders Campus Project
# Draft Environmental Impact Report
**(State Clearinghouse No. 2020039018)**

# Appendix C
# Energy Analysis

# ENERGY IMPACT ASSESSMENT

FOR THE PROPOSED

# STATE CENTER COMMUNITY COLLEGE DISTRICT FIRST RESPONDERS CAMPUS PROJECT

COUNTY OF FRESNO, CA

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| | |
|---|---|
| °F | Degrees Fahrenheit |
| 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 |
| CALGreen | California Green Building Standards Code |
| CBC | California Building Code |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| CO2 | 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 |
| RPS | Renewables Portfolio Standard |
| RTP | Regional Transportation Plan |
| SAF | State Alternative Fuel |
| SB | Senate Bill |
| SCAQMD | South Coast Air Quality Management District |
| SCCCD | State Center Community College 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 First Responders Campus Project. This report also provides a summary of existing conditions in the project area and the applicable regulatory framework pertaining to energy.

# PROPOSED PROJECT

The State Center Community College District (SCCCD) is proposing to undertake the First Responders Campus Project (project).

The SCCCD proposed campus for first responders is to be located on the western half of an approximately 40-acre site northwest of the intersection of Willow and North Avenues in Fresno County, California. The proposed campus will include a fire academy, police academy, and EMT training in numerous small cohorts moving through the academy programs. Approximately 270 students would be on the campus at any one time, staffed by up to 50 employees, including administrators, faculty, and support staff. Site access is expected to be from one or more driveways connecting to North Avenue, with left turns into the site allowed from eastbound North Avenue.

The facilities will include a total of approximately 62,000 square feet of building area with a spot tower, a scenario village, and a virtual-reality/simulation laboratory, which may include joint use with the City of Fresno and other agencies. The police and fire academies are expected to begin daily operations at 7:00 a.m. and finish at approximately 5:00 p.m., although night classes until 10:00 p.m. are possible. Day courses for EMT training are likely to begin at 8:00 a.m. and end at 5:00 p.m. on Tuesdays, Wednesdays, and Thursdays. Evening courses for EMT training are likely to start at 6:00 p.m. and end by 10:00 p.m. on Tuesdays and Thursdays.

Construction is planned to occur from late 2021 to the middle of 2023.

A site vicinity map is presented in Figure 1, Site Vicinity Map, and a site plan is presented in Figure 2, Site Plan.

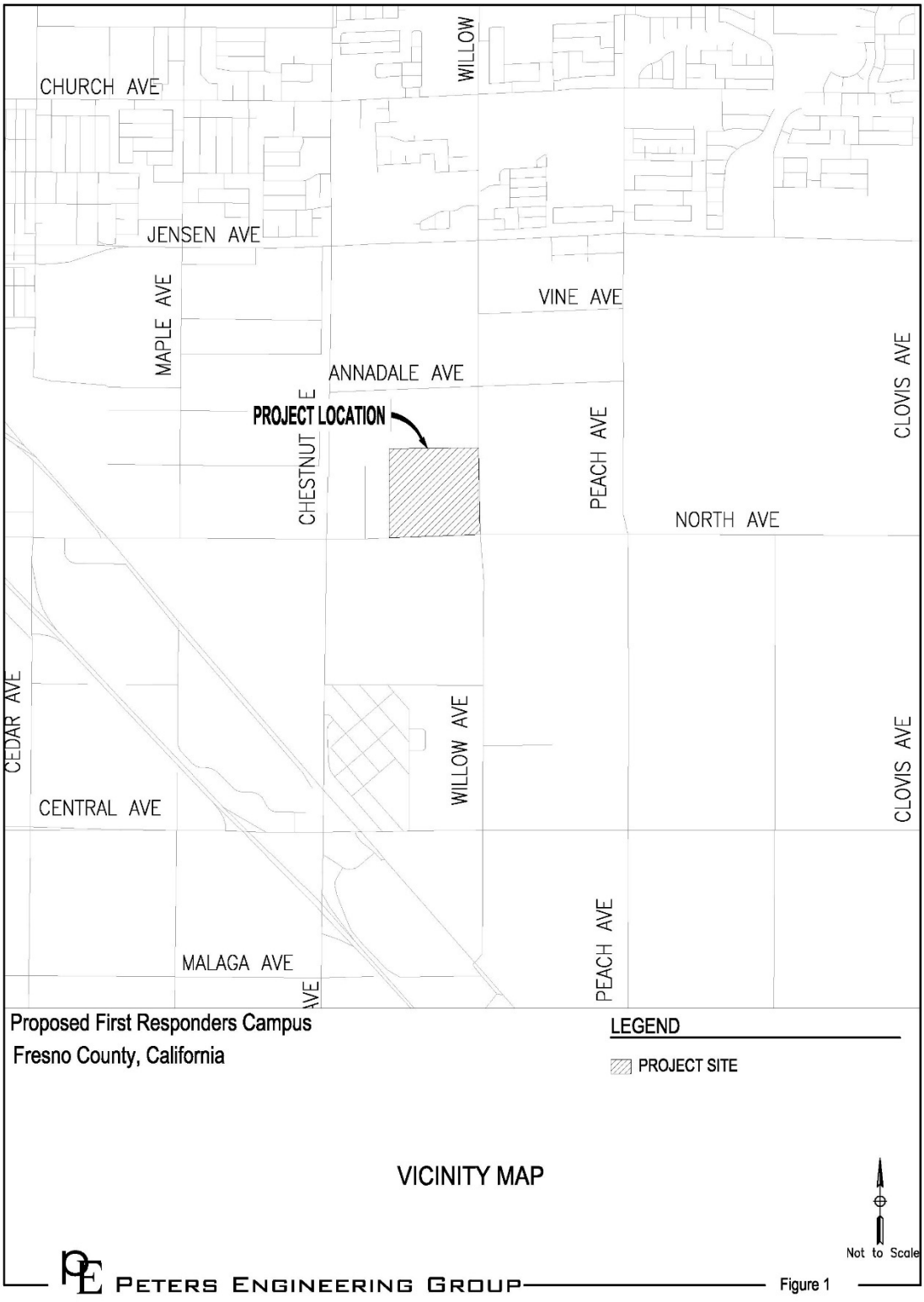
# ENERGY FUNDAMENTALS

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 used 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

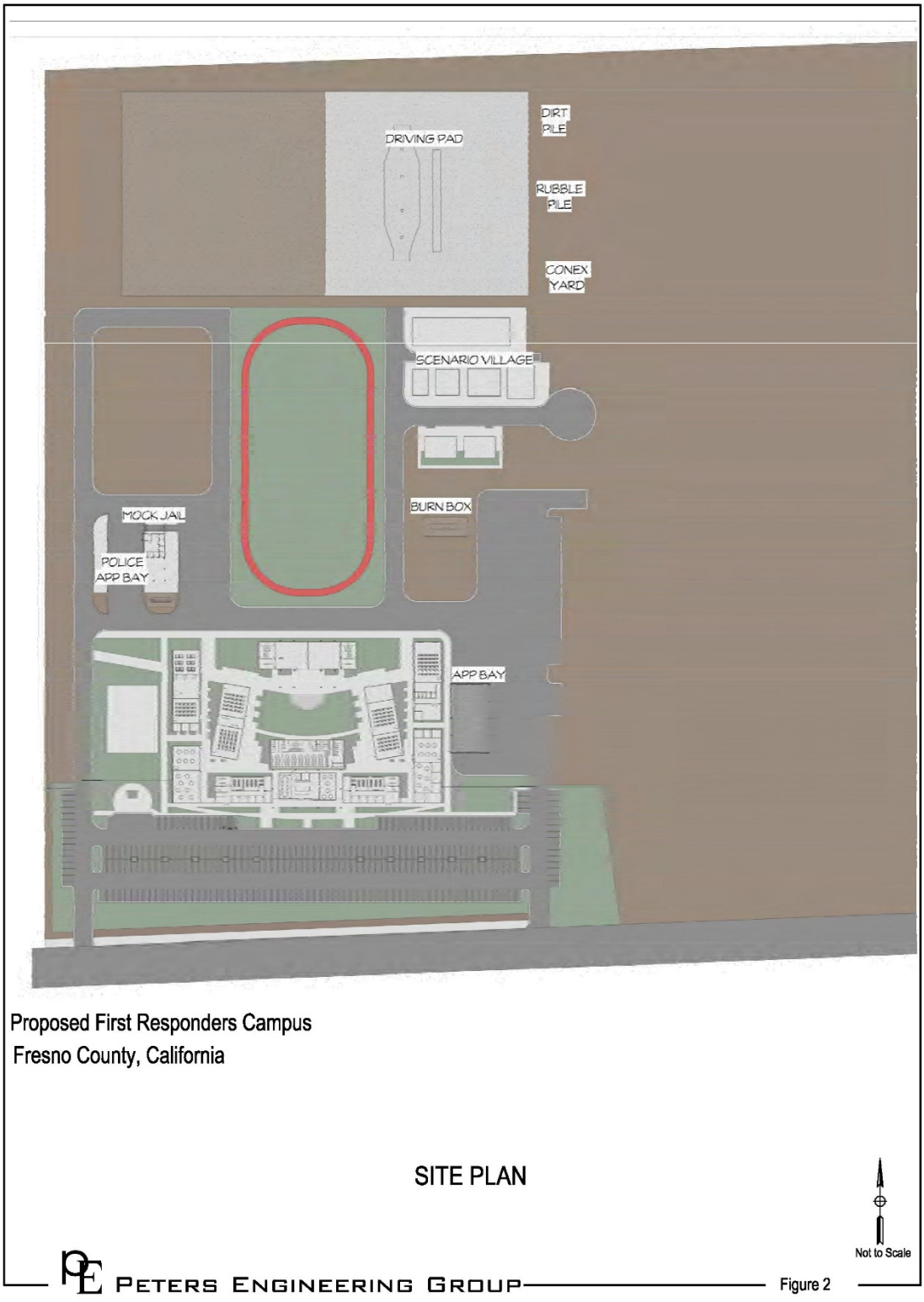
The project is located in the County of Fresno. The project area has a semi-arid climate with an annual average precipitation of approximately 11 inches. Temperatures in the project area range from an average minimum of approximately 37 degrees Fahrenheit (°F), in December, to an average maximum of 98°F, in July (WRCC 2021).

## Figure 1. Site Vicinity Map




Source: PEG 2021

## Figure 2. Site Plan




Source: PEG 2021

# Energy Resources

Energy sources for the County of Fresno are primarily served by Pacific Gas & Electric (PG&E) 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.

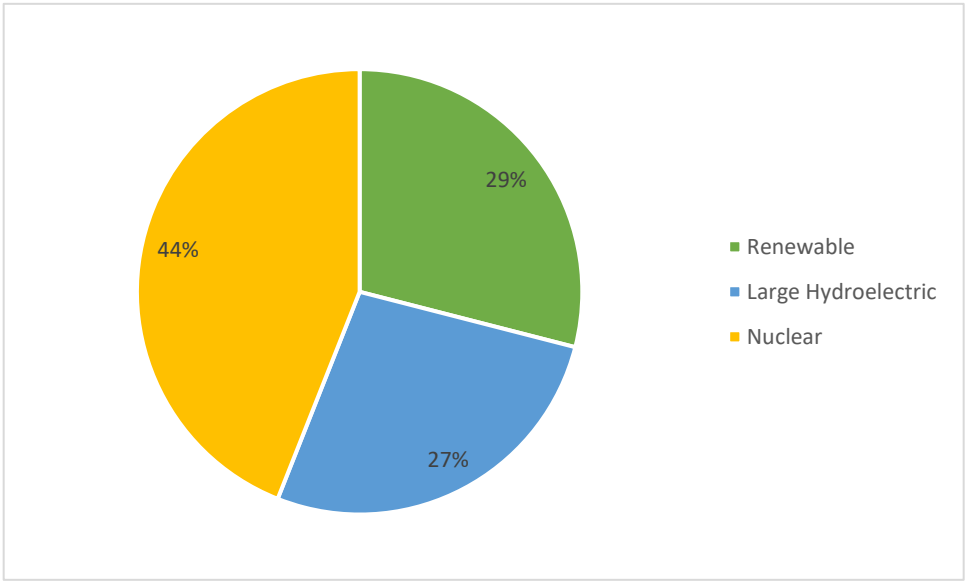
## *Electricity*

Electric services in the County of Fresno are provided by PG&E.

### Pacific Gas & Electric

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

**Figure 3. Pacific Gas & Electric 2019 Power Content Label**




Source: PG&E 2020a

## *Natural Gas*

Natural gas services in the County of Fresno are provided by 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.

## 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 green buildings standards were updated in May 2018. Referred to as the 2019 Building Energy Efficiency Standards, these updates focus on 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 nonresidential lighting requirements. Under the newly adopted standards, nonresidential buildings will use about 30 percent less energy due mainly to lighting upgrades (CEC 2018).

## 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

#### Fresno County General Plan

The Fresno County General Plan is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and for development in the county (County of Fresno 2000). Designed to meet State general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning Fresno County's future. Applicable energy policies and programs include, but are not limited to:

- Policy LU-H.7(j): Energy conservation, and utilization of renewable resources should be given prominent consideration.
- Program H-I.B: The County shall consider inclusion of design standards for new development that encourage alternative transportation (for example, bicycle lanes, bus turnouts, and direct pedestrian connections to transit lines) as a part of the update of the County Zoning Ordinance to conserve energy and improve air quality.
- Policy H-J.2: The County shall promote public awareness of the need for energy conservation.
- Policy H-J.5: The County shall promote and support Pacific Gas and Electric Company's "Energy Partnership Program" aimed at education and conservation efforts.
- Policy H-J.5: The County shall promote and encourage the use of architectural design standards that reduce energy use.

# 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 during construction (e.g., fuel use), it is assumed that only diesel fuel would be used in construction equipment. On-road vehicles for hauling materials and worker commute trips are assumed to use a mix of diesel and gasoline fuel. 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 2016.3.2. 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 site preparation, grading, building construction, and paving. Demolition is not anticipated during construction.

## *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 the CalEEMod. 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. A maximum daily trip rate of 1,256 was used to calculate mobile-source emissions (PEG 2021). Annual energy usage was quantified based on CalEEMod default assumptions for PG&E, including compliance with the RPS. Average fuel usage rates by vehicle class, fuel type (e.g., diesel, gasoline, electric, and natural gas), and calendar year were obtained for Fresno County's emissions inventory and derived from ARB's Emissions Factors (EMFAC) 2017 version 1.0.3 (ARB 2017).

# 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 annual estimated of 32,376 gallons of diesel. On-road vehicles would use an annual estimated of 31,490 gallons of gasoline and 322 gallons of diesel. In total, construction fuel use would equate to approximately 8,281 million British thermal units (MMBTU) per year. Construction equipment use and associated energy consumption would be typical of that commonly associated with the construction of new land uses. 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. Furthermore, on-site construction equipment may include alternatively-fueled vehicles (e.g., natural gas) where feasible. Energy use associated with the 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, 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 | Annual Fuel Use (gallons) | Annual MMBTU |
|---|---|---|
| Off-Road Equipment Use (Diesel) | 32,376 | 4,448 |
| On-Road Vehicles (Gasoline) | 31,490 | 3,789 |
| On-Road Vehicles (Diesel) | 322 | 44 |
| | Total: | 8,281 |

MMBTU = Million British thermal units
Fuel use was calculated based, in part, on default construction schedules, the 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 vehicle 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 shown in Table 2, the vehicle trips associated with the proposed land use would consume an annual estimated 67,076 gallons of diesel and 138,738 gallons of gasoline. The development of increasingly efficient automobile engines would result in increased energy efficiency and energy conservation. Implementation of GHG Mitigation Measure GHG-1 would also ensure that the proposed project reduces motor vehicle use and operational fuel consumption. 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**

| Source | Annual Fuel Use (gallons) | Annual MMBTU |
|---|---|---|
| On-Road Vehicles (Diesel) | 67,076 | 9,215 |
| On-Road Vehicles (Gasoline) | 138,738 | 16,695 |
| | Total: | 25,910 |

MMBTU = Million British thermal units
Fuel use was calculated based, in part, on project trip generation rates derived from the traffic analysis for the project.
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 proposed land use.

Estimated electricity and natural gas consumption associated with the proposed facilities are summarized in Table 3. As depicted, the project would result in the annual consumption of approximately 708,040 kilowatt hours (kWh) of electricity, 27,291 kWh of water, and 1,369,580 kilo British thermal units (kBTU) of natural gas. In total, the proposed project would consume an annual total of approximately 3,879 MMBTU. 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). Adherence to Title 24 requirements and previously noted, Fresno County General Plan energy policies and programs would ensure that the project would not result in wasteful and inefficient use of non-renewable resources due to building operation. For this reason, this impact would be considered **less than significant**.

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

| Source | Annual Energy Use | Annual MMBTU |
|---|---|---|
| Electricity (kWh) | 708,040 | 2,416 |
| Water (kWh) | 27,291 | 93 |
| Natural Gas Use (kBTU) | 1,369,580 | 1,370 |
| | Total: | 3,879 |

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, implementation of GHG Mitigation Measure GHG-1 would comply with applicable Fresno County General Plan energy policies and programs. The energy policies and programs ensure 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 Fresno County General Plan pertaining to renewable energy and energy efficiency. Furthermore, implementation of GHG Mitigation Measure GHG-1 would ensure that the proposed project reduces motor vehicle use and operational fuel consumption. 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**.

# REFERENCES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# APPENDIX A

# ENERGY MODELING

# Energy Use Summary

**Construction Energy Use**

| | Annual Gallons | Annual MMBTU |
|---|---|---|
| Off-Road Equipment Fuel (Diesel) | 32,376 | 4,448 |
| On-Road Vehicle Fuel (Gasoline) | 31,490 | 3,789 |
| On-Road Vehicle Fuel (Diesel) | 322 | 44 |
| | **Total:** | 8,281 |

MMBTU = Million British thermal unit

**Operational Fuel Use**

| | Annual Gallons | Annual MMBTU |
|---|---|---|
| Mobile Fuel (Diesel) | 67,076 | 9,215 |
| Mobile Fuel (Gasoline) | 138,738 | 16,695 |
| | **Total:** | 25,910 |

MMBTU = Million British thermal unit

**Operational Electricity, Water, and Natural Gas Use**

| | Annual Energy | Annual MMBTU |
|---|---|---|
| Electricity (kWh) | 708,040 | 2,416 |
| Water Use, Treatment & Conveyance (kWh) | 27,291 | 93 |
| Natural Gas (kBTU) | 1,369,580 | 1,370 |
| | **Total:** | 3,879 |

MMBTU = Million British thermal unit; kWh = Kilowatt hour; kBTU = Kilo British thermal unit

## Construction Fuel Use - Off-Road Vehicles and Equipment

**OFF-ROAD VEHICLES AND 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 (gal/hp-h) | Total Fuel Diesel (Gallons) |
|---|---|---|---|---|---|---|---|---|---|
| Demolition | 0 | Excavators | 158 | 0 | 0 | 0 | 0.38 | 0.05 | 0 |
| | | Concrete Saws | 81 | 0 | 0 | 0 | 0.73 | 0.05 | 0 |
| | | Rubber Tired Dozer | 247 | 0 | 0 | 0 | 0.40 | 0.05 | 0 |
| Site Preparation | 15 | Rubber Tired Dozers | 247 | 3 | 8 | 15 | 0.40 | 0.05 | 1,778 |
| | | Tractors/Loaders/Backhoes | 97 | 4 | 8 | 15 | 0.37 | 0.05 | 861 |
| Grading | 38 | Excavators | 158 | 2 | 8 | 38 | 0.38 | 0.05 | 1,825 |
| | | Graders | 187 | 1 | 8 | 38 | 0.41 | 0.05 | 1,165 |
| | | Rubber Tired Dozers | 247 | 1 | 8 | 38 | 0.40 | 0.05 | 1,502 |
| | | Scrapers | 367 | 2 | 8 | 38 | 0.48 | 0.05 | 5,355 |
| | | Tractors/Loaders/Backhoes | 97 | 2 | 8 | 38 | 0.37 | 0.05 | 1,091 |
| Building Construction | 370 | Cranes | 231 | 1 | 7 | 370 | 0.29 | 0.05 | 8,675 |
| | | Forklifts | 89 | 3 | 8 | 370 | 0.20 | 0.05 | 7,903 |
| | | Generator Sets | 84 | 1 | 8 | 370 | 0.74 | 0.05 | 9,200 |
| | | Tractors/Loaders/Backhoes | 97 | 3 | 7 | 370 | 0.37 | 0.05 | 13,943 |
| | | Welders | 46 | 1 | 8 | 370 | 0.45 | 0.05 | 3,064 |
| Paving | 28 | Pavers | 130 | 2 | 8 | 28 | 0.42 | 0.05 | 1,223 |
| | | Paving Equipment | 132 | 2 | 8 | 28 | 0.36 | 0.05 | 1,064 |
| | | Rollers | 80 | 2 | 8 | 28 | 0.38 | 0.05 | 681 |
| Architectural Coating | 28 | Air Compressors | 78 | 1 | 6 | 28 | 0.48 | 0.05 | 314 |

hp = Horsepower; gal/hp-h = Gallons per horsepower - hour; BTU = British thermal unit; MMBTU = Million British thermal unit

Equipment usage assumptions based on default assumptions contained in CalEEMod.

| | |
|---|---|
| **Total Diesel Fuel Use (Gallons):** | 59,646 |
| **Number of Construction Years:** | 1.8 |
| **Average Diesel Fuel Use/Year:** | 32,376 |
| **BTU/Gallon:** | 137,381 |
| **BTU:** | 8,194,273,011 |
| **MMBTU:** | 8,194 |
| **MMBTU/Year:** | 4,448 |

## Construction Fuel Use - On-Road Vehicles

**ON-ROAD VEHICLE FUEL USE**

| Activity | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Total | LDA | LDT1 | LDT2 | MDV | HDV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Days | 15 | 38 | 370 | 28 | 28 | | | | | | |
| Worker Trips | 18 | 20 | 27 | 15 | 5 | | | | | | |
| Miles/Trip | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | | | | | | |
| Total VMT | 4,536 | 12,768 | 167,832 | 7,056 | 2,352 | 194,544 | 64,848 | 64,848 | 64,848 | 0 | 0 |
| Vendor Trips | 0 | 0 | 10 | 0 | 0 | | | | | | |
| Miles/Trip | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | | | | | | |
| Total VMT | 0 | 0 | 24,420 | 0 | 0 | 24,420 | 0 | 0 | 0 | 24,420 | 0 |
| Haul Trips | 0 | 0 | 0 | 0 | 0 | | | | | | |
| Miles/Trip | 20 | 20 | 20 | 20 | 20 | | | | | | |
| Total VMT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

VMT = Vehicle miles traveled

| Gasoline | Total VMT | Gallons/Mile* | Gallons | BTU/Gallon** | BTU | MMBTU | MMBTU/Year | Gallons/Year |
|---|---|---|---|---|---|---|---|---|
| **LDA** | 63,859 | 0.27 | 17,006 | 120,333 | 2,046,442,644 | 2,046 | 1,111 | 9,231 |
| **LDT1** | 63,859 | 0.30 | 18,939 | 120,333 | 2,279,003,315 | 2,279 | 1,237 | 10,280 |
| **LDT2** | 63,859 | 0.33 | 21,181 | 120,333 | 2,548,748,164 | 2,549 | 1,383 | 11,497 |
| **MDV** | 24,047 | 0.04 | 888 | 120,333 | 106,898,419 | 107 | 58 | 482 |

VMT = Vehicle miles traveled; BTU = British thermal unit; MMBTU = Million British thermal unit

*Gallons per mile based on year 2021 conditions for Fresno County. Derived from EMFAC2017 (v1.0.3) Emissions Inventory.

**Energy coefficient derived from U.S. EIA.

| Diesel | Total VMT | Gallons/Mile* | Gallons | BTU/Gallon** | BTU | MMBTU | MMBTU/Year | Gallons/Year |
|---|---|---|---|---|---|---|---|---|
| **LDA** | 989 | 0.17 | 170 | 137,381 | 23,347,938 | 23 | 13 | 92 |
| **LDT1** | 989 | 0.18 | 174 | 137,381 | 23,913,577 | 24 | 13 | 94 |
| **LDT2** | 989 | 0.24 | 236 | 137,381 | 32,392,517 | 32 | 18 | 128 |
| **MDV** | 373 | 0.04 | 14 | 137,381 | 1,890,818 | 2 | 1 | 7 |

VMT = Vehicle miles traveled; BTU = British thermal unit; MMBTU = Million British thermal unit

*Gallons per mile based on year 2021 conditions for Fresno County. Derived from EMFAC2017 (v1.0.3) Emissions Inventory.

**Energy coefficient derived from U.S. EIA.

## Construction Fuel Use - On-Road Vehicles

## Construction Fuel Use - On-Road Vehicles

| EMFAC2017 Fuel Rate Calculation | Fuel Consumption (1000 Gallons/Day)* | | VMT (Miles/Day)** | | |
|---|---|---|---|---|---|
| | Diesel | Gasoline | Diesel | Gasoline | TOTAL |
| LDA | 2.24 | 450.58 | 13041.17 | 1691918.99 | |
| LDT1 | 0.02 | 52.13 | 93.98 | 175754.88 | |
| LDT2 | 0.64 | 198.00 | 2687.42 | 596970.03 | |
| MDV | 3.20 | 215.18 | 86518.71 | 4140987.57 | |
| **Total** | 6.09 | 915.89 | 102341.28 | 6605631.46 | 6707972.74 |
| **Percent of Total** | | | 0.02 | 0.98 | |
| **LDA-Miles/Gallon** | 5.82 | 3.75 | | | |
| **LDA-Gallons/Mile** | 0.17 | 0.27 | | | |
| **LDT1-Miles/Gallon** | 5.68 | 3.37 | | | |
| **LDT1-Gallons/Mile** | 0.18 | 0.30 | | | |
| **LDT2-Miles/Gallon** | 4.20 | 3.01 | | | |
| **LDT2-Gallons/Mile** | 0.24 | 0.33 | | | |
| **MDV-Miles/Gallon** | 27.07 | 19.24 | | | |
| **MDV-Gallons/Mile** | 0.04 | 0.05 | | | |

VMT = Vehicle miles traveled

Fuel consumption and VMT based on Fresno County.

*Fuel consumptions derived from EMFAC2017 (v1.0.3) for year 2021 conditIons.

**VMT derived from EMFAC2017 (v1.0.3) for year 2021 conditons.

## Operational Fuel Use - On-Road Vehicles

**ON-ROAD VEHICLE FUEL USE**

| LAND USE | Annual VMT |
|---|---|
| Junior College | 4,391,830 |
| Total | 4,391,830 |

VMT = Vehicle miles traveled

| | Annual VMT | Gallons/Mile* | Gallons | BTU/Gallon** | BTU | MMBTU |
|---|---|---|---|---|---|---|
| **Diesel** | 586,245 | 0.11 | 67,076 | 137,381 | 9,214,997,389 | 9,215 |
| **Gasoline** | 3,805,585 | 0.04 | 138,738 | 120,333 | 16,694,722,701 | 16,695 |

VMT = Vehicle miles traveled; BTU = British thermal unit; MMBTU = Million British thermal unit

*Gallons per mile based on year 2024 conditions for Fresno County. Derived from EMFAC2017 (v1.0.3) Emissions Inventory.

**Energy coefficient derived from U.S. EIA.

## Operational Fuel Use - On-Road Vehicles

## Operational Fuel Use - On-Road Vehicles

| EMFAC2017 Fuel Rate Calculation | Fuel Consumption (1000 Gallons/Day)* | | VMT (Miles/Day)** | | |
|---|---|---|---|---|---|
| | Diesel | Gasoline | Diesel | Gasoline | |
| All Other Buses | 1.126075202 | | 10917.78051 | | |
| LDA | 2.617033897 | 439.3860413 | 143056.4597 | 14641841.35 | |
| LDT1 | 0.012078067 | 50.40365765 | 320.9439304 | 1420789.367 | |
| LDT2 | 0.796226704 | 182.0001116 | 32232.39337 | 4794679.772 | |
| LHD1 | 18.80412128 | 38.41151607 | 343899.4509 | 328049.6356 | |
| LHD2 | 7.512878238 | 7.326304932 | 122653.4263 | 54214.43004 | |
| MCY | | 3.794715687 | | 143680.6365 | |
| MDV | 3.326210975 | 181.7026156 | 97267.43592 | 3809022.188 | |
| MH | 0.622461141 | 2.866713014 | 6211.768507 | 14169.27164 | |
| Motor Coach | 1.242915546 | | 8193.361201 | | |
| PTO | 2.956374635 | | 15698.62652 | | |
| OBUS | | 3.176153125 | | 15359.19986 | |
| SBUS | 4.170902049 | 0.523868083 | 33718.66982 | 5008.773596 | |
| T6 Ag | 0.077794751 | | 705.6481452 | | |
| T6 CAIRP heavy | 2.593973996 | | 31005.10848 | | |
| T6 CAIRP small | 0.389535003 | | 4322.783547 | | |
| T6 instate construction heavy | 4.543240545 | | 39218.93407 | | |
| T6 instate construction small | 14.56421982 | | 126688.4133 | | |
| T6 instate heavy | 22.48756282 | | 237641.0701 | | |
| T6 instate small | 21.98588483 | | 225293.5021 | | |
| T6 OOS heavy | 1.485036684 | | 17750.27577 | | |
| T6 OOS small | 0.227964362 | | 2529.565597 | | |
| T6 Public | 0.986218788 | | 7149.576938 | | |
| T6 utility | 0.19980405 | | 1900.274661 | | |
| T6TS | | 10.61038415 | | 52657.23318 | |
| T7 Ag | 0.136000842 | | 779.2144455 | | |
| T7 CAIRP | 69.73559899 | | 496862.8072 | | |
| T7 CAIRP construction | 4.588607494 | | 28171.30103 | | |
| T7 NNOOS | 80.28359769 | | 605688.7556 | | |
| T7 NOOS | 28.10204099 | | 195220.4321 | | |
| T7 other port | 1.52969966 | | 9597.249321 | | |
| T7 POAK | 6.400526281 | | 38512.6651 | | |
| T7 POLA | 6.544852952 | | 39183.41458 | | |
| T7 Public | 3.075711476 | | 17854.48637 | | |
| T7 Single | 11.65237111 | | 79061.42106 | | |
| T7 single construction | 12.08867801 | | 69887.81629 | | |
| T7 SWCV | 6.56228167 | | 16590.21883 | | |
| T7 tractor | 91.77018771 | | 728714.881 | | |
| T7 tractor construction | 10.04099575 | | 57651.29546 | | |
| T7 utility | 0.123195856 | | 740.5479684 | | |
| T7IS | | 0.117344581 | | 497.0627275 | |
| UBUS | 0.339261118 | 1.552571801 | 2534.80145 | 7049.497546 | |
| **Total** | 445.702121 | 921.8719977 | 3895426.777 | 25287018.42 | 29182445.19 |
| **Percent of Total** | | | 13.35% | 86.65% | |
| **Miles/Gallon** | 8.739978101 | 27.43007541 | | | |
| **Gallons/Mile** | 0.114416763 | 0.036456334 | | | |

VMT = Vehicle miles traveled

Fuel consumption and VMT based on Fresno County.

*Fuel consumptions derived from EMFAC2017 (v1.0.3) for year 2024 conditons.

**VMT derived from EMFAC2017 (v1.0.3) for year 2024 conditons.

## Operational Water Energy Use

**WATER ENERGY USE**

| | WATER USE* | ELECTRIC INTENSITY FACTORS (kWh/Mgal) | | ANNUAL ELECTRIC USE (kWh/Yr) | | |
|---|---|---|---|---|---|---|
| | Mgal/Yr | INDOOR | OUTDOOR | INDOOR | OUTDOOR | TOTAL |
| **ANNUAL INDOOR WATER USE** | 3.04 | 3,500 | | 10,644 | | 27,291 |
| **ANNUAL OUTDOOR WATER USE** | 4.76 | | 3,500 | | 16,648 | |

Mgal = Million gallons; kWh = Kilowatt hour; BTU = British thermal unit; MMBTU = Million British thermal unit

*Based on estimated water use derived from CalEEMod.

**Energy coefficient derived from US EIA.

| | |
|---|---|
| **BTU/kWh**** | 3,412 |
| **BTU:** | 93,118,223 |
| **MMBTU:** | 93 |

## Operational Electricity and Natural Gas Use

**ELECTRICITY ENERGY USE**

| | kWh/Yr | MWh/Yr | BTU/kWh* | BTU | MMBTU |
|---|---|---|---|---|---|
| Junior College | 708,040 | | | | |
| Electricity | 708,040 | 708 | 3,412 | 2,415,832,480 | 2,416 |

kWh = Kilowatt hour; MWh = Megawatt hour; BTU = British thermal unit; MMBTU = Million british thermal unit

*Energy coefficient derived from U.S. EIA.

**NATURAL GAS ENERGY USE**

| | kBTU/Yr | | | BTU | MMBTU |
|---|---|---|---|---|---|
| Junior College | 1,369,580 | | | | |
| Natural Gas | 1,369,580 | | | 1,369,580,000 | 1,370 |

kBTU = Kilo British thermal unit; BTU = British thermal unit; MMBTU = Million British thermal unit

*Energy coefficient derived from U.S. EIA.