New Hilmar Unified Elementary School Project
Initial Study
(State Clearinghouse No. 2019110288)

Appendix 2:

Energy Impact Analysis

ENERGY IMPACT ANALYSIS

FOR THE PROPOSED

NEW ELEMENTARY SCHOOL PROJECT

HILMAR UNIFIED SCHOOL DISTRICT
HILMAR, CA

DECEMBER 2020

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LIST OF COMMON TERMS & ACRONYMS

CalEEMod	California Emissions Estimator Model
CARB	California Air Resource Board
CEQA	California Environmental Quality Act
CHP	Combined Heat and Power
DSG	Department of General Services
EMFAC	Emissions Factor
EO	Executive Order
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
kBTU	Kilo British Thermal Units
kW	Kilowatt
kWh	Kilowatt Hour
MW	Megawatt
PG&E	Pacific Gas and Electric
PV	Photovoltaic
SCAQMD	South Coast Air Quality Management District
SJVAPCD	San Joaquin Valley Air Pollution Control District
USDOT	U.S. Department of Transportation
VMT	Vehicle Mile Traveled

INTRODUCTION

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

PROPOSED PROJECT SUMMARY

The new elementary school campus will provide instruction for Pre-K through 2nd grades and will serve approximately 600 students. Buildout of the new campus will include six classroom buildings housing 25 classrooms; one building housing a library and administrative office; a multipurpose building with an outdoor amphitheater area; and recreational areas including hardcourts, play structures, and turfed athletic fields. At the Elim Elementary campus, the "front" of Elim will be reoriented from facing Lander Avenue (State Route 165) to facing a new interior access area, where a new administration building will be constructed for the Elim campus. New driveways from Geer Avenue will serve as the main access to both elementary schools. A parking area with approximately 58 spaces is proposed to be developed along the eastern portion of the new elementary school campus. The project will also include designated vehicle and bus drop-off areas for each campus.

As part of the project's operation, Pre K through 2nd grades will relocate from Elim Elementary to the new elementary school, leaving Elim with 3rd through 5th grades. Elim's current student population will be reduced from approximately 1,000 to 500 students, and 24 classrooms (all portables) will be removed from its current total of 50 classrooms, leaving the Elim campus with approximately 26 classrooms. The project will increase overall student capacity from approximately 1,000 to 1,200 total students in Pre-K through 5th grades. While each campus is anticipated to have a maximum of 60 staff, it is anticipated that some staff will be shared given the proximity of the schools.

ENERGY FUNDAMENTALS

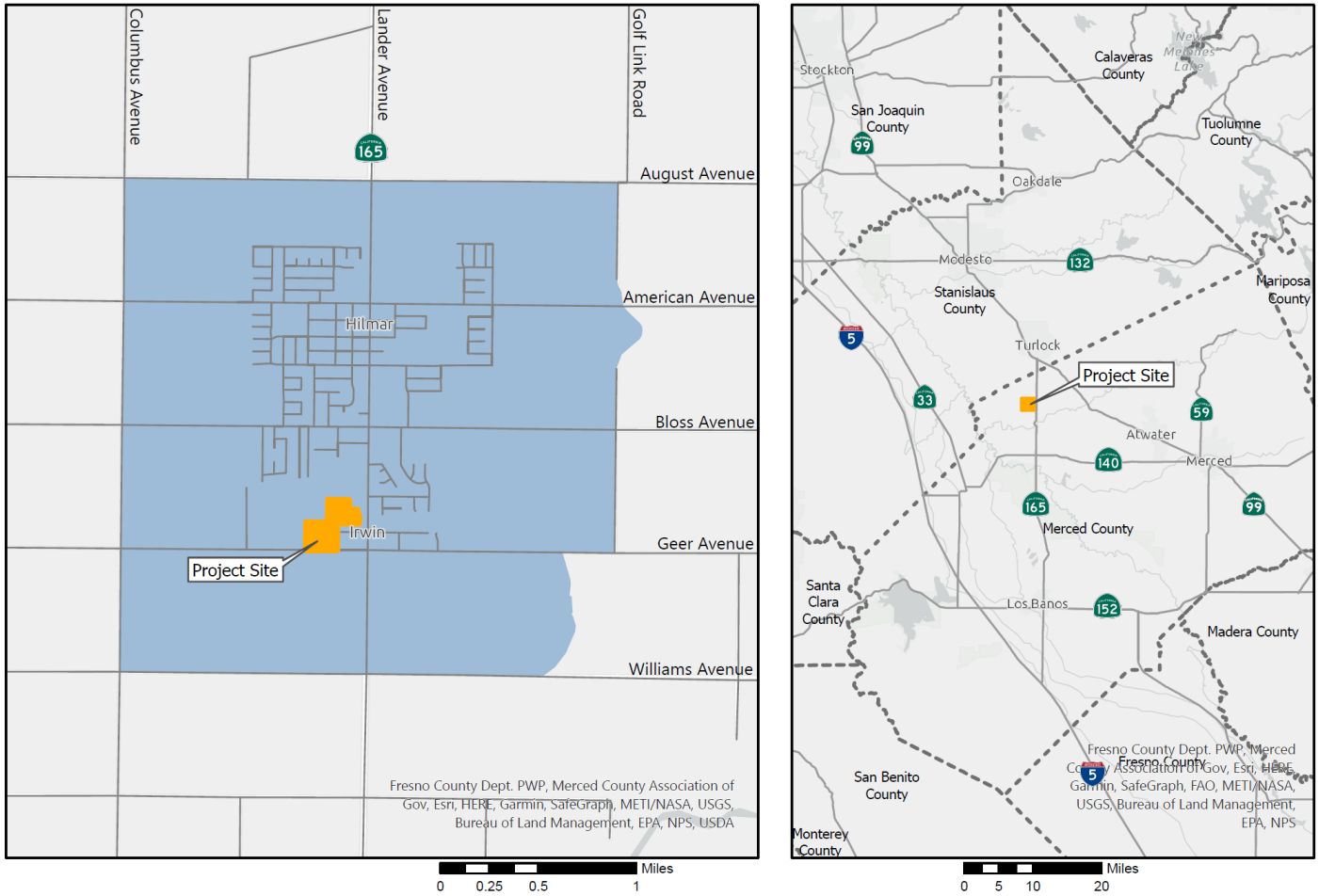
Energy use is typically associated with transportation, construction, and the operation of land uses. Transportation energy use is generally categorized by direct and indirect energy. Direct energy relates to energy consumption by vehicle propulsion. Indirect energy relates to the long-term indirect 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

PHYSICAL SETTING

The project is located in the community of Hilmar, in Merced County. The community is served primarily by Pacific Gas & Electric (PG&E). The climate in the project area is semi-arid, with an annual normal precipitation of approximately 12 inches. Temperatures in the project area range from an average minimum of approximately 38 degrees Fahrenheit (°F) in January to an average maximum of 95°F, in July (WRCC 2020).

Figure 1. Local and Regional Project Location



Local and Regional Location **Figure 1**

New Elementary School Project
Hilmar Unified School District

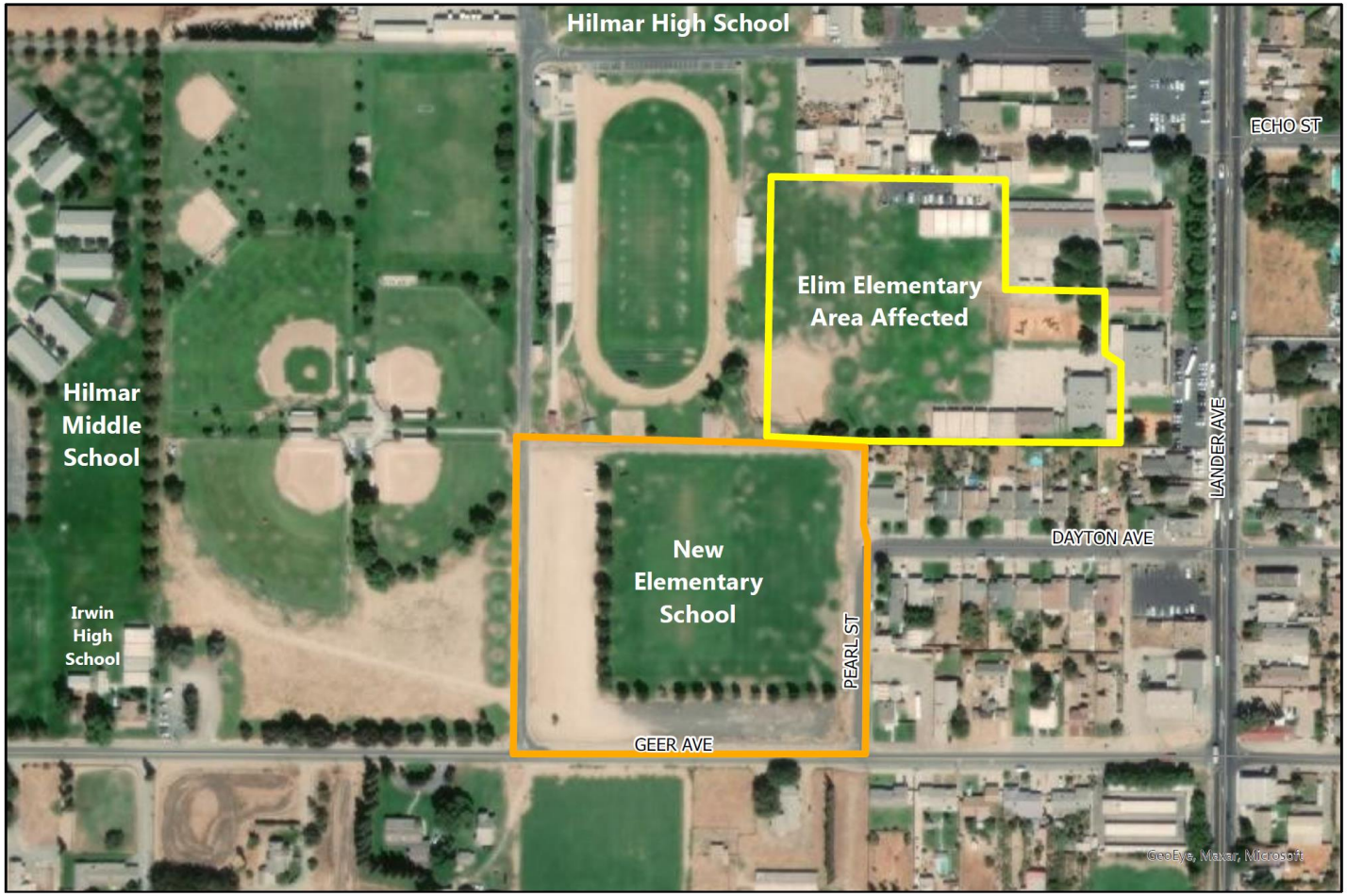
ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

Project Site
Hilmar Census Designated Place

N

Source: OPR 2020

Figure 2. Project Site



Project Site **Figure 2**

New Elementary School Project
Hilmar Unified School District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

0 125 250 500 Feet

N

Source: OPR 2020

Figure 3. Project Site Plan

Source: OPR 2020

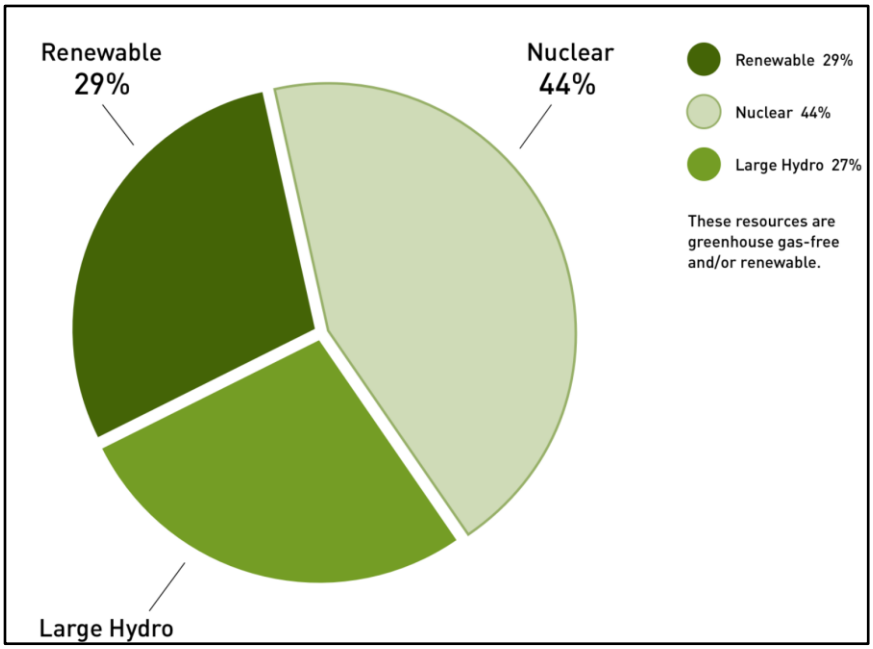
ENERGY RESOURCES

As noted above, electricity and natural gas resources for project area are provided primarily by PG&E. Electricity and natural gas resources are discussed in greater detail, as follows:

ELECTRICITY

Electric services in the project area are purchased from a regulated electric utility, PG&E. The breakdown of PG&E's power mix is shown in Figure 4. As shown, roughly 29 percent of PG&E's 2019 total electric power mix came from renewables, such as solar and wind generation. Approximately 44 percent of their mix came from nuclear generation and the remaining approximately 27 percent came from hydro. These sources are GHG-free and/or renewable (PG&E 2020a).

Figure 4. PG&E 2019 Power Mix



Source: PG&E 2020

NATURAL GAS

As of December 31, 2017, PG&E's natural gas system consisted of approximately 42,800 miles of distribution pipelines, over 6,400 miles of backbone and local transmission pipelines, and various storage facilities. Overall, the vast majority of the gas supplies that serve PG&E customers are sourced from out of state with only a small portion originating from California reservoirs, whose output continues to decline. In 2017, natural gas throughput provided by PG&E totaled 800,923 million cubic feet (MMcf). Natural gas throughput has decreased over by past few years. In comparison to year 2015 throughput, natural gas throughput has decreased by 103,599 MMcf, an approximate 11.5 percent reduction (PG&E 2020b).

REGULATORY FRAMEWORK

FEDERAL

REGULATIONS FOR GREENHOUSE GAS EMISSIONS FROM PASSENGER CARS AND TRUCKS AND CORPORATE AVERAGE FUEL ECONOMY STANDARDS

In October 2012, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce 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 (CO2) per mile for the fleet of cars and light-duty trucks by the model year 2025.

In January 2017, 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, EPA Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that EPA intends to reconsider the Final Determination. On April 2, 2018, 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 EPA, these key assumptions include gasoline prices and overly optimistic consumer acceptance of advanced technology vehicles. The April 2nd notice is not EPA's final agency action. The EPA intends to initiate rulemaking to adopt new standards. Until that rulemaking has been completed, the current standards remain in effect. (EPA 2017, EPA 2018).

ENERGY POLICY AND CONSERVATION ACT

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. 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 National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (USDOT), 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 miles per gallon (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 EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. 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 USDOT 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 2076: REDUCING DEPENDENCE ON PETROLEUM

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resources 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) (CEC and 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 1078: CALIFORNIA RENEWABLES PORTFOLIO STANDARD PROGRAM

Senate Bill 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 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard 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. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superseded this Executive Order 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 350: CLEAN ENERGY AND POLLUTION 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 doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030.

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 *Energy Action Plan 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 recently 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.

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 Plan (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 greenhouse gas (GHG) emissions, and increase in-state production of biofuels without causing significant degradation of public health and environmental quality.

EXECUTIVE ORDER S-06-06

Executive Order (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 Executive Order 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 Executive Order 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.

As of 2016, 2.7 percent of the total electrical system power in California was derived from biomass (CEC 2017).

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 California Building Code 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 California Building Code, 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 most recently updated in May 2018. Referred to as the *2019 Building Energy Efficiency Standards*, these most recent 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 non-residential lighting requirements. Under the newly adopted standards, nonresidential buildings will use about 30 percent less energy due mainly to lighting upgrades (CEC 2018).

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. 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.

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. 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.

EXECUTIVE ORDER B-48-18: ZERO EMISSION VEHICLES

In January 2018, Governor Brown signed Executive Order 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.

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.

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).

IMPACT ANALYSIS

THRESHOLDS OF SIGNIFICANCE

Based on Appendix F and G of the State CEQA Guidelines, the proposed project would result in a potentially significant impact on energy use if it would:

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

2. 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

Regarding energy use (e.g., fuel use) during construction, it is assumed that only diesel fuel would be used to power off-road 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). 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).

OPERATIONS

The long-term operation of proposed project would require electricity and natural gas usage for lighting, space and water heating, appliances, water conveyance, and landscaping maintenance equipment. Indirect energy use would include wastewater treatment and solid waste removal. Project operation would also include the consumption of diesel and gasoline fuel from on-road vehicles.

Building energy use was estimated using CalEEMod, version 2016.3.2. Energy use included electricity and natural gas use, including electricity associated with the use, conveyance, and treatment of water. To be conservative, estimated energy use was based on year 2023 operational conditions. 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 net increases in vehicle miles traveled (VMT) data associated with the proposed project. Net increases in annual VMT was estimated using CalEEMod, version 2016.3.2. Average fuel usage rates by vehicle class, fuel type (e.g., diesel, gasoline, electric, and natural gas), and calendar year were obtained from Merced County's emissions inventory derived from ARB's Emissions Factors (EMFAC) 2017 version 1.0.2 (ARB 2017b). It is important to note that the vehicle fleet used for the calculation of fuel use was conservatively based on the County-wide fleet distribution contained in the EMFAC model, which includes various classifications of heavy-duty trucks. Because the proposed project is anticipated to consist largely of light-duty gasoline vehicles, estimated fuel use is considered conservative and actual fuel use, particularly diesel fuel use, would likely be less.

PROJECT IMPACTS AND MITIGATION MEASURES

Impact E-1:	***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 of the proposed facilities, 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, operation of off-road construction equipment would use an estimated total of 33,446 gallons of diesel fuel. On-road vehicles would use approximately 2,359 gallons of gasoline and 505 gallons of diesel fuel. In total, fuel use would equate to approximately 4,948 million British thermal units per year (MMBU) over the life of the construction project. 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. Idling of on-site equipment during construction would be limited to no more than five minutes in accordance with applicable state and San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements. Furthermore, on-site construction equipment may include alternatively-fueled vehicles (e.g., natural gas) where feasible. Energy use associated with construction of the proposed facilities 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 proposed facilities and improvements 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
Off-Road Equipment Use (Diesel)	33,446	4,595
On-Road Vehicles (Gasoline)	2,359	284
On-Road Vehicles (Diesel)	505	69
	Total:	4,948
Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified 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 commute trips to and from the campus. Energy use associated with commute trips are discussed in greater detail, as follows:

Table 2 summarizes the net increases in fuel use at build-out of the proposed land uses. As noted in Table 2, the proposed land uses would consume an estimated 8,504 gallons/year of diesel fuel and an estimated 10,036 gallons/year of gasoline. In total, fuel use would equate to approximately 2,376 MMBU/year. However, a large majority of the estimated fuel use would be associated with the use of personal vehicles for the transport of students. The operation of HUSD-owned vehicles would comply with applicable regulatory requirements, including state requirements to limit idling periods for diesel-fueled buses. As a result, 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	Total Fuel Use (gallons)	Total MMBTU
Proposed Land Uses		
On-Road Vehicles (Diesel)	8,504	1,168
On-Road Vehicles (Gasoline)	10,036	1,208
	Total:	2,376
Fuel use was calculated based, in part, on VMT data for the proposed land uses derived from CalEEMod. 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 uses. It is important to note that the proposed buildings would be required to comply with Title 24 standards for energy-efficiency, which would include increased building insulation and energy-efficiency requirements, including the use of energy-efficient lighting, energy-efficient appliances, and use of low-flow water fixtures.

Estimated electricity and natural gas consumption associated with proposed facilities to be constructed as part of the proposed project are summarized in Table 3. As depicted, new facilities at build-out would result in the consumption of approximately 250,202 kilowatt hours per year (kWh/Yr) of electricity and approximately 1,250,630 kilo British thermal units per year (kBTU/Yr) of natural gas. In total, the proposed facilities would use consume a total of approximately 2,104 MMBTU/year. The proposed project would comply with the most current building energy-efficient standards (i.e., Title 24), which would result in increased building energy efficiency and energy conservation; as well as, reductions in water use and waste generation. In comparison to the previously adopted 2016 building energy-efficient standards, compliance with current 2019 building standards is anticipated to reduce energy use by approximately 30 percent. For this reason, implementation of the proposed project would not result in wasteful, inefficient, and unnecessary consumption of energy. As a result, this impact would be considered less than significant.

Table 3. Operational Electricity & Natural Gas Consumption

Source	Energy Use	MMBTU/Year
Electricity Consumption	244,747	835
Water Use, Treatment & Conveyance	5,455	19
Total Electricity Consumption:	250,202	854
Natural Gas Use	1,250,630	1,251
	Total:	2,104
Energy use was calculated based, in part, on default usage rates identified in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A for modeling assumptions and results.		

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

As discussed earlier in this report, the proposed land uses would consume an estimated 8,504 gallons/year of diesel fuel and an estimated 10,036 gallons/year of gasoline. However, a large majority of the estimated fuel use would be associated with the use of personal vehicles for the transport of students. The operation of HUSD-owned vehicles would comply with applicable regulatory requirements, including state requirements to limit idling periods for diesel-fueled buses. As a result, 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. As a result, the proposed project would not result in increased fuel usage that would be anticipated to conflict with applicable plans, policies, or regulations adopted for the purpose of reducing future fuel consumption rates.

The proposed project would comply with the most current building energy-efficient standards (i.e., Title 24), which would result in increased building energy efficiency and energy conservation; as well as, reductions in water use and waste generation. In comparison to the previously adopted 2016 building energy-efficient

standards, compliance with current 2019 building standards is anticipated to reduce building energy use by approximately 30 percent. It is also important to note a majority of the students served by the proposed project, roughly 67 percent, already attend the adjacent existing Elim Elementary School. For this reason and given that a majority of the fuel use associated with the proposed project would be associated with existing student-related commute trips, implementation of the project is not anticipated to result in a substantial increase in fuel use that would conflict with applicable regulatory requirements or plans related to fuel conservation. For these reasons, implementation of the proposed project would not result in wasteful, inefficient, and unnecessary consumption of energy that would conflict with applicable plans, policies, or regulations adopted for the purpose of reducing energy use and fuel consumption. As a result, this impact would be considered less than significant.

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APPENDIX A

Energy Modeling

Energy Use Summary

Construction Energy Use

	Gallons	Annual MMBTU
Off-Road Equipment Fuel (Diesel)	33,446	4,595
On-Road Vehicle Fuel (Gasoline)	2,359	284
On-Road Vehicle Fuel (Diesel)	505	69
	Total:	4,948

Operational Fuel Use - 2023

	Gallons	Annual MMBTU
Mobile Fuel (Diesel)	8,504	1,168
Mobile Fuel (Gasoline)	10,036	1,208
	Total:	2,376

Operational Fuel Use - 2030

	Gallons	Annual MMBTU
Mobile Fuel (Diesel)	7,438	1,022
Mobile Fuel (Gasoline)	8,173	983
	Total:	2,005

Operational Electricity & Natural Gas Use - 2023 & 2030

	Annual Energy	Annual MMBTU
Electricity (kWh/yr, MMBTU) with Participation in Monterey Community Power	244,747	835
Water Use, Treatment & Conveyance (kWh/Yr, MMBTU)	5455	19
Natural Gas (kBTU/yr, MMBTU)	1,250,630	1,251
	Total:	2,104

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)
Site Preparation	10	Rubber Tired Dozers	247	3	8	10	0.40	0.05	1186
		Tractors/Loaders/Backhoes	97	4	8	10	0.37	0.05	574
Grading	20	Excavators	158	1	8	20	0.38	0.05	480
		Graders	187	1	8	20	0.41	0.05	613
		Rubber Tired Dozers	247	1	8	20	0.40	0.05	790
		Tractors/Loaders/Backhoes	97	3	8	20	0.37	0.05	861
Building Construction	230	Cranes	231	1	7	230	0.29	0.05	5393
		Forklifts	89	3	8	230	0.20	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
Paving	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
Architectural Coating	20	Air Compressors	78	1	6	20	0.48	0.05	225

Equipment usage assumptions based on default assumptions contained in CalEEMod.

Total Diesel Fuel Use (Gallons):	33446
Number of Construction Years:	1
Average Diesel Fuel Use/Year:	33446
BTU/Gallon:	137381
BTU:	4594884766
MMBTU:	4595

Construction Fuel Use - On-Road Vehicles

Activity	Site Prep	Grading	Bldg	Pav	Arc Coat	Total	LDA	LDT1	LDT2	MDV	HDV
Days	10	20	230	20	20						
Worker Trips	18	15	21	15	4						
Miles/Trip	10.8	10.8	10.8	10.8	10.8						
Total VMT	1944	3240	52164	3240	864	61452	20484	20484	20484	0	0
Vendor Trips	0	0	8	0	0						
Miles/Trip	7.3	7.3	7.3	7.3	7.3						
Total VMT	0	0	13432	0	0	13432	0	0	0	13432	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

	Annual VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
HDT	0	0.18111033	0	137381	0	0.00
LDA	20484	0.03290704	674	120333	81112599	81.11
LDT1	20484	0.03943372	808	120333	97200217	97.20
LDT2	20484	0.04283977	878	120333	105595790	105.60
MDV	13432	0.03758597	505	137381	69357455	69.36

**Gallons per mile based on year 2022 conditions for Merced County. Derived from Emfac2017 (v1.0.2) 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 Gallons/Day)*		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	TOTAL
LDA	0.81557717	146.0182408	40243.36609	4437295.025	
LDT1	0.00952127	14.02108078	215.7441345	355560.7114	
LDT2	0.170728823	52.30730872	6285.165271	1220998.932	
MDV	0.948017024	62.02793843	25222.62838	1167837.203	
HDT	17.57179361	0.036220746	97022.59397	137.4186656	
Total	19.5156379	274.4107895	168989.4978	7181829.29	7350818.788
Percent of Total			2.30%	97.70%	
LDA-Miles/Gallon	49.34341908	30.38863501			
LDA-Gallons/Mile	0.020266127	0.032907039			
LDT1-Miles/Gallon	22.65917619	25.35900884			
LDT1-Gallons/Mile	0.044132231	0.039433718			
LDT2-Miles/Gallon	36.8137328	23.34279782			
LDT2-Gallons/Mile	0.027163776	0.042839766			
MDV-Miles/Gallon	26.6056703	18.82759983			
MDV-Gallons/Mile	0.037585973	0.053113515			
HDT-Miles/Gallon	5.521496332	0.00026358			
HDT-Gallons/Mile	0.181110326	3793.921461			

**Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2022 conditIons.*

***VMT derived from EMFAC2017 (v1.0.2) for year 2022 conditons.*

Fuel consumption and VMT based on Merced County.

Operational Mobile Fuel Use - 2023

LAND USE	Total Annual VMT
Elementary School	325,974

Based on the mitigated annual VMT derived from CalEEMod.

	VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
Diesel	67801	0.125	8504	137381	1168351139	1168.35
Gasoline	258173	0.039	10036	120333	1207693498	1207.69

**Gallons per mile based on year 2023 conditions for Merced County. Derived from Emfac2017 (v1.0.2) 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 Gallons/Day)*		VMT (Miles/Day)**	
	Diesel	Gasoline	Diesel	Gasoline
All Other Buses	0.465196387		4473.417154	
LDA	0.856684651	145.8583782	43363.10183	4554381.284
LDT1	0.008516356	13.80071085	194.6893454	360093.3629
LDT2	0.18566873	50.77404801	7034.211261	1227377.431
LHD1	7.315241805	11.10189559	129672.4299	93125.36672
LHD2	2.606867231	1.858899089	41351.70751	13625.58396
MCY		1.405127517		52906.50089
MDV	0.957823378	58.44198153	26128.47849	1130546.313
MH	0.177051404	0.861805659	1736.648974	4155.009429
Motor Coach	0.612118584		4002.086912	
PTO	0.670787351		3463.834998	
OBUS		1.147909294		5482.43655
SBUS	1.756755136	0.248872752	14279.35716	2375.129883
T6 Ag	0.044867351		405.5137797	
T6 CAIRP heavy	0.914355709		10628.00852	
T6 CAIRP small	0.138712244		1509.918064	
T6 instate construction heavy	2.971785115		25331.44507	
T6 instate construction small	5.18852969		44525.35099	
T6 instate heavy	4.377787187		44549.77916	
T6 instate small	3.500307526		34689.77302	
T6 OOS heavy	0.540382897		6289.988282	
T6 OOS small	0.083566216		910.4337168	
T6 Public	0.531901983		4035.511767	
T6 utility	0.073697532		685.192343	
T6TS		3.693655813		18067.77726
T7 Ag	0.136684702		774.8040695	
T7 CAIRP	46.63566926		326367.1968	
T7 CAIRP construction	3.018361164		18195.79704	
T7 NNOOS	54.14517386		397858.41	
T7 NOOS	18.77612634		128224.5801	
T7 other port	0.978054149		6110.846012	
T7 POAK	4.070533441		24469.87989	
T7 POLA	3.990717959		23878.71398	
T7 Public	0.988349783		5264.069462	
T7 Single	2.653091096		17444.56541	
T7 single construction	7.912551822		45140.4257	
T7 SWCV	1.086858858		2846.444901	
T7 tractor	60.50912198		474270.8515	
T7 tractor construction	6.560204893		37236.877	
T7 utility	0.082261236		489.6436629	
T7IS		0.029554254		121.3089342
UBUS	0.459243569	1.064375997	3239.460515	5088.298928
Total	245.9816086	290.2872145	1961073.444	7467345.804
Percent of Total			20.80%	79.20%
Miles/Gallon	7.972	25.724		
Gallons/Mile	0.125	0.039		

9428419.248 Total VMT

**Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2023 conditons.*

***VMT derived from EMFAC2017 (v1.0.2) for year 2023 conditons.*

Fuel consumption and VMT based on Merced County.

Operational Mobile Fuel Use - 2030

LAND USE	Total Annual VMT
Elementary School	325,974

Based on the mitigated annual VMT derived from CalEEMod.

	VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
Diesel	68178	0.109	7438	137381	1021864888	1021.86
Gasoline	257796	0.032	8173	120333	983488611	983.49

**Gallons per mile based on year 2030 conditions for Merced County. Derived from Emfac2017 (v1.0.2) 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 Gallons/Day)*		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	
All Other Buses	0.561258263		6140.191377		
LDA	1.026391767	141.152699	60170.53103	5213966.944	
LDT1	0.003557077	12.84569771	91.45290704	400271.7995	
LDT2	0.256497315	43.22107225	11302.36205	1303437.688	
LHD1	5.093542557	8.68210395	98781.75628	80527.4551	
LHD2	2.015401401	1.475369151	35077.75383	11892.04363	
MCY		1.374284482		51611.1917	
MDV	0.935854714	40.42507456	30233.7702	964770.8278	
MH	0.156115117	0.65989943	1665.927057	3573.875557	
Motor Coach	0.606203223		4422.816298		
PTO	0.624894471		3461.727447		
OBUS		0.871623017		4702.584329	
SBUS	1.620213529	0.273825808	14383.08352	2826.189369	
T6 Ag	0.019849264		166.2084168		
T6 CAIRP heavy	0.83860231		11620.06919		
T6 CAIRP small	0.133691721		1663.033601		
T6 instate construction heavy	3.126642151		28152.81816		
T6 instate construction small	5.155688838		49484.50853		
T6 instate heavy	3.397067468		36673.21506		
T6 instate small	3.024811971		33315.71194		
T6 OOS heavy	0.500627809		6946.424887		
T6 OOS small	0.081892922		1018.360364		
T6 Public	0.516054927		4424.56099		
T6 utility	0.067189975		724.7256578		
T6TS		3.615438595		20006.63774	
T7 Ag	0.0766835		364.6166884		
T7 CAIRP	42.28215285		361437.2892		
T7 CAIRP construction	2.846698983		20222.41384		
T7 NNOOS	50.45734797		440581.6108		
T7 NOOS	17.06667334		142000.2309		
T7 other port	0.951837373		7154.209807		
T7 POAK	4.742242078		34486.60975		
T7 POLA	4.57081527		29814.67706		
T7 Public	0.908226152		5553.48561		
T7 Single	2.465956667		17433.95136		
T7 single construction	8.029102305		50168.08922		
T7 SWCV	1.13915847		3482.34405		
T7 tractor	60.45707047		536464.636		
T7 tractor construction	6.648085839		41384.25676		
T7 utility	0.076871563		516.1390206		
T7IS		0.031996899		164.4351064	
UBUS	0.172770297	1.010338643	1513.284422	5664.333908	
Total	232.6537419	255.6394235	2132498.853	8063416.006	10195914.86 Total VMT
Percent of Total			20.92%	79.08%	
Miles/Gallon	9.166	31.542			
Gallons/Mile	0.109	0.032			

**Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2030 conditons.*

***VMT derived from EMFAC2017 (v1.0.2) for year 2030 conditons.*

Fuel consumption and VMT based on Merced County.

Operational Electricity & Natural Gas Use - 2023 & 2030

	kWh/yr	MWh/Yr	BTU/kWh*	BTU	MMBTU
Electricity	244747	245	3412	835075399	835

**Energy coefficient derived from US EIA.*

Electricity use includes 30% reduction per current building code compliance.

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

	kBTU/yr			BTU	MMBTU
Natural Gas	1250630			1250630000	1251

**Energy coefficient derived from US EIA.*

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

Water Energy Use - 2023 & 2030

	WATER USE*	ELECTRIC INTENSITY FACTORS (kWh/Mgal)		ANNUAL ELECTRIC USE (kWh/Yr)		
	MGAL/YR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	TOTAL
ANNUAL INDOOR WATER USE	0.39	3500		1358		5,455
ANNUAL OUTDOOR WATER USE	1.17		3500		4097	

**Based on estimated water use derived from CalEEMod.*

***Energy coefficient derived from US EIA.*

Includes the use of low-flow water fixtures and water-efficient irrigation per current code requirements.

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

BTU/kWh**	3412
BTU:	18612538
MMBTU:	18.61