

19 Energy Conservation

19.1 Introduction

This chapter describes the existing setting of the proposed project site as it relates to energy conservation; identifies associated regulatory conditions and requirements; presents the criteria used to evaluate potential impacts related to use of fuel and energy upon implementation of the proposed project; and identifies mitigation measures to reduce or avoid each significant impact. The significance of each impact after the incorporation of identified mitigation measures is included at the end of this chapter.

Information used to prepare this section came from the following resources:

- City of Brentwood General Plan Update (General Plan), 2014
- City of Brentwood General Plan EIR, Draft Program Environmental Impact Report for the 2014 Brentwood General Plan Update, 2014
- Michael Baker International, Brentwood Golf Course Redevelopment Project – Air Quality/Greenhouse Gas Emissions Technical Memorandum, 2017
- WPM Planning Team, Hancock Project Specific Plan Final Environmental Impact Report, 1992
- Michael Paoli and Associates, Brentwood Hills Country Club Draft Environmental Impact Report, 1992
- California Air Resources Board (CARB) Emission Factor Model (EMFAC2014)
- South Coast Air Quality Management District (SCAQMD) California Emissions Estimator Model (CalEEMod version 2016.3.1)
- CEQA Guidelines Appendix F, Energy Conservation

19.2 Scoping Issues Addressed

During the public comment scoping period for the proposed project, no comments regarding energy conservation were received.

19.3 Environmental Setting

19.3.1 California's Energy Use and Supply

Californians consumed 290,567 gigawatt hours (GWh)¹ of electricity in 2016, which is the most recent year for which data is available. Of this total, Contra Costa County consumed 2,797 GWh

¹ A watt hour is a unit of energy equivalent to one watt of power expended for one hour. For example, a typical light bulb is 60 watts, meaning that if it is left on for one hour, 60-watt hours have been used. One kilowatt equals 1,000 watts. The

(CEC, 2017a). In 2016, the California electricity mix included natural gas (36.48 percent), coal (4.13 percent), large hydroelectric plants (10.21 percent), and nuclear (9.18 percent). The remaining 25.45 percent was supplied from renewable resources, such as wind, solar, geothermal, biomass, and small hydroelectric facilities (CEC, 2017b). In 2015, the state consumed 23,103 million therms² of natural gas (EIA, 2017).

In 2002, California established its Renewable Portfolio Standard program³ with the goal of increasing the annual percentage of renewable energy in the state's electricity mix by the equivalent of at least 1 percent of sales, with an aggregate total of 20 percent by 2017. The California Public Utilities Commission subsequently accelerated that goal to 2010 for retail sellers of electricity (*Public Utilities Code* Section 399.15(b)(1)). Then-Governor Schwarzenegger signed Executive Order S-14-08 in 2008, increasing the target to 33 percent renewable energy by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the California Air Resources Board under its Assembly Bill (AB) 32 authority to enact regulations to help the State meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020. In September 2010, the California Air Resources Board adopted its Renewable Electricity Standard regulations, which require all of the state's load-serving entities to meet this target. In October 2015, the Governor signed into legislation Senate Bill 350, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030.

Additional energy efficiency measures are needed to meet these goals as well as the AB 32 greenhouse gas (GHG) reduction goal of reducing statewide GHG emissions to 1990 levels by 2020 (see Chapter 6, Air Quality, and Chapter 10, Greenhouse Gases, for a discussion of AB 32).

California's energy goals include reducing petroleum use in cars and trucks by 50 percent, increasing from one-third to one-half of California's electricity derived from renewable sources, doubling the efficiency savings achieved at existing buildings and making heating fuels cleaner; reducing the release of methane, black carbon, and other short-lived climate pollutants, and managing farm and rangelands, forests, and wetlands so they can store carbon (CEC, 2016).

consumption of electrical energy by homes and businesses is usually measured in kilowatt hours (kWh). Some large businesses and institutions also use megawatt hours (MWh), where one MWh equals 1,000 kWh. One gigawatt equals 1,000 megawatts, or 1,000,000 kilowatts. The energy output of large power plants over long periods of time, or the energy consumption of jurisdictions, can be expressed in gigawatt hours (GWh).

² A British Thermal Unit (BTU) is the amount of energy needed to raise the temperature of one pound of water by one degree Fahrenheit. A kBTU is 1,000 BTUs. A therm is 100,000 BTUs.

³ The Renewable Portfolio Standard is a flexible, market-driven policy to ensure that the public benefits of wind, solar, biomass, and geothermal energy continue to be realized as electricity markets become more competitive. The policy ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or country.

19.3.2 Current Energy Providers

Pacific Gas and Electric Company

Electricity in Contra Costa County is primarily provided by the Pacific Gas and Electric Company (PG&E). The PG&E 2016 power mix was as follows: 17 percent natural gas, 24 percent nuclear, 33 percent renewables, 12 percent large hydroelectric, and 14 percent unspecified power (PG&E, 2017b).

PG&E operates one of the largest natural gas distribution networks in the country, including more than 48,000 miles of natural gas transmission and distribution pipelines (PG&E, 2017a). In all, PG&E delivers gas to approximately 4.3 million customer accounts in Northern and Central California, including in Contra Costa County.

Energy usage is typically quantified using the British Thermal Unit (BTU). Total energy usage in California was 7,676 trillion BTU in 2015 (the most recent year for which this specific data is available), which equates to an average of 197 million BTU per capita. Of California's total energy usage, the breakdown by sector is 39 percent transportation, 24 percent industrial, 19 percent commercial, and 18 percent residential. Electricity and natural gas in California are generally consumed by stationary users such as residences and commercial and industrial facilities, whereas petroleum consumption is generally accounted for by transportation-related energy use.⁴ In 2016, taxable gasoline sales (including aviation gasoline) in California accounted for 15,297,030,909 gallons of gasoline.⁵

The electricity consumption attributable to Contra Costa County from 2006 to 2015 is shown in Table 19-1 (Electricity Consumption in Contra Costa County 2006-2015). As indicated in Table 19-1, energy consumption in Contra Costa County remained relatively constant between 2006 and 2015, with no substantial increase.

Year	Electricity Consumption (in millions of kilowatt hours)
2006	8,674
2007	8,592
2008	9,347
2009	9,083
2010	9,104
2011	9,093
2012	9,092

⁴ EIA (US Energy Information Administration), California State Profile and Energy Estimates, updated September 21, 2017, <http://www.eia.gov/state/data.cfm?sid=CA#ConsumptionExpenditures> and https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_te.html&sid=US&sid=CA, accessed September 28, 2017.

⁵ California Board of Equalization, *Net Taxable Gasoline Sales, 2016*, https://www.boe.ca.gov/sptaxprog/reports/mvf_10_year_report.pdf, accessed September 28, 2017.

Year	Electricity Consumption (in millions of kilowatt hours)
2013	9,168
2014	9,597
2015	9,391

Source: CEC, 2017a.

The natural gas consumption attributable to nonresidential land uses in Contra Costa County from 2006 to 2015 is shown in Table 19-2 (Natural Gas Consumption in Contra Costa County 2006-2015). Similar to energy consumption, natural gas consumption in Contra Costa County remained relatively constant between 2006 and 2015, with no substantial increase.

Year	Natural Gas Consumption (in millions of therms)
2006	1,096
2007	852
2008	985
2009	985
2010	1,018
2011	1,118
2012	1,139
2013	1,086
2014	1,099
2015	1,087

Source: CEC, 2017a.

Transportation Fuels

California's transportation sector uses roughly half of the energy consumed in the state. In 2016, Californians consumed approximately 15.1 billion gallons of gasoline and 3 billion gallons of diesel fuel, which were down from 15 billion gallons of gasoline and 2.8 billion gallons of diesel in 2008 (BOE, 2017a; 2017b).

Fuel Consumption

Automotive fuel consumption in Contra Costa County from 2007 to 2019 is shown in Table 19-3 (Automotive Fuel Consumption in Contra Costa County 2006-2017) (projections for the year 2017-2019 are also shown). As shown in Table 19-3, on-road automotive fuel consumption in Contra Costa County has declined steadily, since 2007. Heavy-duty vehicle fuel consumption dropped in 2010 and has steadily risen since.

Table 19-3: Automotive Fuel Consumption in Contra Costa County 2007-2019

Year	On-Road Automotive Fuel Consumption (Gallons)	Heavy-Duty Vehicle/Diesel Fuel Consumption (Gallons)
2007	436,019,665	52,066,721
2008	418,211,501	48,017,985
2009	415,825,237	43,218,538
2010	417,935,325	41,942,098
2011	408,875,473	43,717,344
2012	403,119,595	44,193,898
2013	396,748,647	44,160,647
2014	399,013,488	44,212,860
2015	399,050,728	44,919,574
2016	398,733,353	45,901,166
2017 (projected)	395,488,408	46,347,571
2018 (projected)	387,124,312	46,775,629
2019 (projected)	378,139,557	47,419,169

Source: California Air Resources Board, EMFAC2014.

19.4 Applicable Regulations, Plans, and Standards

This section presents legislation and regulations specifically related to energy conservation. See also Chapter 6 (Air Quality), Chapter 10 (Greenhouse Gas Emissions), and Chapter 17 (Transportation and Circulation), for other policies related to energy use. See Chapter 18 (Utilities and Service Systems) for policies related to water consumption.

19.4.1 Federal

National Energy Conservation Policy Act

The National Energy Conservation Policy Act serves as the underlying authority for Federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most Federal energy requirements.

Energy Policy Act of 2005

The Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can attain Federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary micro-turbine power plants, and solar power equipment.

Executive Order 13693 (Planning for Federal Sustainability in the Next Decade), signed in 2015, seeks to maintain Federal leadership in sustainability and GHG emission reductions. Its goal is to reduce agency Scope 1 and 2 GHG emissions⁶ by at least 40 percent by 2025, foster innovation, reduce spending, and strengthen communities through increased efficiency and improved environmental performance. Sustainability goals are set for building efficiency and management, energy portfolio, water use efficiency, fleet efficiency, sustainable acquisition and supply chain GHG management, pollution prevention, and electronic stewardship.

Energy and Independence Security Act of 2007

The Energy and Independence Security Act of 2007 sets Federal energy management requirements in several areas, including energy reduction goals for Federal buildings, facility management and benchmarking, performance and standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, and reduction in petroleum use and increase in alternative fuel use. This act also amends portions of the National Energy Policy Conservation Act.

19.4.2 State

Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006." AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05), and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Reductions in overall energy consumption have been implemented to reduce emissions. See Chapter 10 (Greenhouse Gas Emissions) for a further discussion of AB 32.

2008 California Energy Action Plan Update

The *2008 Energy Action Plan Update* provides a status update to the *2005 Energy Action Plan II*, which is the State's principal energy planning and policy document (CPUC and CEC, 2008). The plan continues the goals of the original *Energy Action Plan*, describes a coordinated implementation plan for State energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are energy efficiency, demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure), and the

⁶ In GHG inventories, direct emissions are Scope 1; indirect emissions from consumption of purchased electricity, heat or steam are Scope 2; and other indirect emissions (such as extraction and production of purchased materials and fuels, transport in vehicles not controlled by the reporting entity, outsourced activities) are Scope 3.

use of renewable sources of power. If these actions are unable to satisfy the increasing energy and capacity needs, the plan supports clean and efficient fossil-fired generation.

California Green Building Standards Code

The 2016 *California Green Building Standards Code*, as specified in Title 24, Part 11 of the California Code of Regulations, specifies building standards to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California.

Building Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The California Energy Commission (CEC) adopted an update in 2013, and these new standards became effective on January 1, 2017 (CEC, 2017c).

2006 Appliance Efficiency Regulations

The California Energy Commission adopted Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608) on October 11, 2006. The regulations were approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both Federally regulated appliances and non-Federally regulated appliances. While these regulations are now often viewed as "business-as-usual," they exceed the standards imposed by all other states and they reduce GHG emissions by reducing energy demand.

Senate Bill 1078 and 107; Executive Order S-14-08, S-21-09, and SB 2X

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then-Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the CARB under its AB 32 authority to enact regulations to help the state meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020. In April 2011, Governor Brown signed SB 2X, which legislated the prior Executive Order S-14-08 renewable standard.

Executive Order B-30-15 and Senate Bill 350

In April 2015, the Governor issued Executive Order B-30-15, which established a GHG reduction target of 40 percent below 1990 levels by 2030. SB 350 (Chapter 547, Statutes of 2015) advanced these goals through two measures. First, the law increases the renewable power goal from 33 percent renewables by 2020 to 50 percent by 2030. Second, the law requires the CEC to establish annual targets to double energy efficiency in buildings by 2030. The law also requires the California Public Utilities Commission (CPUC) to direct electric utilities to establish annual efficiency targets and implement demand-reduction measures to achieve this goal.

Senate Bill 32

In September 2016, the Governor signed into legislation SB 32, which builds on AB 32 and requires the state to cut GHG emissions to 40 percent below 1990 levels by 2030. With SB 32, the Legislature also passed AB 197, which provides additional direction for updating the Scoping Plan to meet the 2030 GHG reduction target codified in SB 32. CARB has published a draft update to the Scoping Plan and has received public comments on this draft, but has not released the final version.

Recent CEQA Litigation

In California, *Clean Energy Committee v. City of Woodland* (2014) 225 Cal.App.4th 173 (“CCEC”), the Court observed that *CEQA Guidelines* Appendix F lists environmental impacts and mitigation measures that an EIR may include. Potential impacts requiring EIR discussion include:

1. The project’s energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak and base period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.
6. The project’s projected transportation energy use requirements and its overall use of efficient transportation alternatives.

19.4.3 Local

City of Brentwood General Plan

The City of Brentwood General Plan includes goals, policies, and actions that encourage the conservation of energy in the Conservation and Open Space Element. Below are the policies specifically related to energy that would be applicable to the proposed project.

Goal COS 8: Reduce air pollutants and greenhouse gas (GHG) emissions.

- Policy COS 8-8: Encourage local businesses and industries to engage in voluntary efforts to reduce GHG emissions and energy consumption.
- Policy COS 8-10: Encourage public transit, ridesharing and van pooling, shortened and combined motor vehicle trips to work and services, use of bicycles, and walking. Minimize single passenger motor vehicle use.
- Policy COS 8-11: Encourage new construction to incorporate passive solar features.

Goal COS 9: Promote conservation of energy and other natural resources.

- Policy COS 9-1: Require all new public and privately constructed buildings to meet and comply with the most current “green” development standards in the California Code of Regulations (CCR), Title 24.
- Policy COS 9-2: Support innovative and green building best management practices including, but not limited to, LEED certification for all new development, and encourage project applicants to exceed the most current “green” development standards in the California Code of Regulations (CCR), Title 24, if feasible.
- Policy COS 9-3: Promote the use of alternative energy sources in new development.
- Policy COS 9-4: Incorporate innovative green building techniques and best management practices in the site design, construction, and renovation of all public projects.
- Policy COS 9-5: Promote water conservation among water users.
- Policy COS 9-6: Continue to require new development to incorporate water efficient fixtures into design and construction.
- Policy COS 9-7: Promote the use of reclaimed water and other non-potable water sources.
- Policy COS 9-8: Encourage large-scale developments and golf course developments to incorporate dual water systems.
- Policy COS 9-9: Encourage and support the use of drought-tolerant and regionally native plants in landscaping.
- Policy COS 9-10: Ensure that the layout and design of new development and significant remodels encourages the use of transportation modes other than automobiles and trucks.
- Policy COS 9-11: Continue the citywide recycling program and actively encourage recycling.
- Policy COS 9-12: Continue efforts to reduce solid waste generation throughout the life of the General Plan.

- Policy COS 9-13: Continue to encourage and support the use of bicycles as an alternative means of transportation.

19.5 Environmental Impacts and Mitigation Measures

The analysis below generally follows Appendix F of the State CEQA Guidelines, which states that the goal of conserving energy implies the wise and efficient use of energy, including decreasing overall per capita energy consumption, decreasing reliance on fossil fuels, and increasing reliance on renewable energy sources. According to Appendix F, the analysis should include a description of energy conservation measures included as part of the project and should consider whether a project would result in inefficient, wasteful, and unnecessary consumption of energy.

19.5.1 Significance Criteria

Based upon the criteria derived from Appendix F of the State CEQA Guidelines, the project would result in a significant impact related to energy conservation if it would:

- Encourage activities that result in the use of large amounts of fuel or energy, or use these resources in a wasteful manner.

19.5.2 Impact Assessment Methodology

In determining whether implementation of the proposed project would encourage wasteful consumption of fuel or energy, this analysis considers the recommendations of Appendix F (as described above), which states that environmental impact analyses of energy conservation may include:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project's life cycle including construction, operation, maintenance and/or removal. If appropriate, the energy intensiveness of materials maybe discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak and base period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.
6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

This section analyzes energy consumption on three sources of energy that are relevant to the proposed project: electricity, natural gas, and transportation fuel for vehicle trips associated with new development, as well as the fuel necessary for project construction. The analysis of project electricity/natural gas usage is based on California Emissions Estimator Model (CalEEMod) modeling, which quantifies energy use for occupancy. The results of the CalEEMod modeling are

included in Appendix B (Air Quality/Greenhouse Gas Emissions Data) of this Draft EIR. Modeling related to project energy consumption was based primarily on the default settings in the computer program for Contra Costa County. The amount of operational fuel use was estimated using CalEEMod outputs for the project and the California Air Resources Board's Emissions Factor 2014 (EMFAC2014) computer program for typical daily fuel usage in Contra Costa County. Construction fuel consumption was calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry. The results of EMFAC2014 modeling and construction and operational fuel estimates are included in Appendix B.

Energy consumption impacts are analyzed below according to topic. Mitigation measures directly correspond with an identified impact.

Impact ER-1: Would implementation of the project encourage activities that result in the use of large amounts of fuel or energy, or use these resources in a wasteful manner.

19.5.3 Construction (Short-Term)

The energy consumption associated with buildout of the project includes electricity usage associated with water usage for dust control, diesel fuel consumption from on-road hauling trips and off-road construction diesel equipment, and gasoline consumption from on-road worker commute and vendor trips. The methodology for each category is discussed below. This analysis relies on the construction equipment list and operational characteristics, as stated in Chapter 6 (Air Quality) and Chapter 10 (Greenhouse Gas Emissions), as well as, Appendix B of this Draft EIR. Quantifications of construction energy consumption are provided for the proposed project.

Electricity Usage

Water Consumption for Construction Dust Control

Electricity usage associated with water consumption for construction dust control is calculated based on total water consumption and the energy intensity for supply, distribution, and treatment of water.

The total number of gallons of water usage is calculated based on acreage disturbed during grading and site preparation, as well as the daily water consumption rate per acre disturbed.

- The total acres disturbed are calculated using the methodology described in Chapter 4.2 of Appendix A of the CalEEMod® User's Guide (Grading Equipment Passes).
- The water application rate of 3,020 gallons per acre per day is from Air and Waste Management Association's Air Pollution Engineering Manual.

The energy intensity value is based on the CalEEMod® default energy intensity per gallon of water for Contra Costa County.

As summarized in Table 19-4 (Project Energy Consumption During Construction), the total electricity consumption associated with water consumption for construction dust control would be approximately 117,644 kWh (118 megawatt hours [MWh]) over the duration of buildout of the proposed project.

Table 19-4: Project Energy Consumption During Construction			
Source	Project Construction Usage	Contra Costa County Annual Energy Consumption	Percentage Increase Countywide
Electricity Use	Megawatt Hours (MWh)		
Water Consumption ¹	118	9,391,000	0.0013%
On-Road Construction Trips ²	2		0.0000%
Construction Electricity Total	119		0.0013%
Diesel Use	Gallons		
On-Road Construction Trips ²	19,653	47,419,169	0.0414%
Off-Road Construction Equipment ³	93,159		0.1965%
Construction Diesel Total	112,812		0.2379%
Gasoline	Gallons		
On-Road Construction Trips ²	23,314	378,139,557	0.0062%
Construction Gasoline Total	23,314		0.0062%
Notes:			
1. Construction water use estimated based on acres disturbed per day per construction sequencing and estimated water use per acre (AWMA 1992).			
2. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod and fleet-average fuel consumption in gallons per mile from EMFAC2014 in Contra County. Electricity demand based on VMT and calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide. Energy usage is the total for Village 1 and Village 2.			
3. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (hp)-hour from USEPA.			
Abbreviations:			
CalEEMod: California Emission Estimation Model; EMFAC: Emission Factor Model 2014; kWh: kilowatt-hour.			
Sources: AWMA, 1992; DOE 2016; USEPA 1996.			

On-Road Electric Vehicle Trips

The EMFAC2014 model includes the fraction of electric vehicles projected to be in the on-road fleet during construction. Using this data, electricity consumption related to electric vehicle traffic was estimated. The electric vehicles included in the EMFAC2014 model are all in the light-duty auto and light-duty truck category, and as such would only exist in the construction worker fleet, not the vendor and haul truck fleets. The efficiency of electric vehicles in kilowatt-hours per vehicle mile travelled (kWh/mile) are the model year 2015 average for current model electric vehicles (USDOE 2016). Total electricity usage from the on-road worker fleet during construction would be approximately 1,738 kWh (1.7 MWh) over the duration of buildout of the proposed project.

Diesel Usage

On-Road Construction Trips

The diesel usage associated with on-road construction mobile trips is calculated based on vehicle miles traveled (VMT) from vehicle trips (i.e., worker, vendor, and hauling), the CalEEMod default diesel fleet percentage, and vehicle fuel efficiency in miles per gallon. VMT for the entire construction period is calculated based on the total (See Chapter 6 and Chapter 10). Construction fuel consumption was calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry.

As summarized in Table 19-4, the total diesel consumption associated with on-road construction trips would be approximately 19,653 gallons over the duration of buildout of the proposed project.

Off-Road Construction Equipment

The construction diesel usage associated with the off-road construction equipment is calculated based on CalEEMod emissions outputs and conversion ratios from the Climate Registry. As summarized in Table 19-4, the total diesel consumption associated with off-road construction equipment is approximately 93,159 gallons for duration of buildout the proposed project.

Gasoline Usage

On-Road Construction Trips

The gasoline usage associated with on-road construction mobile trips is calculated based on VMT from vehicle trips (i.e., worker, vendor, and hauling), the CalEEMod default gasoline fleet percentage, and vehicle fuel efficiency in miles per gallon using the same methodology as the construction on-road trip diesel usage calculation discussed above. As summarized in Table 19-4, the total gasoline consumption associated with on-road construction trips would be approximately 23,314 gallons over the duration of buildout the proposed project.

Analysis

In total, construction of the proposed project would consume approximately 119,382 kWh (119 MWh) of electricity, 112,812 gallons of diesel, and 23,314 gallons of gasoline.

As indicated in the environmental setting above, Californians consumed 295,405 GWh of electricity in 2015, of which Contra Costa County consumed 9,391 GWh. Extrapolating this consumption over a five-year period, Californians would consume approximately 1.48 million GWh and Contra Costa County would consume approximately 46,955 GWh. Therefore, construction electricity consumption would represent approximately 5.21×10^{-5} percent of the electricity consumption in the state, and 0.0013 percent of the electricity consumption in Contra Costa County.

In 2015, Californians consumed approximately 15.1 billion gallons of gasoline and 4.2 billion gallons of diesel fuel. Extrapolated over a ten-year period, Californians would consume 151 billion gallons of gasoline and 42 billion gallons of diesel. Project construction gasoline consumption would represent 0.006 percent of gasoline consumption in the County, and construction diesel consumption would represent 0.24 percent of diesel consumption in the County.

Therefore, based on the project's relatively low construction fuel use proportional to State and County consumption, the proposed project would not substantially affect existing energy or fuel supplies or resources. New capacity/additional sources of construction fuel are not anticipated to be required.

Furthermore, there are no unusual project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or state. In addition, some incidental energy conservation would occur during construction through compliance with State requirements that equipment not in use for more than five minutes be turned off. Project construction equipment would also be required to comply with the latest EPA and CARB engine emissions standards. These engines use highly efficient combustion engines to minimize unnecessary fuel consumption.

Due to increasing transportation costs and fuel prices, contractors and owners have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction. There is growing recognition among developers and retailers that sustainable construction is not prohibitively expensive, and that there is a significant cost-savings potential in green building practices and materials. Substantial reductions in energy inputs for construction materials can be achieved by selecting building materials composed of recycled materials that require substantially less energy to produce than non-recycled materials. The project-related incremental increase in the use of energy bound in construction materials such as asphalt, steel, concrete, pipes, and manufactured or processed materials (e.g., lumber and gas) would not substantially increase demand for energy compared to overall local and regional demand for construction materials. It is reasonable to assume that production of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest in minimizing the cost of doing business.

As indicated in Table 19-4, the project's fuel from construction would increase fuel use in the County by less than one percent (i.e., project construction would represent 0.006 percent of gasoline consumption and 0.24 percent of diesel consumption in the County). It should be noted that the CEQA Guideline Appendix F criteria requires the project's effects on local and regional energy supplies and on the requirements for additional capacity to be addressed. A less than one percent increase in construction fuel demand is not anticipated to trigger the need for additional capacity. Additionally, use of construction fuel would be temporary and would cease once the project is fully developed. As such, project construction would have a nominal effect on the local and regional energy supplies. It is noted that construction fuel use is temporary and would cease upon completion of construction activities.

As stated above, there are no unusual project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or state. Therefore, it is expected that construction fuel consumption associated with the proposed project would not be any more inefficient, wasteful, or unnecessary than other similar development projects of this nature.

19.5.4 Operations (Long-Term)

The energy consumption associated with operation of uses pursuant to the proposed project would include building electricity, water, and natural gas usage, as well as fuel usage from on-road vehicles. The methodology for each category is discussed below. Note that this energy resources analysis is consistent with the analysis presented in Chapter 6 and Chapter 10. Quantifications of operational energy consumption are provided for the proposed project.

Transportation Energy Demand

The gasoline and diesel usage associated with on-road vehicular trips is calculated based on total VMT from the Chapter 6 and Chapter 10 analyses, as well as the average fuel efficiency from EMFAC2014 model. The EMFAC2014 fuel efficiency data incorporate the Pavley Clean Car Standards and the Advanced Clean Cars Program.⁷ As summarized in Table 19-5 (Project Annual Energy Consumption During Operations), the total gasoline and diesel consumption associated with on-road trips would be approximately 166,147 gallons per year and 37,553 gallons per year, respectively.

The EMFAC2014 model includes the fraction of electric vehicles projected to be in the on-road fleet during the assumed first year of operation (2020); however, the fraction of the fleet that is electric is assumed to continue to increase, allowing a decrease in gasoline and diesel consumption. The electricity consumption related to electric vehicle traffic during operation was estimated based on the EMFAC2014 fleet mix and the model year 2015 average kWh/mile for current model electric vehicles (USDOE 2016). Total electricity usage from the on-road transportation during operation is approximately 10,995 kWh per year.

⁷ From CARB: "Note that the Low Carbon Fuel Standard (LCFS) regulation is excluded from EMFAC2014 because most of the emissions benefits due to the LCFS come from the production cycle (upstream emissions) of the fuel rather than the combustion cycle (tailpipe). As a result, LCFS is assumed to not have a significant impact on CO₂ emissions from EMFAC's tailpipe emission estimates." <http://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf>.

Table 19-5 Project Annual Energy Consumption During Operations			
Source	Project Operational Usage	Contra Costa County Annual Energy Consumption	Percentage Increase Countywide
Electricity Use		Megawatt Hour/Year (MWh/year)	
Building ¹	2,306	9,391,000	0.0246%
Water ¹	250		0.0027%
Mobile ²	11		0.0001%
Total Electricity	2,568		0.0273%
Natural Gas Use		Therms/year	
Building ¹	59,181	1,087,000,000	0.0054%
Diesel Use		Gallons/Year	
Mobile ²	37,553	47,419,169	0.0792%
Gasoline Use		Gallons/Year	
Mobile ²	166,147	378,139,557	0.0439%
Notes:			
1. The electricity, natural gas, and water usage are based on project-specific estimates and CalEEMod defaults.			
2. Calculated based on the mobile source fuel use based on vehicle miles traveled (VMT) and fleet-average fuel consumption (in gallons per mile) from EMFAC2014 for operational year 2020. For electric vehicles, model year 2015 electric vehicle fuel economy is used from the DOE Fuel Economy Guide. Energy usage is the total for Village 1 and Village 2.			
Abbreviations: CalEEMod: California Emission Estimation Model; EMFAC2014: California Air Resources Board Emission Factor Model; kBTU: thousand British Thermal Units; kWh: kilowatt-hour.			

Electricity Usage

Building Envelope

The electricity usage associated with the building envelopes constructed pursuant to the proposed project is based on CalEEMod defaults. As summarized in Table 19-5, the buildings would consume 2,306,460 kWh (approximately 2.31 GWh) of electricity per year.

Water Consumption

The electricity usage associated with operational water consumption is estimated based on the annual water consumption and the energy intensity factor is the CalEEMod default energy intensity per gallon of water for Contra Costa County. Project area water use is based on the water demand per square foot factors in CalEEMod.

Natural Gas Usage

Building Envelope

The methodology used to calculate the natural gas usage associated with the building envelopes constructed pursuant to the proposed project is based on CalEEMod default usage rates. As summarized in Table 19-5, the building envelope would consume 5,918,060 thousand British Thermal Units (kBTU) (59,181 therms) of natural gas per year.

Analysis

Operation of uses implemented pursuant to the proposed project would annually consume approximately 2.31 million kWh of electricity, 5.92 million kBtu of natural gas, 37,553 gallons of diesel, and 166,147 gallons of gasoline.

Californians consumed 295,405 GWh of electricity in 2015, of which Contra Costa County consumed 9,391 GWh. The proposed project's operational electricity consumption would represent 0.0009 percent of the electricity consumption in the state, and 0.03 percent of the energy consumption in Contra Costa County. Regarding natural gas, Californians consumed 23,103 million therms (or 2,310.3 billion kBtus) of natural gas in 2015. Therefore, the proposed project's operational natural gas consumption would represent 0.0003 percent of the natural gas consumption in the state.

In 2015, Californians consumed approximately 15.1 billion gallons of gasoline and 4.2 billion gallons of diesel fuel. Project operational consumption of gasoline and diesel would represent 0.0011 percent of gasoline and 0.0009 percent of diesel consumption statewide.

Therefore, operation of uses under the proposed project would not substantially affect existing energy or fuel supplies or resources. New capacity would not be required.

Energy Efficiency Measures

As discussed above, California's Energy Efficiency Standards for Residential and Non-residential Buildings create uniform building codes to reduce California's energy consumption, and provide energy efficiency standards for residential and non-residential buildings. These standards are incorporated within the California Building Code and are expected to substantially reduce the growth in electricity and natural gas use. For example, requirements for energy efficient lighting, heating and cooling systems, and green building materials are expected to save additional electricity and natural gas. These savings are cumulative, doubling as years go by.

Furthermore, the electricity provider, PG&E, is subject to California's Renewables Portfolio Standard (RPS). The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020 and to 50 percent of total procurement by 2030. Renewable energy is generally defined as energy that comes from resources which are naturally replenished within a human timescale such as sunlight, wind, tides, waves, and geothermal heat.

The project would be required to adhere to all Federal, State, and local requirements for energy efficiency, including the Title 24 standards. The proposed project would not result in the inefficient, wasteful, or unnecessary consumption of building energy. Therefore, potential impacts are considered less than significant.

19.5.5 Efficiency Measures

The proposed project would generate less-than-significant impacts related to energy use. Additionally, the project would comply with the latest State Building Code (Title 24, Part 6 of the California Code of Regulations), which further minimize energy consumption towards the California Long-term Energy Efficiency Strategic Plan's (CEESP) goal to have 100 percent of new homes achieve zero net energy beginning in 2020. The latest Building Code approved by the California Energy Commission reduces energy use in new homes by 28 percent compared to the previous (2013) version of the code. Additionally, the California Plumbing and Green Building Codes require water efficient fixtures that would reduce water consumption and water related energy use. For example, the code requires automatic irrigation systems utilizing weather and/or soil moisture based irrigation controllers. The code also requires the installation of high efficiency toilets (HET) with a maximum of 1.28 gallons per flush, install kitchen faucets, bath faucets, and shower heads that are 20 percent more efficient than typical low-flow plumbing fixtures.

19.5.6 Cumulative Impacts

Construction and operations associated with implementation of the project would result in the consumption of fuel and energy, but it would not do so in a wasteful manner. The consumption of fuel and energy would not be substantial in comparison to statewide electricity, natural gas, gasoline, and diesel demand; refer to Table 19-5 and Table 19-6. New capacity or supplies of energy resources would not be required. Additionally, the proposed project would be subject to compliance with all Federal, State, and local requirements for energy efficiency.

The anticipated project impacts, in conjunction with cumulative development in the site vicinity, would increase urbanization and result in increased energy consumption. Potential land use impacts are site-specific and require evaluation on a case-by-case basis. Each cumulative project would require separate discretionary approval and CEQA assessment, which would address potential energy consumption impacts and identify necessary mitigation measures, where appropriate.

As noted above, the proposed project would not result in significant energy consumption impacts. The proposed project would not be considered inefficient, wasteful, or unnecessary with regard to energy. Thus, the proposed project and identified cumulative projects are not anticipated to result in a significant cumulative impact.

19.5.7 Level of Significance After Mitigation

Table 19-6 (Summary of Impacts and Mitigation Measures – Energy Conservation) summarizes the environmental impacts, significance determinations, and mitigation measures for the proposed project with regard to energy conservation.

Table 19-6: Summary of Impacts and Mitigation Measures – Energy Conservation

Impact	Impact Significance	Mitigation
Impact ER-1: Encourage activities that result in the use of large amounts of fuel or energy, or use these resources in a wasteful manner	Less than Significant	None required

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