DOCKETED	
Docket Number:	23-OPT-01
Project Title:	Fountain Wind Project
TN #:	248288-9
Document Title:	DEIR Energy
Description:	N/A
Filer:	Caitlin Barns
Organization:	Stantec Consulting Services, Inc.
Submitter Role:	Applicant Consultant
Submission Date:	1/3/2023 10:55:06 AM
Docketed Date:	1/3/2023

3.7 Energy

This section identifies and evaluates issues related to Energy in the context of the Project and alternatives. It includes information about the physical and regulatory setting and identifies the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment. The information presented in this analysis is based in part on the modeling results provided in **Appendix B**, *Air Quality and Greenhouse Gas Emissions*.

In response to its notice of intention to prepare this Draft EIR, the County received scoping input about energy efficiency and existing hydropower generation facilities (e.g., Pit #1 through Pit #7; hydropower plants located at Shasta Dam, the Spring Creek Power plant, Judge Francis Carr Powerhouse, Trinity Dam and Keswick Dam; and privately-owned hydropower plants including Balta on Battle Creek, Kilarc on Cow Creek, Hat Creek, Roaring Creek and Haynes Burney Creek). Scoping input also noted the existing Wheelabrator and cogeneration power plant facilities in Shasta County. Scoping commenters requested that the EIR consider fuel use for construction equipment, backup power generation, construction vehicles, and worker transportation to/from the Project Site as well as for vehicles idling on SR 299 during materials delivery and as required to start/re-start a turbine. Other comments requested disclosure of the difference between estimated and actual power generation from the turbines, including an explanation of the existing sources of energy that would be replaced by this Project; and consideration of whether water diverted for Project use would reduce the water going through existing hydropower plants and of the power loss that occurs when power is transmitted over long distances. All scoping input received, including regarding Energy, is provided in Section 4.1 of the Scoping Report, a copy of which is provided in **Appendix J**, *Scoping Report*.

The Project would not involve the use of natural gas; therefore, natural gas is not discussed in this section.

3.7.1 Setting

3.7.1.1 Study Area

The study area for Project impacts related to energy includes the State, the Pacific Gas & Electric Company (PG&E) service area, the County, and the areas surrounding the Project Site as relates to energy generation, energy consumption, and fuel consumption.

3.7.1.2 Environmental Setting

State Energy Setting

Total energy usage in California was 7,881 trillion British Thermal Units (Btus) in 2017 (the most recent year for which specific data are available), which equates to an average of 200 million Btu per capita. These figures place California second among the nation’s 50 states in total energy use and 48th in per capita consumption (EIA, 2020a).

Electricity

In 2018, total system electric generation for California was 285,488 gigawatt-hours (GWh), down two percent from 2017's total generation of 292,037 GWh. Approximately 71 percent of the electrical power needed to meet California's demand is produced in the state; the balance, approximately 29 percent, is imported from the Pacific Northwest and the Southwest. In 2018, California's in-state electricity use was derived from natural gas (35 percent); coal (3 percent); large hydroelectric resources (11 percent); nuclear sources (9 percent); renewable resources that include geothermal, biomass, small hydroelectric resources, wind, and solar (31 percent); and unspecified sources (11 percent). Of the approximately 63,028 GWh generated from renewable sources in the state, solar-generated electricity made up the highest proportion (43 percent), followed by wind (22 percent), geothermal (18 percent), biomass (9 percent), and small hydroelectric (7 percent) (CEC, 2020a).

Wind-Generated Electricity

In 2018, California was the fifth-largest producer of wind energy in the U.S. California's wind power potential is widespread, especially along the state's many mountain crests, as well as in northern California coastal areas both onshore and offshore (EIA, 2020a). Six major wind resource areas, or particular areas in California containing a concentration of wind generation projects, and many smaller wind sites have been identified in the state. The Project Site is not located in one of these wind resource areas, but is located in close proximity to the Hatchet Ridge Wind Project also located in Shasta County, one of the smaller wind sites in the state (CEC, 2019). By the end of the third quarter of 2019, California had more than 5,800 megawatts (MW) of installed wind capacity (EIA, 2020a). The most recently reported wind generation peak of 5,309 MW was set in May 8, 2019, and a new overall renewable generation penetration peak was recorded on May 15, 2019, with approximately 80 percent of load served by all renewables (CAISO, 2019).

Transportation Fuels

Gasoline and diesel, both derived from petroleum (also known as crude oil), are the two most common fuels used for vehicular travel. Aviation gasoline, a specialized type of fuel used to power aircraft, also is derived from petroleum. According to the California Energy Commission (CEC), the state relies on petroleum-based fuels for 95 percent of its transportation needs (EIA, 2018). In 2019, approximately 30 percent of California's crude oil was produced within the state, about 12 percent was produced in Alaska, and the remaining 58 percent was produced in foreign lands (CEC, 2020b).

In 2019, taxable gasoline sales (including aviation gasoline) in California accounted for approximately 15.4 billion gallons of gasoline (CDTFA, 2020a), and taxable diesel fuel sales accounted for approximately 3.1 billion gallons of diesel fuel (CDTFA, 2020b). Statewide, there was an overall decrease in gasoline and diesel consumption from 2007 to 2011 due to the economic recession, but consumption has increased since then. The corona virus outbreak also is expected to decrease gasoline and diesel consumption throughout 2020.

California is nearly self-sufficient with regard to the gasoline, diesel, and aviation gasoline fuel supply, obtaining almost all of the supply to meet local demand from the California refineries

(CEC, 2014). Refineries in California often operate at or near maximum capacity because of the high demand for petroleum products. When unplanned refinery outages occur, replacement supplies must be brought in by marine tanker from refineries in the state of Washington or on the U.S. Gulf Coast. California requires that all motorists use, at a minimum, a specific blend of motor gasoline called CaRFG (California Reformulated Gasoline) as part of an overall program to reduce emissions from motor vehicles. Refineries in several other countries can also supply CaRFG, although it can take several weeks to locate and transport replacement motor gasoline that conforms to California's strict fuel specifications (EIA, 2020a). As a result, unplanned outages often result in a reduction in supply that causes prices to increase, sometimes dramatically. The severity and duration of these price spikes depend on how quickly the refinery issue can be resolved and how soon supply from alternative sources can reach the affected market (EIA, 2015).

Most petroleum supply disruptions or shortage events are resolved by the energy industry before they become significant. However, there are instances where the severity and scope of disasters require additional actions by the government to help facilitate and coordinate response and recovery efforts (NASEO, 2018).

Regional and Local Setting

PG&E is an investor-owned utility company that provides electricity supplies and services throughout a 70,000 square-mile service area that extends from Eureka in the north, to Bakersfield in the south, and from the Pacific Ocean in the west, to the Sierra Nevada mountains in the east. Shasta County is within PG&E’s service area for electricity. Operating characteristics of PG&E’s electricity supply and distribution systems are provided below. Also discussed is the regional consumption of transportation fuels.

PG&E Electric Utility Operations

PG&E provides “bundled” services (i.e., electricity, transmission and distribution services) to most of the six million customers in its service territory, including residential, commercial, industrial, and agricultural consumers. In recent years, PG&E has improved its electric transmission and distribution systems to accommodate the integration of new renewable energy resources, distributed generation resources, and energy storage facilities, and to help create a platform for the development of new Smart Grid technologies (PG&E, 2019).

In 2018, PG&E generated and/or procured a total of 48,832 gigawatt hours (GWh) of electricity.[1] Of this total, PG&E owns approximately 7,686 MW of generating capacity, itemized below (see **Table 3.7-1**). The remaining electrical power is purchased from other sources in and outside of California.

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1 This amount excludes electricity provided to direct access customers and Community Choice Aggregation (CCA) entities who procure their own supplies of electricity.

TABLE 3.7-1
PG&E-OWNED ELECTRICITY GENERATING SOURCES (2018)

Source	Generating Capacity (MW)
Nuclear (Diablo Canyon-2 reactors)	2,240
Hydroelectric	3,891
Fossil Fuel-Fired	1,400
Fuel Cell	3
Solar Photovoltaic (13 units;12 in Fresno County, 1 in Kings County)	152
Total	7,686

SOURCE: PG&E, 2019

Renewable Energy Resources

California law requires load-serving entities, such as PG&E, to gradually increase the amount of renewable energy they deliver to their customers to at least 33 percent of their total annual retail sales by 2020. This program, known as the Renewables Portfolio Standard (RPS) program, became effective in December 2011, and established three multi-year compliance periods that have gradually increasing RPS targets: 2011 through 2013, 2014 through 2016, and 2017 through 2020. After 2020, the RPS compliance periods will be annual.

Renewable generation resources, for purposes of the RPS program, include bioenergy such as biogas and biomass, certain hydroelectric facilities (30 MW or less), wind, solar, and geothermal energy. As shown in **Table 3.7-2**, during 2018, 38.9 percent of PG&E's energy deliveries were from renewable energy sources, exceeding the annual RPS target of 28.0 percent (PG&E, 2019).

TABLE 3.7-2
PG&E 2018 RENEWABLE ENERGY SOURCES

Source	Percent of Total Energy Portfolio
Bioenergy	4.4
Geothermal	3.7
Wind	10.0
RPS-Eligible Hydroelectric	2.7
Solar	18.1
Total	**38.9**

SOURCE: PG&E, 2019

Electricity Consumption

Table 3.7-3 shows electricity consumption by sector in the PG&E service area based on the latest available data from the CEC. As shown in the table, PG&E delivered approximately 80 billion kilowatt-hours (kWh) in 2018, of which approximately 30 billion kWh were consumed by commercial building uses.

TABLE 3.7-3
ELECTRICITY CONSUMPTION IN PG&E SERVICE AREA (2018)

Agricultural and Water Pump	Commercial Building	Commercial Other	Industry	Mining and Construction	Residential	Streetlight	Total Usage
All Usage Expressed in Millions of kWh (GWh)							
5,832	30,148	4,266	10,519	1,594	27,700	311	80,369

SOURCE: CEC, 2020c

In Shasta County, approximately 1.6 billion kWh of electricity was consumed in 2018, with approximately 821 million kWh consumed by non-residential uses (CEC, 2020c).

Local Energy Infrastructure

Existing electrical infrastructure in the Project vicinity includes transmission lines and PG&E's 500 kV Round Mountain Substation, which is located along Highway 299 approximately 2.7 miles west of the Project Site. The Round Mountain Substation is part of the Pacific Intertie, which is a vital transmission route between the Northwest and California. The Round Mountain Substation has an abundant amount of hydroelectric generation connected at the substation (PG&E, 2018). PG&E north-south direction 500 kV Transmission lines (Path 66 and a set of connecting wires to Path 15) run through the Round Mountain Substation. Other 220 kV to 287 kV PG&E transmission lines in the Project vicinity also run generally northeast from Round Mountain to Burney, including one that bisects the Project Site (PG&E, 2020).

As discussed above, there are multiple municipal hydropower plants in the Project area (Pit #1 through Pit #7) with additional hydropower plants throughout the County, including Spring Creek Power plant and Judge Francis Carr Powerhouse, and at Shasta Dam, Trinity Dam, and Keswick Dam; as well as privately owned hydropower, including Balta on Battle Creek, Kilarc on Cow Creek, Hat Creek, Roaring Creek, and Haynes Burney Creek. Wheelabrator, a biomass plant, and cogeneration power plant facilities are also located in Shasta County. The Hatchet Ridge Wind project is located within approximately 1 mile of the Project Site. These facilities include substations, transmission lines, and other infrastructure to connect to the energy grid.

Gasoline and Diesel

The CEC estimates that 87 million gallons of gasoline and approximately 50 million gallons of diesel were sold in 2018 in Shasta County and that there are 136 gasoline stations in the County (CEC, 2019).

3.7.1.3 Regulatory Setting

Federal

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA, 42 USC §8201 et seq.) serves as the underlying authority for federal energy management goals and requirements and is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer projects and includes, among other things, energy-efficiency standards for new construction.

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 (42 USC §13201 et seq.) sets equipment energy efficiency standards and seeks to reduce reliance on nonrenewable 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; and constructing energy-efficient buildings. Additionally, the act includes incentives for renewable energy production, including wind power.

Energy and Independence Security Act of 2007

The Energy and Independence Security Act of 2007 (42 USC §17001) 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, including by setting automobile efficiency standards, and increase in alternative fuel use. This act also amends portions of the National Energy Policy Conservation Act, described above.

Corporate Average Fuel Economy Standards

Section 3.10, *Greenhouse Gas Emissions*, details federally established fuel economy standards by the U.S. Environmental Protection Agency (USEPA) and National Highway Traffic Safety Administration (NHTSA). NHTSA's Corporate Average Fuel Economy (CAFE) standards regulate how far vehicles must travel on a gallon of fuel. NHTSA sets CAFE standards for passenger cars and for light trucks (collectively, "light-duty vehicles"), and separately sets fuel consumption standards for medium- and heavy-duty trucks and engines. In the course of more than 30 years, this regulatory program has resulted in improved fuel economy throughout the United States' vehicle fleet (NHTSA, 2014, 2019).

State

Warren-Alquist Act

The 1975 Warren-Alquist Act (Pub. Res. Code §25000 et seq.) established the California Energy Resources Conservation and Development Commission, now known as the CEC. The Act established a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The Act also was the driving force behind the creation of Appendix F to the CEQA Guidelines.

State of California Integrated Energy Policy

Public Resources Code Section 25301(a) requires the CEC to develop an integrated energy plan at least every 2 years for electricity, natural gas, and transportation fuels. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. An overarching goal of the resulting Integrated Energy Policy Report (IEPR) is to achieve the statewide greenhouse gas (GHG) emission reduction targets, while improving overall energy efficiency. See, for example, the CEC's 2019 Integrated Energy Policy Report Update, which includes integrating renewable energy, including wind, as a key component (CEC, 2020d).

Renewables Portfolio Standard

The State of California adopted standards to increase the percentage that retail sellers of electricity, including investor-owned utilities and community choice aggregators, must provide from renewable resources. The standards are referred to as the RPS. Qualifying renewables under the RPS include bioenergy such as biogas and biomass, small hydroelectric facilities (30 MW or less), wind, solar, and geothermal energy. The California Public Utilities Commission (CPUC) and the CEC jointly implement the RPS program. The CPUC's responsibilities include: (1) determining annual procurement targets and enforcing compliance; (2) reviewing and approving each investor-owned utility's renewable energy procurement plan; (3) reviewing contracts for RPS-eligible energy; and (4) establishing the standard terms and conditions used in contracts for eligible renewable energy (CPUC, 2020).

Executive Orders S-14-08 and S-21-09

In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expanded the State's RPS to 33 percent renewable power by 2020. In September 2009, Governor Schwarzenegger continued California's commitment to the RPS by signing Executive Order S-21-09, which directed the California Air Resources Board under its Assembly Bill (AB) 32 authority to enact regulations to help the State meet its RPS goal of 33 percent renewable energy by 2020.

Senate Bill 350 – Clean Energy and Pollution Reduction Act of 2015

Senate Bill (SB) 350, known as the Clean Energy and Pollution Reduction Act of 2015, was enacted on October 7, 2015. It provides a new set of objectives in clean energy, clean air, and pollution reduction by 2030. The objectives include the following:

1. To increase from 33 percent to 50 percent by December 31, 2030, the procurement of electricity from renewable sources.
2. To double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

Senate Bill 100 and Executive Order B-55-18

On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also created new standards for the RPS goals that were established by SB 350 in 2015. Specifically, the bill increases required energy from renewable sources for both investor-owned and publicly-owned utilities from 50 percent to 60 percent by 2030. Incrementally, these energy providers are also required to have a renewable energy supply of 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

On the same day that SB 100 was signed, Governor Brown signed Executive Order B-55-18 with a new statewide goal to achieve carbon neutrality (zero-net GHG emissions) by 2045 and to maintain net negative emissions thereafter.

Energy-efficient Building Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings specified in Title 24, Part 6 of the California Code of Regulations include requirements for non-residential building lighting, insulation, ventilation, and mechanical systems (CEC, 2018). Its provisions would be relevant to the Project’s proposed O&M building.

The California Green Building Standards Code (CALGreen, Title 24 Part 11) is a statewide regulatory code for all buildings. CALGreen is intended to encourage more sustainable and environmentally friendly building practices, require use of low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment (CBSC, 2019).

Local

Shasta County General Plan

The Energy Element of the Shasta County General Plan identifies the potential for development of wind as an alternative source of energy production in the County. The objectives and policy that would apply to the Project related to energy are provided below (Shasta County, 2004).

> **Objective E-2:** Increase utilization of renewable energy resources by encouraging development of solar, hydroelectric, biomass, waste-to-energy, and cogeneration sources.
>
> **Objective E-4:** Conserve nonrenewable energy resources, specifically raw materials, transportation fuels, and resource land area.
>
> **Policy E-c:** The County should develop energy thresholds and standards which assist applicants for development projects in designing conservation features into their proposals. Energy threshold standards could also be used to assist in the evaluation of potential energy consumption impacts which may be environmentally significant.

3.7.2 Significance Criteria

CEQA Guidelines Appendix G Section VI identifies considerations relating to energy. See Section 3.1.4, *Environmental Considerations Unaffected by the Project or Not Present in the Project Area*, as it relates to the County's analysis of the potential impacts of this Project relating to the energy considerations suggested in CEQA Guidelines Appendix G. Otherwise, for purposes of this analysis, a project would result in a significant impact to energy if it would:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction, operation and maintenance, or decommissioning.

3.7.3 Direct and Indirect Effects

3.7.3.1 Methodology

This impact analysis evaluates the potential for the Project to result in a substantial increase in energy demand, consistent with Public Resources Code Section 21100(b)(3), and/or wasteful use of energy during Project construction and operation. The impact analysis is informed by CEQA Guidelines Appendix F. Though the analysis provides construction, operational, and decommissioning energy use estimates for the Project, the impacts are analyzed based on an evaluation of whether this energy use would be considered excessive, wasteful, or inefficient taking into account required compliance with applicable standards and policies aimed to reduce energy consumption. Energy emissions detail supporting the Project estimates presented in this section are also presented in Section 3.10, *Greenhouse Gas Emissions*.

3.7.3.2 Direct and Indirect Effects of the Project

a) Whether the Project would result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction, operation and maintenance, or decommissioning.

Impact 3.7-1: Project construction, operation and maintenance, and decommissioning and site reclamation could result in the wasteful, inefficient, or unnecessary consumption or use of energy. (*Less-than-Significant Impact*)

Construction, Decommissioning, and Site Reclamation

The analysis in this section utilizes the assumptions identified in Appendix B, *Air Quality and Greenhouse Gas Emissions*. Because the California Emissions Estimator Model (CalEEMod) program and other sources used in this technical analysis does not display the amount and fuel type for construction-related sources, additional calculations were conducted and are summarized in **Tables 3.7-4** and **3.7-5** below and provided in **Appendix E**, *Energy: Fuel Use Calculations*.

TABLE 3.7-4
PROJECT ENERGY CONSUMPTION DURING CONSTRUCTION

Type (use)	Quantity	Units	Energy (MBtu)[a]
Diesel (construction equipment and trucks)	876,933	gallons	120,474
Gasoline (worker vehicles)	87,253	gallons	10,495
Aviation gasoline (construction helicopter use)	15,380	gallons	1,849
Electricity (water-related)	55,883	kWh	191
Total	-	-	**133,009**

NOTES:
MBtu = million British thermal unit
kWh = kilowatt-hours

[a] Based on U.S. Energy Information Administration (EIA) conversion factors.

SOURCE: Data compiled by Environmental Science Associates in 2020 (Appendix E); EIA, 2020b.

TABLE 3.7-5
PROJECT ENERGY CONSUMPTION DURING OPERATION

Type (use)	Quantity	Units	Energy (MBtu)[a]
Electricity			
O&M building	48,157	kWh/year	164
Diesel			
Maintenance equipment and crane trucks, Emergency Generator	10,402	gallons/year	1,429
Gasoline			
O&M employee vehicles	15,542	gallons/year	1,869
Propane			
O&M building heating	1,000–2,000	gallons/year	183
Total	-	-	**3,646**

NOTES:
MBtu = million British thermal unit
kWh = kilowatt-hours

[a] Based on U.S. Energy Information Administration (EIA) conversion factors.

SOURCE: Data compiled by Environmental Science Associates in 2020 (Appendix E); EIA, 2020b.

Project construction activities include timber removal and grubbing, grading and access road work, temporary concrete batch plant construction, foundation work, turbine and transformer installation, substation and O&M building installation, underground and overhead connector system work, transmission line connection, and substation aggregate and security fence installation. Construction of the Project would occur over an up-to 24-month period and would result in fuel consumption from the use of construction tools and equipment (e.g., graders, excavators, scrappers), from haul truck trips required to deliver materials and equipment to the site, potentially from helicopter use during the overhead collection system and transmission line connection phases, and from vehicle trips generated from construction workers traveling to and from the site. Vehicle emissions used to derive fuel use include running, startup, and idling emissions. Project construction is expected to consume a total of approximately 876,933 gallons of diesel fuel from construction equipment and haul truck trips, approximately 87,253 gallons of gasoline from construction worker vehicle trips, and approximately 15,380 gallons of aviation gasoline from helicopter use. Project fuel use during construction would represent approximately 0.1 percent of gasoline and 1.6 percent of diesel sold in Shasta County in 2018 (CEC, 2019). Project gasoline and aviation gasoline use would represent approximately 0.0007 percent of taxable gasoline sales (including aviation gasoline) in California in 2019 (CDTFA, 2020a). Aviation gasoline use would be minimal considering the limited duration of activity, which was assumed to last approximately six working days during conductor installation. Gasoline would be obtained by workers from among the 136 gas stations in the County. Diesel for haul truck trips required to deliver materials and equipment to the site would be obtained by truck drivers along their transport routes, including Shasta County and other jurisdictions along the route from the Port of Stockton, as necessary. Diesel for construction and transportation equipment during construction would be stored on-site in aboveground tanks, and would be replenished by commercial vendors as necessary. Aviation gasoline would be procured at the airport from which the helicopter takes-off and lands, which likely would be the Redding Municipal Airport or Fall River Mills Airport.

Construction activities and the corresponding fuel energy consumption would be temporary and localized, as this level of diesel fuel and gasoline use would not be a typical condition of the Project. In addition, there are no unusual Project characteristics that would cause the use of construction equipment that would be less energy efficient compared with other similar construction sites in other parts of the state.[2] Helicopters also often are used during construction to string overhead power lines. Therefore, construction-related fuel consumption by the Project would not result in inefficient, wasteful, or unnecessary energy use compared with other, similar construction in the region.

As discussed in Section 3.12, *Hydrology and Water Quality*, water use during construction would amount to a total of up to 49 acre-feet and would likely be obtained from groundwater resources, either sourced from wells on-site or purchased and delivered to the Project Site. Electricity associated with the supply, distribution, and treatment of water used for construction would be approximately 55,883 kWh over the 2-year construction period.[3] This energy consumption would be approximately 0.004 percent of the electricity consumption for the mining and construction sector in PG&E's service area in 2018 (CEC, 2020c). Additionally, as shown in Table 3.7-1, the total energy consumption during the two-year construction period would be approximately 133,009 MBtu, which is less than 0.01 percent of statewide energy use as of 2017. Therefore, construction-related indirect electricity consumption by the Project would not result in inefficient, wasteful, or unnecessary energy use.

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2 Since energy consumption is directly proportional to GHG emissions generation, the Project's construction-related GHG were compared to the Humboldt Wind Energy Project's GHG emissions (Humboldt County, 2019) because the Humboldt Wind project provides the most current, relevant estimate known of a wind project construction site elsewhere in the state.

3 Based on the CalEEMod energy intensity of 0.0035 kWh per gallon for supply, distribution, and treatment of water for Shasta County.

Operation and Maintenance

The Project would receive service power from PG&E, and would have an emergency generator available on-site. A small amount of electricity would be consumed by the Project to operate lights, telecommunications devices associated with the Supervisory Control and Data Acquisition (SCADA) system, which provides communication capabilities between turbine locations, substation, and operations and maintenance facilities, and other electronic equipment. For operational activities, annual electricity consumption was calculated using demand factors for a general heavy industry type building, because CalEEMod does not provide demand factors specifically for wind O&M facilities, as shown in the CalEEMod output in Appendix B. The Project's energy consumption was estimated to be approximately 48,157 kWh of electricity per year. This energy consumption would be less than 0.001 percent of the electricity consumption for the industrial sector in PG&E's service area in 2018 (CEC, 2020c). Using the Project's total nameplate generating capacity of up to 216 MW and conservatively assuming an average capacity factor of 32 percent,[4] the Project would be anticipated to generate up to approximately 605,491,200 kWh per year.[5] Thus, the minimal amount of electricity required during Project operation would be greatly offset by the generation of electricity from the Project, and the Project's electricity demand would not constitute a wasteful, inefficient, or unnecessary use of energy.

Operation and maintenance would require the use of utility vehicles, cranes, and other maintenance-related equipment. No other heavy equipment would be used during normal Project operation. Non-routine maintenance such as repair or replacement of rotors or other major components, if needed, could involve use of one or more cranes and equipment transport vehicles. Cranes for maintenance would not be as large as the track-mounted cranes needed to erect the turbine towers. Additionally, permanent access roads would be graded and compacted periodically to minimize erosion. Crane trucks and other maintenance equipment (i.e., mowers) may require the use of diesel fuel. Project diesel use from equipment is estimated to be 10,402 gallons per year, and would represent approximately 0.02 percent of diesel sold in Shasta County in 2018 (CEC, 2019). As outlined in Chapter 2, *Description of Project and Alternatives*, the Applicant would develop an O&M protocol to be implemented throughout Project operation. This protocol would specify routine turbine maintenance and operation in accordance with the maintenance requirements prescribed by the turbine manufacturer. Thus, the amount of diesel fuel consumed during Project operation would be relatively minimal and would not constitute a wasteful, inefficient, or unnecessary use of energy.

The Project would require approximately 12 full-time personnel on-site for operation and maintenance. While performing most routine maintenance activities, O&M staff would travel via pickup or other light-duty trucks using gasoline. Gasoline also would be required by Project workers commuting to and from the Project Site. The total mobile emissions rates (Appendix B) during operation yield a conservative estimate of 15,542 gallons of gasoline required annually

4 Conservatively based on a 32 percent average capacity factor. Note that the average 2018 capacity factor among projects built from 2014 to 2017 was 41.9 percent, compared to an average of 30.8 percent among all projects built from 2004 to 2011, and 23.8 percent among all projects built from 1998 to 2001 (U.S. Department of Energy, 2018).

5 Note that electricity transmission and distribution losses averaged about 5 percent of the electricity that was transmitted and distributed in 2018 in California (EIA, 2019). With these losses taken into consideration, the Project would supply up to approximately 575,216,640 kWh per year.

during Project operation. The gasoline consumption by Project workers would be approximately 0.02 percent of gasoline consumed in Shasta County in 2018 (CEC, 2019). Therefore, the gasoline use during Project operation would not constitute a wasteful, inefficient, or unnecessary use of energy.

Additionally, the emergency generator for the O&M building would require diesel fuel during operation. Assuming 100 hours of operational use per year, the Project would use approximately 100 gallons of diesel fuel during operation. The O&M building would also use propane for ambient heating. Approximately 500 to 1,000 gallons would be stored in an aboveground propane storage vessel. Assuming the propane tank would need to be refilled twice per year, the Project would use approximately 1,000 to 2,000 gallons of propane per year during operation. Diesel fuel and propane use during operation would be minimal, and fuel levels would be replenished on-site by commercial vendors as necessary. Therefore, the diesel and propane fuel use during Project operation would not constitute a wasteful, inefficient, or unnecessary use of energy.

Additionally, as shown in Table 3.7-2, the Project's total annual energy consumption would be approximately 3,646 MBtu, which is less than 0.0001 percent of statewide energy use in 2017. The Project would also be anticipated to generate up to approximately 605,491,200 kWh per year, or 2,065,936 MBtu, which represents 0.03 percent of statewide energy use in 2017. Therefore, the energy use during Project operation would not constitute a wasteful, inefficient, or unnecessary use of energy. This impact would be less than significant.

Decommissioning and Site Restoration

The Project is anticipated to be in commercial operation for approximately 40 years from the commencement of operation as would be allowed under the requested terms of the use permit, although upgrading and replacing equipment could extend the operating life of the wind energy facility indefinitely. Proposed decommissioning of existing facilities and infrastructure and reclamation of the Project Site would require approximately 18 to 24 months. The types of equipment, vehicles, and workforce necessary for decommissioning and reclamation activities at the Project Site would be similar to the requirements for construction, except considerably less intensive in that no concrete batch plant(s), cable delivery, or concrete trucks would be required, and no cable trenching or similar work would occur. Moreover, existing service roads would be used; no new access roads or road widening would be required. Decommissioning and site reclamation activities and corresponding fuel energy consumption would be temporary and would be comparable to the construction-related fuel demand. Decommissioning- and site reclamation-related fuel use would also not represent a substantial demand on energy resources. Thus, decommissioning-related fuel consumption by the Project would not result in inefficient, wasteful, or unnecessary energy use compared with other construction sites in the region.[6] This impact would be less than significant.

Mitigation: None required.

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6 See Footnote 2.

3.7.3.3 PG&E Interconnection Infrastructure

Upgrades to PG&E facilities to facilitate the interconnection between the Project's electricity and the PG&E transmission lines are anticipated to include construction and/or reconfiguration of utility line structures and transmission line circuits involving four to six new transmission poles. If required, these new poles would be located adjacent to the proposed substation and switching station. The construction equipment, workers, vehicle trips, and fuel required for upgrades to these facilities would be minimal compared to overall Project construction activities, and are captured by the Project's calculations. Therefore, activities associated with the PG&E interconnection infrastructure would result in a less-than-significant impact relating to energy.

3.7.3.4 Direct and Indirect Effects of Alternatives

Alternative 1: South of SR 299

Under Alternative 1, the Project would be constructed, operated and maintained, and ultimately decommissioned as proposed south of SR 299, and none of the up to seven turbines proposed to the north of SR 299 (turbine numbers A01 through A07) or related infrastructure would be developed. Alternative 1 would have a total nameplate generating capacity of up to 195 MW, which equates to approximately 21 MW less nameplate generating capacity as compared to the Project. The number of workers and durations of construction, operation and maintenance, and decommissioning and site reclamation would be substantially the same as for the Project, resulting in similar fuel and electricity use which would continue to be offset by the Project's energy generation. Alternative 1 would continue to provide a new source of renewable energy supporting SB 100 and the State's energy goals, although with less overall capacity than the Project. Overall, Alternative 1 would result in no significant impacts to energy; impact conclusions would be the same as those identified for the Project.

Alternative 2: Increased Setbacks

Under Alternative 2, proposed setbacks would be increased relative to the Project to preclude turbine construction within three times the height of the turbine (i.e., within 2,037 feet) of a residential property line and within 1.5 times the height of the turbine (i.e., within 1,018.5 feet) of State Route 299, any other publicly-maintained public highway or street, and of Supan Road or Terry Mill Road. This would remove four wind turbines, as compared to the Project, resulting in the loss of approximately 12 MW to 22.8 MW of generating capacity based on generation potential per turbine. Under Alternative 2, the number of workers and durations of construction, operation and maintenance, and decommissioning and site restoration would be substantially the same as for the Project, resulting in similar fuel and electricity use, which would continue to be offset by the Project's energy generation. Alternative 2 would continue to provide a new source of renewable energy supporting SB 100 and the State's energy goals, although with less overall capacity than the Project. Overall, Alternative 2 would result in no significant impacts to energy; impact conclusions would be the same as those identified for the Project.

No Project Alternative

If the No Project Alternative is implemented, none of the proposed wind project infrastructure would be delivered to the Project Site, and there would be no Project-related construction, operation and maintenance, or decommissioning there. No construction-related equipment or additional vehicle trips would be made to, from, or within the Project Site relative to baseline conditions for a wind project purpose. Fuel and electricity use associated with the Project would not occur. The Project Site would continue to be operated as managed forest timberlands. Because there would be no change relative to baseline conditions, the No Project Alternative would create no impact related to energy. However, under the No Project Alternative, a new source of renewable energy supporting SB 100 and the State's energy goals would not be provided.

The Project Site is zoned for timber production. Pursuant to regulations implementing the California Timberland Productivity Act (Government Code §51100 et seq.; 14 Cal. Code Regs. §897[a]), there is a legal presumption that "timber harvesting is expected to and will occur on such lands." The regulations further specify that timber harvesting on such lands "shall not be presumed to have a Significant Adverse Impact on the Environment" (14 Cal. Code Regs. §898). Therefore, the No Project Alternative, including anticipated timber harvesting, is not presumed to result in a significant adverse individual or cumulative effect relating to energy. CAL FIRE would review any future timber harvesting proposal to evaluate any potential project-specific, site-specific environmental impacts.

3.7.4 Cumulative Analysis

The geographic context for potential cumulative impacts related to electricity is within PG&E's service area and for equipment and vehicle fuel use is within the Project's construction workers' commute radius (assumed to be approximately 50 miles) and jurisdictions along the route from the Port of Stockton (assumed to be approximately 270 miles), where major Project components would likely be delivered and transported to the Project Site from, since these are the areas within which energy resources would be demanded and supplied for the Project. The Project would use energy resources during initial construction, operation and maintenance, and decommissioning/ reclamation; therefore, it could contribute to potential cumulative impacts during any of these phases.

Regarding electricity, there is no existing significant adverse condition that would be worsened or intensified by the Project or an alternative. To the contrary, both the Project and Alternatives 1 and 2 would provide an additional source of renewable energy that could serve the cumulative demand. No significant adverse cumulative effect would result relating to electricity use; instead, a beneficial cumulative impact on energy resources would result.

Similarly regarding the efficiency of fuel use, there is no existing significant adverse condition (such as a shortage) that would be worsened or intensified by the Project or an alternative. Past, present, and reasonably foreseeable future projects within approximately 50 miles of the Project

Site could require gasoline and within approximately 270 miles of the Project Site could require diesel, but would not combine with the fuel demands of the Project to cause a significant adverse cumulative impact relating to the wasteful, inefficient, or unnecessary consumption or use of fuel. In the event of a future shortage, higher prices at the pump would curtail unnecessary trips that could be termed "wasteful" and would moderate choices regarding vehicles, equipment, and fuel efficiency. Under these conditions, the Project's less-than-significant impacts relating to wasteful, inefficient, or unnecessary consumption or use of fuel would not cause a significant cumulative impact.

3.7.5 References

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