3.1.9 Energy

Appendix F of the California Environmental Quality Act Guidelines requires that environmental impact reports (EIRs) discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy to ensure that energy implications are considered in project-related decision-making processes. As such, this section analyzes the energy impacts of Otay Ranch Village 14 and Planning Areas 16/19 (Proposed Project). Specifically, this section summarizes the existing conditions in the Project Area, discusses the regulatory framework, and discloses estimated energy use during the construction and operational phases of the Proposed Project. This analysis considers the electricity, natural gas, and transportation fuel (petroleum) demand of the Proposed Project, as well as potential service delivery impacts.

Information in this section is based on the Proposed Project's Greenhouse Gas Emissions Technical Report (2017), prepared by Dudek, which is included as Appendix 2.7-1 of this EIR, and the Proposed Project's Energy Conservation Plan (2017), prepared by Ramboll Environ, which is included as Appendix 3.1.9 of this EIR.

This section tiers from the Otay Ranch Final Program EIR (Otay Ranch PEIR) because the Proposed Project is within the boundaries of the Otay Ranch General Development Plan/Otay Subregional Plan (GDP/SRP), and development of the Project Area was analyzed in the Otay Ranch PEIR (City of Chula Vista and County of San Diego 1993). At the time the 1993 EIR was developed, the requirements of Appendix F of the California Environmental Quality Act Guidelines were not in place. The Otay Ranch PEIR estimated the use of energy in evaluating air quality impacts of the Proposed Project; there was no significance determination made regarding energy. Since certification of the Program EIR, energy and fuel efficient standards, such as Renewable Portfolio Standards, California's Green Building Standards (CALGreen) Standards, and Corporate Average Fuel Economy (CAFE) Standards, have been updated. Further, the development concept for the Proposed Project has been further refined and more precise and site-specific technical analyses were performed to determine the potential impacts of the Proposed Project. Accordingly, this analysis for the Proposed Project is different than that contained within the Otay Ranch PEIR because it specifically considers the Project Area, which is a subset of Otay Ranch. As a result, this EIR's determinations regarding potential energy impacts is specific to the Proposed Project.

3.1.9.1 Existing Conditions

3.1.9.1.1 Environmental Setting

The environmental setting for the Proposed Project related to electricity, natural gas, and petroleum, including associated service providers, supply sources, and estimated consumption, is

discussed below. In summary, in 2015 (the latest calendar year for which data is uniformly available for all three types of energy sources), California's estimated annual energy use included the following:

- Approximately 282,896 gigawatt hours of electricity (EIA 2017a)
- Approximately 23 billion therms of natural gas (approximately 6.4 billion cubic feet of natural gas per day) (EIA 2017b)
- Approximately 14 billion gallons of gasoline (CEC 2015a)

Electricity

Electricity usage in California for different land uses varies substantially by the types of uses in a building, types of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. Due to the state's energy efficiency building standards and efficiency and conservation programs, California's electricity use per capita has remained stable for more than 30 years, and the national average has steadily increased (CEC 2015b).

San Diego Gas & Electric (SDG&E) provides electric services to 3.6 million customers through 1.4 million electric meters located in a 4,100-square-mile service area that includes the San Diego County (County) and southern Orange County (SDG&E 2016). SDG&E is a subsidiary of Sempra Energy and would provide electricity to the Proposed Project. According to the California Public Utilities Commission (CPUC), SDG&E customers consumed approximately 19,722 million kilowatt-hours (kWh) of electricity in 2015 (CPUC 2016).

SDG&E receives electric power from a variety of sources. According to CPUC's 2016 Biennial Renewable Portfolio Standard (RPS) Program Update, 36.4% of SDG&E's power came from eligible renewable energy sources in 2014, including biomass/waste, geothermal, small hydroelectric, solar, and wind sources. This is an improvement from the 15.7% that SDG&E maintained in 2011 (CPUC 2016).

Based on recent energy supply and demand projections in California, statewide annual peak electricity demand is projected to grow an average of 890 megawatts per year for the next decade, or 1.4% annually, and consumption per capita is expected to remain relatively constant at 7,200–7,800 kWh per person (CEC 2015b).

In the County, the California Energy Commission (CEC) reported an annual electrical consumption of approximately 19.9 billion kWh in 2014, with 13.1 billion kWh for non-residential use and 6.8 billion kWh for residential use (CEC 2016a).

Natural Gas

CPUC regulates natural gas utility service for approximately 10.8 million customers who receive natural gas from Pacific Gas & Electric (PG&E), Southern California Gas (SoCalGas), SDG&E, Southwest Gas, and several smaller natural gas utilities. CPUC also regulates independent storage operators Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage (CPUC 2017). SDG&E provides natural gas service to the Counties of San Diego and Orange and would provide natural gas to the Proposed Project. SDG&E is a wholesale customer of SoCalGas and currently receives all of its natural gas from the SoCalGas system (CPUC 2017).

The majority of California's natural gas customers are residential and small commercial customers (core customers). These customers accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large consumers, such as electric generators and industrial customers (noncore customers), accounted for approximately 68% of the natural gas delivered by California utilities in 2012 (CPUC 2017).

CPUC regulates California natural gas rates and natural gas services, including in-state transportation over transmission and distribution pipeline systems, storage, procurement, metering, and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. California gas utilities may soon also begin receiving biogas into their pipeline systems (CPUC 2017).

In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California (CPUC 2017). Natural gas from out-of-state production basins is delivered into California through the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Southern Trails, and Mojave Pipeline. The North Baja–Baja Norte Pipeline takes gas off the El Paso Pipeline at the California/Arizona border and delivers it through California into Mexico. The Federal Energy Regulatory Commission regulates the transportation of natural gas on interstate pipelines, and CPUC often participates in Federal Energy Regulatory Commission regulatory proceedings to represent the interests of California natural gas consumers (CPUC 2017).

Most of the natural gas transported through interstate pipelines, as well as some California-produced natural gas, is delivered through the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the backbone pipeline system is then delivered into local transmission and distribution pipeline systems or to natural gas storage fields. Some large

noncore customers take natural gas directly off the high-pressure backbone pipeline system, and some core customers and other noncore customers take natural gas off the utilities' distribution pipeline systems. CPUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the natural gas delivered to California's gas consumers in 2012 (CPUC 2017).

PG&E and SoCalGas own and operate several natural gas storage fields that are located in Northern and Southern California. These storage fields and four independently owned storage utilities—Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage—help meet peak-season natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently (CPUC 2017).

California's regulated utilities do not own any natural gas production facilities. All natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the Federal Energy Regulatory Commission in the mid-1980s and is determined by market forces. However, CPUC decides whether California's utilities have taken reasonable steps to minimize the cost of natural gas purchased on behalf of its core customers (CPUC 2017).

As indicated in the preceding discussion, natural gas is available from a variety of in-state and out-of-state sources, and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available through existing delivery systems, thereby increasing the availability and reliability of resources.

Petroleum

There are more than 35 million registered vehicles in California, and those vehicles consume an estimated 18 billion gallons of fuel each year (CEC 2017; DMV 2017). Gasoline and other vehicle fuels are commercially provided commodities and would be available to the Proposed Project through commercial outlets.

Petroleum currently accounts for approximately 92% of California's transportation energy consumption (CEC 2017). However, technological advances, market trends, consumer behavior, and government policies could result in significant changes in fuel consumption by type and in total. At the federal and state levels, various policies, rules, and regulations have been enacted to improve vehicle fuel efficiency, promote the development and use of alternative fuels, reduce transportation-source air pollutants and greenhouse gas (GHG) emissions, and reduce vehicle miles traveled (VMT). Market forces have driven the price of petroleum products steadily upward over time, and technological advances have made use of other energy resources or alternative transportation modes increasingly feasible.

Largely as a result of and in response to these multiple factors, gasoline consumption within the state has declined in recent years, and availability of other alternative fuels/energy sources has increased. The quantity, availability, and reliability of transportation energy resources have increased in recent years, and this trend may likely continue and accelerate (CEC 2017). Increasingly available and diversified transportation energy resources act to promote continuing reliable and affordable means to support vehicular transportation within the state.

Existing Infrastructure

The Proposed Project is within the SDG&E service area and would receive service through an extension from the existing Telegraph substation at the intersection of Agua Vista and Proctor Valley Road in Chula Vista. Planning Areas 16/19 would receive service through an extension from the existing Proctor Valley substation at either Melody Road or Whispering Meadows Lane. The existing Proctor Valley substation is in proximity to the Proposed Project. A 200-foot-wide SDG&E transmission corridor traverses the Central Village in an east/west direction. Proposed Project land uses adjacent to or in the vicinity of the Proctor Valley substation and the transmission corridor have been chosen, and improvements will be designed for compatibility.

3.1.9.1.2 Regulatory Setting

Federal, state, and local agencies regulate energy use and consumption through various means and programs. On the federal level, the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, CPUC and CEC are two agencies with authority over different aspects of energy. Relevant federal, state, and local energy-related regulations are summarized below. This information helps to place the impact analysis within its proper regulatory context. Note, however, that compliance with all applicable regulations is required. For this reason, the EIR does not specifically assess the Proposed Project's ability to comply with such regulations, except in those instances where a regulatory standard is being used as the threshold for determining impact significance.

Federal

Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 FR 62624–63200). Fuel economy

is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Intermodal Surface Transportation Efficiency Act of 1991

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of intermodal transportation systems to maximize mobility and address national and local interests in air quality and energy. ISTEA contained factors that metropolitan planning organizations were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, metropolitan planning organizations adopted policies defining the social, economic, energy, and environmental values guiding transportation decisions.

Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century was signed into law in 1998 and builds on the initiatives established in the ISTEA legislation, discussed above. The act authorizes highway, highway safety, transit, and other efficient surface transportation programs. The act continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of transportation decisions. The act also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of intelligent transportation systems to help improve operations and management of transportation systems and vehicle safety.

Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law. In addition to setting increased CAFE ~~Corporate Average Fuel Economy~~ standards for motor vehicles, the EISA includes the following other provisions related to energy efficiency:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Sections 301–325)
- Building Energy Efficiency (Sections 411–441)

This federal legislation requires ever-increasing levels of renewable fuels (the RFS) to replace petroleum (EPA 2013, 2015). The U.S. Environmental Protection Agency is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States. As required under the act, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the EISA, the RFS program was expanded in several key ways that lay the foundation for achieving significant reductions in GHG emissions from the use of renewable fuels, reducing imported petroleum, and encouraging the development and expansion of the renewable fuels sector in the United States. The updated program is referred to as "RFS2" and includes the following:

- EISA expanded the RFS program to include diesel, in addition to gasoline.
- EISA increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022.
- EISA established new categories of renewable fuel, and set separate volume requirements for each one.
- EISA required the U.S. Environmental Protection Agency to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

Additional provisions of the EISA address energy savings in government and public institutions, research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green" jobs.

State

The discussion below focuses primarily on those policies, regulations, and laws that directly pertain to energy-related resources. Refer to Section 2.7, Greenhouse Gas Emissions, of this EIR, which addresses various policies, regulations, and laws targeted to the reduction of GHG emissions that are expected to achieve co-benefits in the form of reduced demand for energy-related resources and enhanced efficiencies in the consumption of energy-related resources.

Warren-Alquist Act

The California Legislature passed the Warren-Alquist Act in 1974. The Warren-Alquist Act created the CEC. The legislation also incorporated the following three key provisions designed to address the demand side of the energy equation:

- It directed the CEC to formulate and adopt the nation's first energy conservation standards for both buildings constructed and appliances sold in California.

- The act removed the responsibility of electricity demand forecasting from the utilities, which had a financial interest in high demand projections, and transferred it to a more impartial CEC.
- The CEC was directed to embark on an ambitious research and development program, with a particular focus on fostering what were characterized as non-conventional energy sources.

State of California Energy Action Plan

The CEC and CPUC approved the first State of California Energy Action Plan in 2003. The plan established shared goals and specific actions to ensure that adequate, reliable, and reasonably priced electrical power and natural gas supplies are provided, and identified policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers. In 2005, a second Energy Action Plan was adopted by the CEC and CPUC to reflect various policy changes and actions of the prior 2 years.

At the beginning of 2008, the CEC and CPUC determined that it was not necessary or productive to prepare a new energy action plan. This determination was based in part on a finding that the state's energy policies have been significantly influenced by the passage of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 (discussed below). Rather than produce a new energy action plan, the CEC and CPUC prepared an "update" that examines the state's ongoing actions in the context of global climate change.

Senate Bill 1078 (2002)

This bill established the California RPS Program and required that a retail seller of electricity purchase a specified minimum percentage of electricity generated by eligible renewable energy resources as defined in any given year, culminating in a 20% standard by December 31, 2017. These retail sellers include electrical corporations, community choice aggregators, and electric service providers. The bill relatedly required the CEC to certify eligible renewable energy resources, design and implement an accounting system to verify compliance with the RPS by retail sellers, and allocate and award supplemental energy payments to cover above-market costs of renewable energy.

Senate Bills 107 (2006), X1-2 (2011), and 350 (2015)

Senate Bill (SB) 107 (2006) accelerated the RPS established by SB 1078 by requiring that 20% of electricity retail sales be served by renewable energy resources by 2010 (not 2017). Additionally, SB X1-2 (2011) requires all California utilities to generate 33% of their electricity from eligible renewable energy resources by 2020. Specifically, SB X1-2 sets a three-stage compliance period: by December 31, 2013, 20% shall come from renewables; by

December 31, 2016, 25% shall come from renewables; and by December 31, 2020, 33% shall come from renewables.

SB 350 (2015) requires retail seller and publicly owned utilities to procure 50% of their electricity from eligible renewable energy resources by 2030, with interim goals of 40% by 2024 and 45% by 2027.

Consequently, utility energy generation from non-renewable resources is expected to be reduced based on implementation of the 33% RPS in 2020 and the 50% RPS in 2030. Therefore, the Proposed Project's reliance on non-renewable energy sources would also be reduced.

Assembly Bill 1007 (2005)

AB 1007 (2005) required the CEC to prepare a statewide plan to increase the use of alternative fuels in California (State Alternative Fuels Plan). The CEC prepared the plan in partnership with the California Air Resources Board (CARB) and in consultation with the other state, federal, and local agencies. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Assembly Bill 32 (2006) and Senate Bill 32 (2016)

In 2006, the Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020. In 2016, the Legislature enacted SB 32, which extended the horizon year of the state's codified GHG reduction planning targets from 2020 to 2030, requiring California to reduce its GHG emissions to 40% below 1990 levels by 2030. In accordance with AB 32 and SB 32, CARB prepares scoping plans to guide the development of statewide policies and regulations for the reduction of GHG emissions. Many of the policy and regulatory concepts identified in the scoping plans focused on increasing energy efficiencies and the use of renewable resources and reducing the consumption of petroleum-based fuels (such as gasoline and diesel). As such, the state's GHG emissions reduction planning framework creates co-benefits for energy-related resources. Additional information on AB 32 and SB 32 is provided in Section 2.7 of this EIR.

California Building Standards

Part 6 of Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6 establishes energy efficiency standards for residential and non-residential buildings constructed in California to reduce energy demand and consumption. Part 6 is updated periodically to incorporate and consider new energy

efficiency technologies and methodologies. The 2016 Title 24 building energy efficiency standards, which became effective on January 1, 2017, further reduce energy used in the state. In general, single-family homes built to the 2016 standards are anticipated to use approximately 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015c).

Title 24 also includes Part 11, the ~~California's Green Building Standards (~~CALGreen~~)~~. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The 2016 CALGreen standards became effective on January 1, 2017. The mandatory standards require the following:

- 20% mandatory reduction in indoor water use
- 50% diversion of construction and demolition waste from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency

Integrated Energy Policy Report

CEC is responsible for preparing integrated energy policy reports, which identify emerging trends related to energy supply, demand, conservation, public health and safety, and maintenance of a healthy economy. The CEC's 2015 Integrated Energy Policy Report discusses the state's policy goal to require that new residential construction be designed to achieve zero net energy (ZNE) standards by 2020 and that new non-residential construction be designed to achieve ZNE standards by 2030, which is relevant to this EIR. Refer to Section 2.7 of this EIR for additional information on the state's ZNE objectives and how the state's achievement of its objectives would serve to beneficially reduce the Proposed Project's GHG emissions profile and energy consumption.

State Vehicle Standards

In a response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, AB 1493 was enacted in 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. The 2009–2012 standards resulted in a reduction in approximately 22% GHG emissions compared to emissions from the 2002 fleet, and the 2013–2016 standards resulted in a reduction of approximately 30%.

In 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. By 2025, when the rules would be fully implemented, new automobiles would emit 34% fewer global warming gases and 75% fewer smog-forming emissions (CARB 2011).

Although the focus of the state's vehicle standards is on the reduction of air pollutants and GHG emissions, one co-benefit of implementation of these standards is a reduced demand for petroleum-based fuels.

Sustainable Communities Strategy

The Sustainable Communities and Climate Protection Act of 2008, or SB 375, coordinates land use planning, regional transportation plans, and funding priorities to help California meet its GHG emissions reduction mandates. As codified in California Government Code, Section 65080, SB 375 requires metropolitan planning organizations (San Diego Association of Governments) to include a sustainable communities strategy in its regional transportation plan. The main focus of the sustainable communities strategy is to plan for growth in a fashion that will ultimately reduce GHG emissions, but the strategy is also a part of a bigger effort to address other development issues within the general vicinity, including transit and VMT, which influence the consumption of petroleum-based fuels.

Local

SDG&E Long-Term Procurement Plan

In 2009, CPUC approved SDG&E's Long-Term Procurement Plan (LTPP), which identifies how SDG&E will meet the future energy needs of customers in SDG&E's service area (SDG&E 2009). The LTPP identifies several energy demand reduction targets (i.e., conservation) and goals for increasing renewable energy supplies, new, local power generation, and increased transmission capacity.

The LTPP sets a standard for acquiring 20% of SDG&E's energy mix from renewables by 2010 and 33% by 2020. The LTPP also calls for greater use of in-region energy supplies, including renewable energy installations. The LTPP states that, by 2020, SDG&E intends to achieve and maintain the capacity to generate 75% of summer peak demand energy with in-County generation. The LTPP also identifies 44% of its renewables to be generated and distributed in-region by 2020.

County of San Diego General Plan

The County's General Plan takes steps to address energy by including policies for improving energy efficiency, reducing waste, recycling, and managing water use. The General Plan also seeks to reduce energy consumption through minimizing VMT; approving land use patterns that support increased density in areas where there is infrastructure to support it; creating increased opportunities for transit, pedestrians, and bicycles; and encouraging and approving green building and land development conservation initiatives. The following policies identified in the General Plan's Conservation and Open Space Element are applicable to the Proposed Project (County of San Diego 2011):

- **COS-14.1: Land Use Development Form.** Require that development be located and designed to reduce vehicular trips (and associated air pollution) by utilizing compact regional and community-level development patterns while maintaining community character.
- **COS-14.2: Villages and Rural Villages.** Incorporate a mixture of uses within Villages and Rural Villages that encourage people to walk, bicycle, or use public transit to reduce air pollution and GHG emissions.
- **COS-14.3: Sustainable Development.** Require design of residential subdivisions and nonresidential development through "green" and sustainable land development practices to conserve energy, water, open space, and natural resources.
- **COS-14.5: Building Siting and Orientation in Subdivisions.** Require that buildings be located and oriented in new subdivisions and multi-structure non-residential projects to maximize passive solar heating during cool seasons, minimize heat gains during hot periods, enhance natural ventilation, and promote the effective use of daylight.
- **COS-14.7: Alternative Energy Sources for Development Projects.** Encourage development projects that use energy recovery, photovoltaic, and wind energy.
- **COS-15.4: Title 24 Energy Standards.** Require development to minimize energy impacts from new buildings in accordance with or exceeding Title 24 energy standards.
- **COS-15.6: Design and Construction Methods.** Require development design and construction methods to minimize impacts to air quality.
- **COS-16.2: Single-Occupancy Vehicles.** Support transportation management programs that reduce the use of single-occupancy vehicles.
- **COS-17.2: Construction and Demolition Waste.** Require recycling, reduction and reuse of construction and demolition debris.
- **COS-19.1: Sustainable Development Practices.** Require land development, building design, landscaping, and operational practices that minimize water consumption.

The Proposed Project's consistency with applicable General Plan policies is evaluated in Section 3.1.3, Land Use and Planning, of this EIR.

Otay Ranch General Development Plan/Subregional Plan

Energy conservation is a core component of the Otay Ranch GDP/SRP; the goals, objectives, and policies regarding energy are outlined in Section E of Chapter 10, Resource Protection, Conservation, and Management (Otay Ranch Joint Planning Project 2013). The following policies are included in the Otay Ranch GDP/SRP:

- Prepare a non-renewable energy conservation plan for each SPA [Sectional Planning Area]. This plan shall identify measures to reduce the consumption of non-renewable energy resources by feasible methods, including, but not requiring, and not limited to the following:
    - Transportation:
        - Reduction in vehicle-trip miles
        - Increase[d] use of transit
        - Use of energy-efficient or high occupancy vehicles
        - Reduction in freight-hauling truck trips
        - Provision of facilities for telecommunications
    - Building design and use:
        - Building orientation
        - Use of better-insulated buildings
        - Use of earth sheltered design
        - Use of energy efficient appliances
        - Use of solar energy systems, as practical
    - Lighting:
        - Use of energy-efficient public lighting
        - Use of energy-efficient lighting within buildings
        - Use of low intensity lighting where appropriate in areas adjacent to open space boundaries
    - Business:
        - Use of individual and district co-generation facilities
        - Use of more energy-efficient production practices

- Recycling:
  - Programs which encourage or mandate residential and commercial recycling
- Alternative energy sources:
  - Solar
  - Wind
  - Hydro-electric
  - Biomass (wood, chaparral, etc.)

- Reduce the reliance for project residents to utilize the automobile, thereby minimizing automobile trips and miles traveled.

Refer to the Proposed Project's Energy Conservation Plan, which was prepared in accordance with the requirements of the Otay Ranch GDP/SRP (Appendix 3.1.9).

3.1.9.2 Analysis of Project Effects and Determination as to Significance

Guidelines for the Determination of Significance

The County's Guidelines for Determining Significance do not explicitly address energy. Therefore, for this EIR, Appendix F of the California Environmental Quality Act Guidelines was used to assess the Proposed Project's direct, indirect, and cumulative impacts. Appendix F does not prescribe a threshold for the determination of significance. Rather, Appendix F focuses on reducing and minimizing inefficient, wasteful, and unnecessary consumption of energy. Therefore, for the purpose of this EIR, a significant impact to energy would result if the Proposed Project would:

1. Result in the wasteful and inefficient use of nonrenewable resources during its construction.
2. Result in the wasteful and inefficient use of nonrenewable resources during long-term operation.
3. Be inconsistent with adopted plans and policies.

Analysis

Energy Consumption

Electricity

Construction Use

Temporary electric power for as-necessary lighting and electronic equipment (such as computers inside temporary construction trailers and heating, ventilation, and air conditioning) would be provided by SDG&E. The amount of electricity used during construction would be minimal because typical demand stems from the use of several construction trailers that are used by managerial staff during the hours of construction activities in addition to electrically powered hand tools. The majority of the energy used during construction would be from petroleum. The electricity used for construction activities would be temporary and minimal; therefore, impacts would be **less than significant**.

Operational Use

At full build-out, the Proposed Project's operational phase would require electricity for operating the various buildings and residences. To calculate the total residential building electricity input (from regulated and unregulated loads[1]), the Proposed Project's electricity use data that reflects the Proposed Project's commitment[2] to meet the CEC's definition of ZNE buildings[3] was used (ConSol 2017). ConSol estimated the electricity consumption of ZNE residences using the CEC's public-domain compliance software, known as "CBECC-Res."[4, 5]

[1] "Regulated" loads are those that are subject to standards set forth in Title 24, Part 6, of the California Code of Regulations and include the major building envelope systems, such as space heating, space cooling, water heating, and ventilation. "Unregulated" loads are those that are not subject to Title 24, Part 6, of the California Code of Regulations and include all other end uses, such as appliances, electronics, and other miscellaneous plug-in uses.

[2] PDF-AQ/GHG-2, Zero Net Energy Homes, as discussed in Sections 2.3 and 2.7 of this EIR, requires all residences to be designed to achieve ZNE.

[3] ZNE buildings are designed to achieve enhanced energy efficiency in the building envelope and to use renewable energy sources such as rooftop-mounted solar panels. Therefore, to meet ZNE design standards, each residential unit would be constructed with a rooftop photovoltaic (PV) system. The system's size for each home was determined based on the estimated annual energy demand of a residence.

[4] "CBECC-Res" is shorthand for California Building Energy Code Compliance – Residential.

For non-residential land uses, the California Emissions Estimator Model (CalEEMod), version 2016.3.1, default values for electricity consumption for each land use were applied (CAPCOA 2016). The electricity use for non-residential buildings is calculated in CalEEMod using energy intensity value (electricity use per square foot per year) assumptions, which were based on the California Commercial End-Use Survey database (CEC 2006).

The current Title 24 building energy efficiency standards (24 CCR Part 6) are the 2016 Title 24 building energy efficiency standards, which became effective January 1, 2017. In general, non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015a). CalEEMod default values assume compliance with the 2013 Title 24 standards, which became effective on July 1, 2014. The Proposed Project would include a project design feature (PDF) (PDF-AQ/GHG-3 below) that requires non-residential land uses to be 10% more energy efficient than required by the 2016 Title 24 energy efficiency standards.

The following PDFs would reduce electricity use during operation of the Proposed Project:

PDF-AQ/GHG-2 **Zero Net Energy Development – Residential Land Uses**. Prior to the issuance of residential building permits, the applicant or its designee shall submit building plans illustrating compliance with the zero net energy (ZNE) development standards defined by the California Energy Commission (CEC).

PDF-AQ/GHG-3 **Non-Residential Energy Improvement Standards.** Prior to the issuance of non-residential building permits, the applicant or its designee shall submit building plans illustrating that the Proposed Project's non-residential land uses shall achieve a 10% greater building energy efficiency than required by the 2016 state energy efficiency standards in Title 24, Part 6, of the California Code of Regulations.

PDF-AQ/GHG-4 **Energy Star Appliances**. All appliances (washer/dryers, refrigerators, and dishwashers) installed by builders in residences and commercial businesses shall be Energy Star rated or equivalent.

[5] The Proposed Project proposes a variety of residential product types that may range from approximately 2,000 to 4,500 square feet. The prototype residence studied by ConSol was selected to represent the approximate weighted average square footage of the residential product types, thereby providing a reasonable representation of building energy consumption for this environmental analysis. The calculated weighted average square footage is 3,400, but use of a 3,652-square-foot prototype residence reasonably represents the energy profile of a slightly larger home and is conservative in that it likely serves to overestimate the energy demand profile of the Proposed Project by some small increment.

PDF AQ/GHG-6 **Outdoor Lighting.** Prior to the issuance of building permits, the Proposed Project applicant or its designee shall submit building plans that demonstrate that all outdoor lighting shall be (light emitting diodes) LED or other high efficiency lightbulbs.

PDF-AQ/GHG-7 **New Resident Information Package**. Prior to the issuance of Certificate of Occupancy for new residences, the Project applicant or its designee shall submit certification that it has information on energy efficiency, energy efficient lighting and lighting control systems, energy management, and existing energy incentive programs to new homebuyers.

PDF AQ/GHG-8 **Cool Roofs**. Prior to the issuance of residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year solar reflectance index (SRI) of 64 for a low-sloped roof and an SRI of 32 for a high- sloped roof.

Prior to the issuance of non-residential building permits, the Proposed Project applicant or its designee shall submit building plans illustrating non-residential structures shall meet the U.S. Green Building Council standards for cool roofs. This is defined as achieving a three-year SRI of 64 for a low-sloped roof and 32 for a high- sloped roof.

PDF AQ/GHG-9 **Cool Pavement**. Prior to the issuance of building permits, the Proposed Project applicant or its designee shall submit building plans illustrating that outdoor pavement, such as walkways and patios shall use paving materials with three-year SRI of 0.28 or initial SRI of 0.33.

The Proposed Project would include three swimming pools with an average size of 140,026 gallons. Electricity demand for swimming pools was estimated using baseline demand in the SDG&E service area from SCE's *Metering and Measuring of Multi-Family Pool Pumps, Final Report – Phase 1 & 2* (SCE 2016). The swimming pools are assumed to use electricity for pumps. Additionally, water supplied to the site would require electricity to be pumped to the site, and wastewater would require electricity in treatment.

Operational electricity use for the Proposed Project is presented in Table 3.1.9-1. The Proposed Project is estimated to have a total electrical demand of 10,841,180 kWh per year but is estimated to produce 9,056,043 kWh per year of electricity from on-site solar photovoltaic (PV) facilities as a result of the Proposed Project's commitment to achieving residential ZNE design.

After accounting for on-site solar production, the Proposed Project is estimated to produce approximately 85% of its demand. Therefore, because of energy efficiency design features, the Proposed Project would not result in a wasteful use of energy. Impacts related to operational electricity use would be **less than significant**.

Natural Gas

Construction Use

Natural gas is not anticipated to be required during construction of the Proposed Project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed under the subsection "Petroleum." Any minor amounts of natural gas that may be consumed as a result of Proposed Project construction would be temporary and negligible and would not have an adverse effect; therefore, impacts would be **less than significant**.

Operational Use

Natural gas would be directly consumed throughout operation of the Proposed Project, primarily through building heating and fireplace options for homes. As described above and consistent with electricity use, the Proposed Project's natural gas use from the residential component was estimated by ConSol, and the natural gas use from other land uses was estimated using CalEEMod. The following PDF will help reduce natural gas use during operation:

PDF-AQ/GHG-5 **Solar Water Heating**. Prior to the issuance of private recreation center building permits, the applicant or its designee shall submit swimming pool heating design plans to San Diego County for review and approval. The design plans shall demonstrate that swimming pools located at private recreation centers on the Project Area have been designed and shall be constructed to use solar water heating or other technology with an equivalent level of energy efficiency.

Table 3.1.9-2, Estimated Natural Gas Demand, shows the estimated natural gas use (in therms per year) for the Proposed Project during operation, which includes PDFs. As shown, the Proposed Project is estimated to use 268,245 therms of natural gas per year. By comparison, in 2015, SDG&E supplied 464.5 million therms of natural gas to customers (CEC 2016b). The Proposed Project's energy efficiency design features would not result in a wasteful use of energy. Therefore, natural gas consumption impacts would be **less than significant.**

Petroleum

Construction Use

Petroleum would be consumed throughout construction of the Proposed Project. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, and VMT associated with the transportation of construction materials and construction worker commutes would also result in petroleum consumption. Heavy-duty construction equipment associated with construction activities, as well as haul trucks involved in moving dirt around the Project Area, would rely on diesel fuel. Construction workers would travel to and from the Project Area throughout the duration of construction. It is assumed that construction workers would travel to and from the Project Area in gasoline-powered vehicles.

Heavy-duty construction equipment of various types would be used during each phase of construction. CalEEMod was used to estimate construction equipment usage, and results are included in Appendix 2.7-1. The construction equipment and fuel use associated with the rock-crushing phase of construction are also included in this analysis. Based on that analysis, over all phases of construction, diesel-fueled construction equipment would operate for an estimated 315,132 hours, as summarized in Table 3.1.9-3, Hours of Operation for Construction Equipment.

Fuel consumption from construction equipment was estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. Construction is estimated to occur during 2019–2027 based on the construction phasing schedule. The conversion factor for gasoline is 9.13 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.35 kilograms per metric ton CO_2 per gallon (The Climate Registry 2016). The estimated diesel fuel use from construction equipment is shown in Table 3.1.9-4, Construction Equipment Diesel Demand.

Fuel consumption from worker and vendor trips is estimated by converting the total CO_2 emissions from each construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline fueled, and vendor/hauling vehicles are assumed to be diesel fueled.

Calculations for total worker, vendor, and hauler fuel consumption are provided in Table 3.1.9-5, Construction Worker Vehicle Gasoline Demand; Table 3.1.9-6, Construction Vendor Truck Diesel Demand; and Table 3.1.9-7, Construction Haul Truck Diesel Demand. As shown in Tables 3.1.9-5 through 3.1.9-7, the Proposed Project is estimated to consume 872,501 gallons of petroleum during the construction phase. The Proctor Valley Road North Option would nominally increase this total if selected by the Board of Supervisors, but the Perimeter Trail and Preserve Trail Options would not change petroleum use during construction. By

comparison, approximately 164 billion gallons of petroleum would be consumed in California over the course of the Proposed Project's construction period based on the California daily petroleum consumption estimate of approximately 52.9 million gallons per day (CEC 2016c). The Proposed Project would be required to comply with CARB's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes. Therefore, because petroleum use during construction, including construction of the Proctor Valley Road North and Perimeter Trail Options, would be temporary and minimal and would not be wasteful or inefficient, impacts would be **less than significant**. It is noted that mitigation measure (M)-AQ-5, Construction Equipment Maintenance, and M-AQ-6, Use of Electrical-Powered Equipment, described in Section 2.3, Air Quality, of this EIR would result in further un-quantified reductions in fuel consumed during construction.

Operational Use

The majority of fuel consumption resulting from the Proposed Project's operational phase would be attributable to the use of resident, visitor, and employee motor vehicles traveling to and from the Project Area, as well as fuels used for alternative modes of transportation that may be used by residents, visitors, and employees. The following PDFs would reduce petroleum use during operation of the Proposed Project:

PDF-AQ/GHG-10~~6~~ **Electric Vehicle Charging Stations**. Prior to the issuance of residential building permits, the applicant or its designee shall submit plans for the installation of a dedicated 208/240 dedicated branch circuit in each garage of every residential unit and one Level 2 electric vehicle charging station in the garage in half of all residential units to San Diego County for review and approval. Prior to the issuance of non-residential building permits, the applicant or its designee shall submit plans to San Diego County for review and approval for the installation of 10 Level 2 electric vehicle charging stations in parking spaces located in the Village Core's commercial Development Area and P1 through P4 park areas.

PDF-TR-1 **Transportation Demand Management.** The applicant proposes implementation of a Transportation Demand Management program to facilitate increased opportunities for transit, bicycling, and pedestrian travel, as well as provide the resources, means, and incentives for ridesharing and carpooling. The full description of this project design feature (PDF) can be found in Table 1-5, Project Design Features, in Chapter 1, Project Description, of this Environmental Impact Report.

Petroleum fuel consumption associated with motor vehicles traveling to and from the Project Area is a function of VMT as a result of Proposed Project operation. As shown in Appendix 2.7-1, the annual VMT attributable to the Proposed Project with the inclusion of PDFs is expected to be 50,470,265 VMT per year. Similar to construction worker and vendor trips, fuel consumption was estimated by converting the total CO_2 emissions from each land use type to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Based on the annual fleet mix provided in CalEEMod, 92.5% of the fleet range from light-duty to medium-duty vehicles and motorcycles were assumed to run on gasoline. The remaining 7.5% of vehicles represent medium-heavy duty to heavy-duty vehicles and buses/recreational vehicles, which were assumed to run on diesel.

Calculations for annual mobile-source fuel consumption are provided in Table 3.1.9-8, Mobile Source Fuel Consumption – Operation. Mobile sources from the Proposed Project would result in approximately 1,718,084 gallons of gasoline per year and 123,215 gallons of diesel consumed per year beginning in 2028. By comparison, California as a whole consumes approximately 19.3 billion gallons of petroleum per year (CEC 2016c).

Over the lifetime of the Proposed Project, the fuel efficiency of the vehicles being used by residents, visitors, and employees is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the Project Area during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, CARB has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and GHG emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emissions vehicles in California (CARB 2013). Additionally, in response to SB 375, CARB adopted the goal of reducing per-capita GHG emissions from 2005 levels by 8% by the year 2020 and 13% by the year 2035 for light-duty passenger vehicles in the planning area for the San Diego Association of Governments. This reduction would occur by reducing VMT through the integration of land use and transportation planning (SANDAG 2015). As discussed in Section 2.7, the Proposed Project's inclusion of multi-modal design features, traffic-calming measures, and the integrated walking and bicycling trail support the goals of SB 375 to reduce VMT. As such, operation of the Proposed Project is expected to use decreasing amounts of petroleum over time due to advances in fuel economy. In addition, the inclusion of electric-vehicle charging stations would result in the potential for reduced petroleum use during operation because residents would have the option of charging their electric vehicles.

In summary, although the Proposed Project would increase petroleum use during operation, the use would be a small fraction of the statewide use and, due to efficiency increases, diminish over time. Additionally, the inclusion of on-site walking/bicycling trails and other resident-serving amenities would help ensure that petroleum-based fuels are efficiently consumed. Given these

considerations, petroleum consumption associated with the Proposed Project would not be considered inefficient or wasteful and would result in a **less-than-significant impact.**

Conflict with Energy Standards and Regulations

The Proposed Project would follow applicable energy standards and regulations during the construction phases. Construction equipment for rock crushing would meet Tier 4 Final standards in accordance with M-AQ-1, and all other construction equipment would meet Tier 4 Interim standards in accordance with M-AQ-4 (see Section 2.3). The Proposed Project would also provide electrical hookups and use electrical construction equipment in accordance with M-AQ-6. The applicant has committed to incorporating ZNE features into residential building design, including rooftop solar PV systems. The Proposed Project would be built and operated in accordance with all existing, applicable regulations at the time of construction. For the reasons stated, the Proposed Project would not conflict with existing energy standards or regulations, and impacts would be **less than significant.**

Demand on Local and Regional Energy Supply

Electricity

As described previously, the Proposed Project would involve minimal use of electricity during construction. Further, the Proposed Project would produce 85% of its electricity. A large proportion of the electrical demand (39%) would be generated by water and wastewater service, of which a large proportion would occur outside the local utility and at minor scales compared to water demand for the region as a whole. The Project Area would produce more energy on site than required to serve all other project demands. In addition, the Proposed Project would implement design features described in Section 3.1.9.2, Analysis of Project Effects and Determination as to Significance, under the subsections Energy Consumption, Electricity Operational Use, to minimize its demand for electricity through the use of enhanced building energy efficiency standards. Implementation of the Proposed Project would not result in substantial amounts of local or regional energy supplies compared to existing conditions. The resultant increase in energy demand would not exceed the available capacity of SDG&E servicing infrastructure to the site or beyond. Therefore, impacts would be **less than significant**.

Natural Gas

As described previously, the Proposed Project would use a minimal amount of natural gas during construction. The Proposed Project is estimated to use 268,245 therms of natural gas per year during its operational phase. In 2015, SDG&E supplied 464.5 million therms of natural gas to customers (CEC 2016b). The Proposed Project would implement design features, described above, to minimize its demand for natural gas through the use of enhanced building energy

efficiency standards. In summary, the Proposed Project's demand would not have a significant impact on the local utility; therefore, impacts would be **less than significant.**

Petroleum

During construction, the Proposed Project is anticipated to use 872,501 gallons of petroleum over 8.5 years, or 102,647 gallons per year. By comparison, Countywide total petroleum use by vehicles is expected to be 2.0 million gallons per year by 2020 (Caltrans 2008).

During operation, the Proposed Project is anticipated to use 1,841,299 gallons of petroleum per year. Because data were not available for the Proposed Project's build-out year (2028), the data from 2025 and 2030 were interpolated for 2028. By comparison, in 2028, the County is expected to use 2.3 ~~million~~ billion gallons of petroleum per year for transportation (Caltrans 2008).

Although the Proposed Project would see an increase in petroleum use during construction and operation, the use is a small fraction of the regional use and, due to efficiency increases, would diminish over time. Given these considerations, the petroleum consumption associated with the Proposed Project would not be considered a substantial demand on local or regional supply; therefore, impacts would be **less than significant**.

3.1.9.3 Cumulative Impact Analysis

Potential cumulative impacts on energy would result if the Proposed Project, in combination with past, present, and future projects, would result in the wasteful or inefficient use of energy. This could result from development that would not incorporate sufficient building energy efficiency features, would not achieve building energy efficiency standards, or would result in the unnecessary use of energy during construction and/or operation. The cumulative projects within the areas serviced by the energy service providers would be applicable to this analysis. Projects that include development of large buildings or other structures that would have the potential to consume energy in an inefficient manner would have the potential to contribute to a cumulative impact. Projects that would mostly include construction, such as transportation infrastructure, could also contribute to a cumulative impact; however, the impact of these projects would be limited because they would typically not involve substantial ongoing energy use. Other large master planned communities (see Table 1-7, Cumulative Projects List, and Figure 1-16, Cumulative Projects, in Chapter 1), such as Otay Ranch Village 13, University Villages, Village Two, and other Otay Ranch developments, would result in incremental increases in long-term energy consumption similar to the Proposed Project through the introduction of new population to the region. Each of these projects, however, would incorporate design features for reducing energy consumption and increasing efficiency during operation.

As described previously, the Proposed Project would not result in wasteful, inefficient, or unnecessary use of energy due to various design features, including design to accommodate a balanced mix of uses internal to the Proposed Project, installation of energy-efficient appliances and efficient water fixtures, and the offset of 100% of residential electrical energy usage through the installation of PV solar panels. Similar to the Proposed Project, the cumulative projects would be subject to CALGreen, which provides energy efficiency standards for commercial and residential buildings. CALGreen would implement increasingly stringent energy efficiency standards that would require the Proposed Project and the cumulative projects to minimize the wasteful and inefficient use of energy. In addition, cumulative projects would be required to meet or exceed the Title 24 building standards, further reducing the inefficient use of energy. Future development would also be required to meet even more stringent requirements, including the objectives set in the AB 32 Scoping Plan (CARB 2017), which would seek to make all newly constructed residential homes ZNE consumers by 2020, and all new commercial buildings ZNE consumers by 2030. Furthermore, various federal and state regulations, including the Low Carbon Fuel Standard, Pavley Clean Car Standards, and Low Emission Vehicle Program, would serve to reduce the transportation fuel demand of cumulative projects.

In consideration of cumulative energy use, the Proposed Project would not contribute to a substantial demand on energy resources or services such that new regional energy facilities would be required to be constructed as a result of the incremental increase in energy demand resulting from the Proposed Project.

As discussed in Section 3.1.9.1, Existing Conditions, the Otay Ranch PEIR estimated the use of energy in evaluating the air impacts of the Proposed Project, but there was no cumulative consideration for energy or significance determination made regarding energy within that EIR (City of Chula Vista and County of San Diego 1993). With adherence to the increasingly stringent building and vehicle efficiency standards, and with implementation of the Proposed Project's design features that would reduce energy consumption, the Proposed Project **would not contribute to a cumulative impact** to the wasteful or inefficient use of energy. As such, the Proposed Project would not result in a cumulatively considerable contribution to a potential cumulative impact.

3.1.9.4 Conclusion

The Proposed Project would comply with regulatory requirements and implement PDFs such that energy use associated with construction and operation of the Proposed Project would be reduced. As such, the Proposed Project would not result in the wasteful or inefficient use of electricity, and impacts would be **less than significant**.

Additionally, the Proposed Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing energy consumption, including the County's General Plan policies. As a result, impacts would be **less than significant**.

Table 3.1.9-1
Estimated Electrical Demand – Operation

Land Use Type[a]	Estimated Electrical Demand (kWh per year)
Industrial park	106,080
Parking lot	472,122
Regional shopping center	114,800
Village 14 – residential	5,206,460
Planning Areas 16/19 – residential	679,794
Community swimming pools	65,309
Water and wastewater service	4,196,615
Subtotal	*10,841,180*
Solar PV production from ZNE design (PDF-AQ/GHG-2)	9,056,043
Total	**1,785,137**

Source: Appendix 2.7-1.
kWh = kilowatt-hour; PDF = Project Design Feature; PV = photovoltaic; ZNE = zero net energy
[a] Land use type was taken from the CalEEMod modeling and represents the closest land use to what is in the Proposed Project.

Table 3.1.9-2
Estimated Natural Gas Demand – Operation

Land Use Type[a]	Estimated Natural Gas Demand (therms per year)
Industrial park	1,525
Regional shopping center	207
Village 14 – residential	263,410
Planning Areas 16/19 – residential	33,103
Community swimming pools	268,245
Subtotal	*566,490*
Community swimming pools solar heating (PDF-AQ/GHG-4)	268,245
Total	**298,245**

Source: Appendix 2.7-1.
[a] Land use type was taken from the CalEEMod modeling and represents the closest land use to what is in the Proposed Project.
The parking lot land use was omitted from this table because it does not consume natural gas.

Table 3.1.9-3
Hours of Operation for Construction Equipment

Phase	Hours of Equipment Use
Central Village 14 – non-residential	40,346
Central Village 14 – residential phases 1–5	42,741
Central Village 14 – residential phases 6–11	24,747

Table 3.1.9-3
Hours of Operation for Construction Equipment

Phase	Hours of Equipment Use
North Village 14 – non-residential	5,703
North Village 14 – residential phases 1–4	27,072
North Village 14 – residential phases 5–7	12,712
Planning Areas 16/19 – phases 1–5	72,599
Planning Areas 16/19 – phases 6–9	16,580
South Village 14 – non-residential	9,936
South Village 14 – residential	37,736
Rock crushing	5,760
Proctor Valley Road	19,200
Total	**315,132**

Source: Appendix 2.7-1.

Table 3.1.9-4
Construction Equipment Diesel Demand

Phase	Pieces of Equipment[a]	Equipment CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Central Village 14 – non-residential	232	490.91	10.35	47,430.77
Central Village 14 – residential phases 1–5	115	1247.48	10.35	120,529.60
Central Village 14 – residential phases 6–11	114	462.26	10.35	44,663.09
North Village 14 – non-residential	25	95.30	10.35	9,207.48
North Village 14 – residential phases 1–4	96	683.47	10.35	66,035.73
North Village 14 – residential phases 5–7	57	266.29	10.35	25,728.84
Planning Areas 16/19 – phases 1–5	254	919.32	10.35	88,823.09
Planning Areas 16/19 – phases 6–9	76	308.08	10.35	29,765.86
South Village 14 – non-residential	58	237.19	10.35	22,917.31
South Village 14 – residential	151	860.55	10.35	83,144.52
Rock crushing	11	2,422.99	10.35	234,105.31
Proctor Valley Road	60	269.81	10.35	26,068.35
			Total	**798,419.96**

Sources:
[a] Appendix 2.7-1.
[b] The Climate Registry 2016.
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Table 3.1.9-5
Construction Worker Vehicle Gasoline Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Central Village 14 – non-residential	5,776	13.01	9.13	1,424.73
Central Village 14 – residential phases 1–5	17,010	56.27	9.13	6,162.78

Table 3.1.9-5
Construction Worker Vehicle Gasoline Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Central Village 14 – residential phases 6–11	13,058	39.05	9.13	4,277.34
North Village 14 – non-residential	770	2.40	9.13	262.92
North Village 14 – residential phases 1–4	5,238	16.96	9.13	1,857.39
North Village 14 – residential phases 5–7	2,180	6.69	9.13	733.04
Planning Areas 16/19 – phases 1–5	8,306	25.74	9.13	2,819.07
Planning Areas 16/19 – phases 6–9	2,862	8.08	9.13	885.15
South Village 14 – non-residential	1,260	4.38	9.13	479.45
South Village 14 – residential	18,154	63.43	9.13	6,947.86
Proctor Valley Road	2,240	4.32	9.13	473.38
			Total	**26,323.13**

Sources:
[a] Appendix 2.7-1.
[b] The Climate Registry 2016.
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Table 3.1.9-6
Construction Vendor Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg/CO_2/Gallon[b]	Gallons
Central Village 14 Non-Residential	3,792	39.76	10.35	3,841.87
Central Village 14 Residential Phases 1–5	7,866	100.73	10.35	9,732.44
Central Village 14 Residential Phases 6–11	5,840	72.93	10.35	7,046.50
North Village 14 Non-Residential	640	8.03	10.35	775.54
North Village 14 Residential Phases 1–4	862	10.86	10.35	1,048.95
North Village 14 Residential Phases 5–7	1,678	20.98	10.35	2,027.52
Planning Areas 16/19 Phases 1–5	1,172	59.71	10.35	5,769.40
Planning Areas 16/19 Phases 6–9	2,464	30.46	10.35	2,942.83
South Village 14 Non-Residential	1,128	14.71	10.35	1,421.18
South Village 14 Residential	7,924	103.47	10.35	9,997.36
Proctor Valley Road	2,680	19.81	10.35	1,914.31
			Total	**46,517.90**

Sources:
[a] Appendix 2.7-1.
[b] The Climate Registry 2016.
CO_2 = carbon dioxide; MT = metric ton; kg = kilogram

Table 3.1.9-7
Construction Haul Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Central Village 14 – non-residential	0	0.00	10.35	0.00

Table 3.1.9-7
Construction Haul Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Central Village 14 – residential phases 1–5	1,741,115	6.77	10.35	653.78
Central Village 14 – residential phases 6–11	0	0.00	10.35	0.00
North Village 14 – non-residential	0	0.00	10.35	0.00
North Village 14 – residential phases 1–4	108,837	1.16	10.35	111.81
North Village 14 – residential phases 5–7	0	0.00	10.35	0.00
Planning Areas 16/19 – phases 1–5	297,321	2.71	10.35	261.57
Planning Areas 16/19 – phases 6–9	0	0.00	10.35	0.00
South Village 14 – non-residential	0	0.00	10.35	0.00
South Village 14 – residential	154,902	2.21	10.35	213.15
Proctor Valley Road	0	0.00	10.35	0.00
			Total	**1,240.30**

Sources:
[a] Appendix 2.7-1.
[b] The Climate Registry 2016.
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Table 3.1.9-8
Mobile Source Fuel Consumption – Operation

Fuel	Vehicle MT CO_2	kg CO_2/Gallon	Gallons
Gasoline	15,686.11	9.13	1,718,084.09
Diesel	1,275.27	10.35	123,214.82
		Total	**1,841,298.92**

Sources:
[a] Appendix 2.7-1.
[b] The Climate Registry 2016.
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton