4.17 ENERGY

This section was prepared pursuant to Appendix F of the California Environmental Quality Act (CEQA) Guidelines, which requires an EIR to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. This section has been developed from data and reports from the California Energy Commission (CEC) and the Energy Administration of the U.S. Department of Energy.

4.17.1 ENVIRONMENTAL SETTING

In 2007, total energy usage for the State of California was 8,492 trillion Btu.\(^1\) The total energy usage can be broken down by industry sector. In 2007, residential uses consumed 1,535 trillion Btu, commercial uses consumed 1,614 trillion Btu, industrial uses consumed 1,956 trillion Btu, and 3,387 trillion Btu was consumed for transportation. The most relevant sources of energy for the plan area would be electricity, natural gas, and gasoline for vehicle trips generated by the development allowed by the New General Plan.

Electricity

In 2008, California consumed an average of over 61,000 kilowatt-hour (kWh) of electricity per month. About 70 percent of the electricity is generated by power plants either within California or owned by the State of California. The remainder is imported from the Pacific Northwest and the Southwest regions of the United States.

Natural gas is the main source for electricity generation in California. Natural gas-fired power plants account for about 46 percent of California’s electricity generation, followed by coal (18 percent), nuclear (14 percent), hydroelectric (11 percent), and renewable (11 percent).

California is the leading state in the country in terms of electricity generation from non-hydroelectric renewable energy sources including wind, geothermal, solar, fuel wood, and municipal solid waste/landfill gas resources. California is also a leader in the production of wind energy, with nearly 10 percent of the capacity within the United States. California is also the leading producer of geothermal, with over 2,500 megawatts of capacity. The State’s solar energy portfolio continues to grow with numerous existing and planned solar power facilities in the Mojave Desert.

Redwood City (City) receives its electricity from Pacific Gas & Electric Company (PG&E), a natural gas and electric utility. PG&E receives 42 percent of its electricity from natural gas-fired power plants, 23 percent from nuclear, 19 percent from hydroelectric, 13 percent from renewable resources, and three percent from coal.

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\(^1\) The British thermal unit (Btu) is a traditional unit of energy equal of about 1.06 kilojoules, or approximately the amount of energy needed to heat one pound of water by one degree Fahrenheit.
PG&E has an obligation to serve the energy demands of its customers. This obligation includes forecasting the load and procuring adequate generation resources to meet the annual peak load plus fifteen percent. According to PG&E Land Services, any new growth and development (in the plan area, or anywhere else in the regional service area) could require the expansion of distribution and transmission lines and related facilities. As new development is proposed in the future, system upgrades and improvements may be required in order to meet electricity demand. Any such system improvements would be developed as required; such system improvements would be subject to separate CEQA review.

Natural Gas

California produces less than two percent of the total United States supply of natural gas. Basins producing natural gas are located across the State, as well as offshore in the Pacific Ocean. Only about 14 percent of the natural gas that California consumes is developed from in-State sources. While natural gas production in California is currently declining, its supply is fairly stable due to an increase in natural gas piped in from the Rocky Mountains, the Southwest, and western Canada. Electricity generation is the largest user of natural gas, followed by residential uses such as space and water heating.

Total residential natural gas consumption increased from about 535 billion ft\(^3\) in 1970 to about 652 billion ft\(^3\) in 2007. However, the average annual natural gas consumption per household dropped more than 36 percent, from 82,198 ft\(^3\) to 52,335 ft\(^3\) during this same time period.

PG&E provides natural gas to the City and has an obligation to serve the demand of its customer base. PG&E recognizes that growth and development (in the plan area, or anywhere else in its regional service area) could require the expansion of gas distribution lines and related facilities. As new development is proposed in the future, system upgrades and improvements may be required in order to meet natural gas demand. Any such system improvements would be developed as required; such system improvements would be subject to separate CEQA review.

Gasoline

In 2005, California alone consumed approximately 15.9 billion gallons of on-road gasoline. The CEC projects that the demand for fuel will increase by the end of 2010. By the end of 2010, Californians are expected to use between 16.6 billion gallons and 17.5 billion gallons of gasoline. However, by 2030, the CEC projects that demand for gasoline will either drop to 141 billion gallons or increase to 18.6 billion gallons per year, based on assumptions related to new energy efficiency and regulations at the state and local levels, expectation of rising fuel prices, and an increasing number of hybrid and light-duty diesel vehicles.

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Between 2001 and 2005, the number of hybrid vehicles on the road increased by 95 percent each year. By 2030, hybrid vehicles are expected to account for 18 percent of the on-road vehicle fleet, compared to three percent in 2007. Light-duty diesel vehicles are expected to account for 13 percent of on-road vehicles by 2030, compared to zero percent in 2007.

Imports of crude oil and combined fuel (gasoline, diesel, and jet fuel) are expected to increase by 2015 and exports to neighboring states including Nevada and Arizona are predicted to increase more than 50 percent. By 2015, refinery capacity is expected to increase between 3.3 and 8.1 percent.

### 4.17.2 Regulatory Setting

**Federal Energy Regulatory Commission**

The Federal Energy Regulatory Commission (FERC) regulates the interstate exchange of electricity, natural gas, and oil, the licensing and permitting of hydroelectric projects, and oversees general environmental issues pertaining to electricity.

**California Public Utilities Commission**

The California Public Utilities Commission (CPUC) regulates privately owned electric, natural gas, and other public utilities. Utility companies providing electricity, gas, and telecommunications services to the City are under CPUC’s regulatory authority.

**California Energy Commission**

The CEC is the State’s energy policy and planning agency. Among its duties, the CEC has exclusive regulatory authority over the construction or expansion of power generating facilities. The Warren Alquist State Energy Resources Conservation and Development Act (Public resources Code 25000 et seq) created the CEC and gave it statutory authority to regulate energy resources throughout the State in terms of supply, demand, and consumption. Title 20, Public Utilities and Energy, includes the regulations pertaining to power plant site certification. Title 24, California Building Code, includes energy efficiency standards. Please refer to **Section 4.16, Greenhouse Gas Emissions**, for more information on Title 24 in regards to energy efficiency standards.

**Assembly Bill 32 – The California Global Warming Solutions Act of 2006**

The Governor of California signed Assembly Bill 32 (AB 32) into law in 2006. AB 32 requires California to cap its greenhouse gas emissions (GHG) at 1990 levels by 2020. For more information on AB 32 and its applicability to the New General Plan, please refer to **Section 4.16, Greenhouse Gas Emissions**.
Senate Bill 375 – California’s Regional Transportation and Land Use Planning Efforts

Senate Bill 375 (SB 375) was enacted to further the efforts of AB 32 by controlling indirect GHG emissions through land use and transportation processes. Please refer to Section 4.16, Greenhouse Gas Emissions, for more information pertaining to SB 375.

Executive Order S-14-08

Executive Order S-14-08 was signed into law in November 2008. This Executive Order raises California’s renewable energy goals, where all retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020. It also simplifies the licensing process for renewable energy projects.

Executive Order S-21-09

Executive Order S-21-09 was signed into law in September 2009, which reiterates the intent of Executive Order S-14-08 to enhance the availability of renewable energy. Executive Order S-21-09 allows California Air Resources Board (CARB) to work with State energy agencies to adopt regulations necessary to implement the 33 percent increase in renewable energy by 2020 goal. Executive Order S-21-09 also encourages coordination between the CPUC, CEC, and CARB to consider and implement a regulation to reduce GHG emissions through the creation and use of renewable energy sources.

Senate Bills 107 and 1078 – California’s Renewable Energy Portfolio Standard Program

The State of California established its Renewable Energy Portfolio Standard Program under Senate Bill 1078 (SB 1078) in 2002, which originally included a goal of increasing the percentage of renewable energy in the State’s electricity mix to 20 percent by 2017. Senate Bill 107 (SB 107) requires investor-owned utilities, such as Pacific Gas and Electric, to meet the 20 percent renewable energy goal by 2010. As of 2005, the most recent Energy Action Plan in the State raised the renewable energy goal to 33 percent by 2020.

California’s Energy Efficiency Standards for Residential Buildings, Title 24, Part 6, of the California Code of Regulations

The Energy Efficiency Standards for Residential Buildings were established in 1978 in response to a legislative mandate to reduce California’s energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest standards went into effect in October 2005. Projects that apply for a building permit on or after this date must comply with the 2005 Standards. The 2008 Standards have been adopted and went into effect on January 1, 2010. Typically every three years energy efficiency standards are revised and performance requirements are more stringent.
Redwood City Green Building Code

In October 2009, Redwood City adopted a Green Building Code (Ordinance 2348, Section 1). The Green Building Code requires new single-family residential construction of 1,000 square feet or more to complete a GreenPoint3 or LEED4 checklist. The checklists include a variety of green building design and construction measures, including site selection, water efficiency, and indoor environmental quality standards. Points are awarded for each technique or design measure incorporated into the project construction or operation phases. All non-residential construction is required to complete a LEED checklist. The Green Building Code is intended to encourage and mandate green building practices in the design, construction, and maintenance of buildings.

Redwood City Community Climate Action Plan

The City’s draft Community Climate Action Plan (CCAP) provides tools and encouragement for residents and local businesses to coordinate with the City to implement energy efficient practices in an effort to reduce GHG emissions. Refer to Section 4.16, Greenhouse Gas Emissions, for further discussion regarding the CCAP.

Project Consistency Analysis

The project does not include or foresee the construction of new energy generating facilities within the plan area. However, the plan area is and will continue to receive energy from private utilities, who are regulated by the previously described federal and state agencies/regulatory bodies. Section 4.16, Greenhouse Gas Emissions, fully addresses the New General Plan’s consistency with state laws regarding the reduction of GHG emissions.

The New General Plan includes policies and implementation programs that would reduce energy usage. Policies BE-24.9, BE-42.1, PS-1.3, PS-4.1, PS-4.2, PS-4.3, and PS-5.3 and Programs BE-21, BE-130, BE-132, BE-133, BE-139, BE-144, and PS-5 are focused on adopting energy efficient technologies and support the use of renewable and alternative energy. Policies BE-24.8, BE-24.12, and H-1.6 and Programs BE-131, BE-133, BE-139, and BE-144 would promote the use of solar, wind energy generation systems, promote the installation of energy saving facilities in new and existing homes, and encourage coordination with energy providers (i.e., PG&E) to promote renewable and low-emission power sources. Additionally, Goal NR-4 and all of its policies and programs are focused on maximizing energy conservation and renewable energy production. Policies NR-4.1 through NR-4.5 would also maximize energy conservation and renewable energy.

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3 Greenpoint is a residential green building rating system developed by the Build It Green organization.

4 LEED is the "Leadership in Energy and Environmental Design" green building rating system developed by the U.S. Green Building Council.
production, while Programs NR-13 through NR-21 would promote energy conserving design and construction measures and encourage the use of on-site alternative energy. **Appendix A** lists these and all other policies and programs. Therefore, the New General Plan would be consistent with the energy-related regulations.

### 4.17.3 Thresholds of Significance

The City has not established local CEQA significance thresholds as described in Section 15064.7 of the CEQA Guidelines. Therefore, significance determinations utilized in this Section are based on Appendix F of the CEQA Guidelines. A significant energy impact could occur if development allowed by the New General Plan would:

a) Use fuel or energy in a wasteful manner.

b) Result in a substantial increase in demand on energy resources during peak and base period demands and in relation to projected energy supplies.

c) Result in a substantial increase in transportation energy use.

### 4.17.4 Environmental Impacts and Mitigation Measures

**Project Impacts**

**Impact 4.17-1: New growth and development within the plan area allowed by the New General Plan could result in the use of substantial amounts of electricity and natural gas, but would not result in wasteful fuel or energy use. (Less than Significant)**

The New General Plan would allow for the construction of up to 9,103 residential units and about 7.3 million square feet of new non-residential development (including commercial, industrial, office, and institutional space). Energy would be consumed throughout the construction and operation of such new development, in addition to energy consumption associated with existing development. Energy would be required during construction for the transportation of building materials, manufacturing of building materials, and the actual construction of buildings and infrastructure. During the operation, energy would be consumed for purposes including, but not limited to, building heating and cooling, use of consumer products, lighting, and vehicular traffic.

Using statewide energy consumption rates, total energy consumption for development allowed by the New General Plan has been estimated. **Table 4.17-1** shows estimates of energy usage associated with the New General Plan buildout in 2030, prior to any mitigation. In total, the buildout assumed under the New General Plan would result in approximately 805.9 million kWh of electricity use and 3.01 billion ft³ of natural gas use per year.
Table 4.17-1 Estimated Average Annual Energy Use

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Usage/Unit</th>
<th>New General Plan (2030) Build-out</th>
<th>Annual Energy Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>6,960 kWh/du/year</td>
<td>46,284 du</td>
<td>322 million kWh</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>45,000 ft³/du/year</td>
<td>46,284 du</td>
<td>2.08 billion ft³</td>
</tr>
<tr>
<td><strong>Commercial/Industrial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>13 kWh/ft²/year</td>
<td>37.2 million ft²</td>
<td>483.6 million kWh</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>25 ft³/ft²/year</td>
<td>37.2 million ft²</td>
<td>930 million ft³</td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>0.048 gallons/vehicle/mile</td>
<td></td>
<td>34 million gallons</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>805.6 million kWh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>3.01 billion ft³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Energy usage predictions are rough estimates. Actual energy usage may vary greatly. Gasoline use is based on an estimate of average daily vehicle trips.

Source: California Commercial End-Use Survey, CEC, March 2006; Energy Information Administration, U.S. Department of Energy

As discussed in Section 4.17.2, the New General Plan includes numerous policies and implementation programs that are focused on improving the sustainability of the community, including through the reduction of energy consumption in existing and new construction. These policies and implementation programs encourage energy efficient technologies in new construction and support renewable and alternative energy sources. Moreover, the City’s recently adopted Green Building Code would help reduce energy consumption in new construction through the application of GreenPoint or LEED criteria, many of which are focused on reducing new building energy consumption. While the amount of energy required to construct and operate development associated with the New General Plan is considerable, New General Plan policies and implementation programs, taken as a whole, would ensure that new development is constructed and operated in a manner that does not use fuel or energy in a wasteful manner.

With adherence to and implementation of New General Plan policies and implementation programs, impacts related to electricity and natural gas use would be less than significant. No additional mitigation is required.
Impact 4.17-2: New growth and development allowed by the New General Plan would increase the demand on natural gas and electricity. (Less than Significant)

As documented in association with Impact 4.17-1, the increase in population, housing, and jobs generated by new development allowed by the New General Plan would have the potential to increase the demand on energy resources. The increase in population would lead to an increased demand on energy resources because of additional buildings and infrastructure required to support the growing population’s demand for energy-dependent heating, cooling, lighting, electronics, and appliances powered by electricity and natural gas.

The private utility supplying the plan area with electricity and natural gas services, PG&E, periodically updates its “load” forecasts to ensure the reliability of its electricity and gas services. As implementation of the New General Plan would occur over a 20 year period, the projected incremental electric and gas demand would be incorporated into PG&E’s forecasts.

To the extent that PG&E forecasts result in the need to provide additional conveyance facilities within the City, construction impacts may result. These impacts include the construction or undergrounding of energy transmission and/or distribution lines. Such temporary construction impacts, including impacts to noise and air quality, are examined in respective sections within Chapter 4.0 of this EIR.

Therefore, implementation of the New General Plan would not result in the construction of new electric or natural gas infrastructure beyond what has already been assumed and will be included in PG&E’s regional forecasts. Impacts related to the possible need for new electrical or gas generation or transmission facilities as a result of the New General Plan would be considered less than significant. No mitigation is required.

Impact 4.17-3: New development allowed by the New General Plan would allow for an increase in population and employment, which could increase vehicle trips and associated transportation energy use within the plan area. (Less than Significant)

The majority of fuel consumption associated with development allowed by the New General Plan would involve the use of motor vehicles. Typically, the efficiency of motor vehicle use is determined by the average miles per gallon that can be achieved by a particular type of vehicle. For the purposes of this analysis and when assessing a project with the scope and planning horizon (20 years) of the New General Plan, this type of analysis is not appropriate or feasible. Rather, a more appropriate measure of energy use when evaluating a land use plan, such as the New General Plan, is to consider the average distance traveled by vehicles associated with the proposed project. This analysis therefore focuses on the overall Vehicle Miles Traveled (VMT) associated with the new development allowed by the New General Plan and the associated transportation energy use.

As new development allowed by the New General Plan would result in population and employment growth within the plan area, there would be an associated increase in the
overall VMT. It is assumed that adoption of the New General Plan would have the potential to increase VMT by approximately 21 percent, from 1,796,922 VMT in 2008 to 2,174,428 in 2030 with buildout of the New General Plan. This increase in VMT could result in additional fuel consumption, and therefore an increase in energy use associated with transportation within the plan area.

However, the New General Plan includes multiple policies and implementation programs that would promote certain land use patterns to reduce vehicle trip lengths and to reduce reliance on the automobile, thereby reducing the energy use associated with transportation in the plan area.

The New General Plan also includes several policies and implementation programs that would encourage the development of housing near existing employment and transportation centers, leading to a potential decrease in VMT. Policy PS-5.1 of the New General Plan would facilitate infill and transit-oriented development, which would place housing near existing transit and/or employment options and have the potential to reduce VMT. The encouragement of transit-oriented development could allow for an increase in trip chaining, or combining several errands into one trip, which could result in a reduction in overall VMT. Policy H-3.5 would further promote the development of high-density housing to support housing located near jobs, shopping, services, schools, transportation, and recreation opportunities.

In regards to promoting alternative modes of transportation to reduce VMT, Goal BE-26 of the New General Plan is intended to improve walking and bicycling facilities to be more convenient, comfortable, and safe, and therefore more common transportation modes in the plan area. Policies BE-10.7, BE-12.6, BE-14.3, BE-24.13, and BE-26.19 and Program BC-2 would improve bicycle and transit linkages throughout the plan area, including linkages to existing transit facilities (i.e., Caltrain). These New General Plan policies and implementation programs would also integrate public places with major transit hubs and improve bicycle facilities on existing corridors. Program PS-12 also supports new energy-efficient technologies for automobiles by replacing City fleet vehicles with vehicles using new technologies, such as hybrid, electric, and biofuel.

With adherence to and implementation of New General Plan policies and implementation programs, impacts related to transportation energy use would be less than significant. No additional mitigation is required.
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