3.1.2 Energy

This section provides an evaluation of existing energy production/consumption conditions, as well as potential energy use and related impacts from the Proposed Project. The following discussion is based in part on CEQA Guidelines Appendix F, Energy Conservation (2010); the Greenhouse Gas Analyses Report prepared by HELIX (2015f; Appendix J); the California Energy Demand 2014-2024 Final Forecast (California Energy Commission [CEC] 2014a); and the CEC's 2013 Integrated Energy Policy Report (IEPR) (CEC 2013).

3.1.2.1 *Existing Conditions*

Existing Energy Consumption and Generation

Units of Measure

The units of energy used in this section are the British thermal units (BTU), kilowatt hours (kWh)[1], therms and gallons. A BTU is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit (°F) at sea level. Because the other units of energy can all be converted into equivalent BTU, the BTU is used as the basis for comparing energy consumption associated with different resources. A kWh is a unit of electrical energy, and one kWh is equivalent to approximately 3,413 BTU, taking into account initial conversion losses (i.e., from one type of energy, such as chemical, to another type of energy, such as mechanical) and transmission losses. Natural gas consumption is described typically in terms of cubic feet or therms; one cubic foot of natural gas is equivalent to approximately 1,050 BTU, and one therm represents 100,000 BTU. One gallon of gasoline/diesel is equivalent to approximately 125,000/139,000 BTU, respectively, taking into account energy consumed in the refining process.

Overview of Energy Supply

California's electricity needs are satisfied by a variety of entities, including investor-owned utilities, publicly owned utilities, electric service providers and community choice aggregators.[2] As of 2010, in-state generating facilities accounted for about 71 percent of the total electric power produced in California, with the remaining electricity coming from out-of-state imports. In-state generation also accounted for approximately 12 percent of the state's natural gas supply and approximately 38 percent of the state's crude oil supply. The remaining energy supply comes from other western states and Canada (CEC 2011). Table 3.1.2-1, *California Energy Sources 2010*, provides a summary of California's energy sources as of 2010.

[1] Kilowatt hour is the most commonly used measure of electrical consumption; however, due to the scope of this analysis, gigawatt hour (GWh; equivalent to one million kWh) is also used.

[2] Community choice aggregation is authorized in California by AB 117 (Chapter 836, Statutes of 2002), which allows cities, counties, and groups of cities and counties to aggregate the electric load of the residents, businesses and institutions within their jurisdictions to provide them electricity.

Since deregulation in 1998, the CEC has licensed or given small power plant exemptions to 94 power plants, including:

- 54 projects representing 17,737 megawatts[3] (MW) currently on-line.
- 24 projects totaling 10,299.5 MW currently under construction or pre-construction.
- Three projects totaling 1,879 MW currently on hold but available for construction.
- 13 projects totaling 5,765 MW approved but then cancelled by applicants.

In addition, as of December 2012, the CEC had a total of nine proposed projects under review, totaling approximately 4,635 MW (CEC 2012). Two of these projects in active review are large-scale solar thermal projects totaling 1,000 MW. Two additional projects, representing 906 MW, have been suspended while in review.

On the demand side, Californians consumed 273,103 gigawatt hours (GWh) of electricity in 2010, primarily in the commercial, residential and industrial sectors. CEC staff forecasts of future electricity demand anticipate that consumption will grow by between 1.03 and 1.69 percent per year from 2010 to 2022, with peak demand growing by 1.0 to 1.91 percent annually over the same period. The American Recovery and Reinvestment Act of 2009 (ARRA) was signed on February 13, 2009, providing $787 billion nationwide to create new jobs, jump-start the economy and invest in long-term growth. ARRA funding provided California additional resources to develop and conduct programs aimed at saving energy, creating jobs and contributing to California's economic recovery through energy efficiency upgrade projects in existing buildings. The ARRA programs emphasized collaborations of local governments and industry to deliver energy assessments, ratings, efficiency improvements and quality assurance. ARRA-funded programs have allowed California to establish revolving loan programs that will remain in operation after the ARRA funding ceases, provide loan loss reserves to encourage lenders to provide financing for energy efficiency upgrades and pilot PACE financing in concert with local property assessments. ARRA funding will contribute to California's energy policy goals of achieving cost-effective energy efficiency in existing buildings, meeting a 33 percent renewable energy target by 2020 and reducing the state's dependence on petroleum fuels.

The San Diego Regional Energy Office's (SDREO) 2003 *San Diego Regional Energy Infrastructure Study* provided an integrated and comprehensive analysis of the electricity and natural gas supply and demand inventory and issues (SDREO 2003). The San Diego Regional Energy Infrastructure Study found that the San Diego region is unique compared to the rest of the state because of its proximity to Baja California, Mexico and the close integration with respect to trade flows, movement of people, and capital. Currently, there is a growing interdependency between San Diego County and Northern Baja California in terms of both the supply and demand of energy. Electric power transfers have taken place between California and Northern Baja California, to some extent, for more than 20 years and recently, the bi-national supply and demand interdependencies have increased dramatically. Additionally, while abundant renewable resources are located within the County, the available resources are much greater when the potential of surrounding counties and Baja California are considered. The

[3] Megawatt (MW) is a unit of power and represents the rate at which energy is generated or used. One MW is equivalent to one million watts.

San Diego region's economic and energy development future depends on bi-national as well as interregional cooperation and joint problem solving. The County experiences many unique challenges because of its "island-like" geographic situation, bounded by the Pacific Ocean to the west, the Laguna Mountains to the east, the Mexican border to the south and Camp Pendleton to the north. Because of this fact, there are supply issues and risks that the region is facing unless additional supply options are made available.

SANDAG's 2009 Regional Energy Strategy (RES) (SANDAG 2009) identifies priority early implementation actions, essential to meeting the region's energy goals:

1. Pursue a comprehensive building retrofit program to improve efficiency and install renewable energy systems;

2. Create financing programs to pay for projects and improvements that save energy;

3. Utilize SANDAG-SDG&E Local Government Partnership to help local governments identify opportunities and implement energy savings at government facilities and throughout their communities;

4. Support land use and transportation planning strategies that reduce energy use and greenhouse gas emissions;

5. Support planning of electric charging and alternative fueling infrastructure; and

6. Support use of existing unused reclaimed water to decrease the amount of energy needed to meet the water needs of the San Diego region.

The RES identified the main drivers of the strategy, including the state's preferred loading order for meeting new energy needs and global climate change and its policy implications. The California Public Utilities Commission (CPUC) and CEC adopted a preferred loading order to meet the goals for satisfying the state's growing demand for electricity, which would place top priority on increasing energy efficiency and demand response (i.e., temporary reduction or shift in energy use during peak hours), generating new energy from renewable and distributed generation resources, and improvements to clean fossil-fueled generation and infrastructure. Environmental changes caused by climate change are anticipated to have an increasing impact on energy production and peak demand for electricity. Global climate change is discussed in detail in Section 3.1.1, *Global Greenhouse Gases*, of this EIR.

The major sources of energy in the San Diego region, which encompasses the Proposed Project area, include petroleum, electricity and natural gas. Electricity and natural gas are primarily provided to the San Diego region by SDG&E. The following discussion outlines consumption rates for these various energy sources in San Diego.

Electricity

San Diego County has two major steam electric generating units and a number of smaller combustion turbine units, most of which were constructed between 1960 and 1978. Although these units have continued operation with modifications and upgrades, they are quickly nearing

technological and economical obsolescence. Reliability must-run units are generation facilities that are necessary during certain operating conditions in order to maintain the security of power systems in a competitive environment. A number of the units that are currently considered "must-run" to meet the region's energy needs have been operating in the three percent capacity range, but need to be operating in the five percent capacity range. Must-run units are more expensive to operate and are only used as operating reserves during peak periods or in times of emergency backup. This is because the outage costs are much higher than the power generating cost (SDREO 2003).

As of 2003 when the San Diego Regional Energy Infrastructure Study was completed, San Diego had a total on-system generation capacity of about 2,359 MWs, which was about 55 percent of the region's summer peak demand. This capacity consists of 1,628-MW base-load plants. Base-load plants are the production facilities used to meet some or all of a given region's continuous energy demand, and produce energy at a constant rate, usually at a low cost relative to other production facilities available to the system. The remaining capacities are small and medium-sized peaking plants and on-site generators (excluding backup generation). All of this generation is not normally available since many of the generators are for emergency use and not available when needed. During peak demand periods, approximately 64 percent of peak demand can be met by in-county electrical generation.

San Diego's electricity supply is newly supplemented by the Sunrise Powerlink, a 117-mile, high voltage transmission line which carries renewable energy from Imperial Valley County to San Diego County. Construction of this transmission line began in 2010. In June of 2012, SDG&E announced its completion and start of service. This 500,000-volt transmission line will eventually carry 1,000 MW of power (enough energy for 650,000 homes; SDG&E 2012).

As shown in Table 3.1.2-2, *San Diego County Electricity Consumption 2007 – 2012*, the electricity consumption within the County of San Diego decreased approximately six percent from 2008 to 2010 because of the economic downturn and is now showing an upward trend with an increase of approximately three percent from 2010 to 2012 (CEC 2014b). Figure 3.1.2-1, *SDG&E Electricity Forecast*, shows the SDG&E planning area's anticipated electricity demands through the year 2024 as compared to the historical electricity use represented by the blue line. The California Energy Demand (CED) 2013 demand presents three demand scenarios: high, mid, and low. The high demand scenario (represented by the green line) is characterized by low electricity rates, high population growth, low levels of efficiency, and low self-generation. Inversely, the low demand scenario (represented by the purple line) is characterized by high electricity rates, low population growth, high levels of efficiency, and high self-generation. The mid demand scenario (represented by the brown line) uses assumptions in between the high and low scenarios. Additionally, these 2013 forecast scenarios are compared to the adopted CED 2011 forecast represented by the red line (CEC 2014a). As shown in Figure 3.1.2-1, the CED 2013 adopted forecast estimates that annual electricity consumption for the County would reach between 23,000 and 26,000 GWh by 2024, depending on which demand scenario is realized.

Figure 3.1.2-2, *SDG&E Per Capita Electricity Consumption*, illustrates the per-capita electricity consumption[4] projections within the SDG&E planning area through 2024. Projections are shown to increase toward the end of the forecast period (2024) as a result of consumption from electric vehicles. The recent recession and increased savings from conservation and energy efficiency programs combined to cause a short-term dip in per capita consumption from 2008 to 2011. By 2024, per capita electricity consumption is projected to range between approximately 6,375 and 7,000 kWh per person.

Residential and commercial sectors use the most electricity in the San Diego region, and consumption is projected to increase with regional population and job growth (SANDAG 2009). Figure 3.1.2-3, *SDG&E Electricity Consumption Per Household*, shows the 2024 forecast electricity consumption within the SDG&E planning area for residential uses. As shown in Figure 3.1.2-3, the CED 2013 adopted projections increase over the forecast period; this is a result of increased electric vehicle consumption in the residential sector. By 2024, electricity consumption per household is expected to reach between approximately 6,900 and 7,375 kWh per year.

Figure 3.1.2-4, *SDG&E Electricity Consumption for Commercial Uses*, shows the 2024 forecast energy consumption within the SDG&E planning area for commercial uses. As shown in Figure 3.1.2-4, 2024 commercial electricity consumption rates are anticipated to reach between approximately 10,500 and 11,250 GWh based on the CED 2013 adopted forecast.

The 2024 forecast energy consumption within the SDG&E planning area for the Transportation, Communication, Utilities and Street Lighting (TCU) sector is shown in Figure 3.1.2-5, *SDG&E Electricity Consumption for the TCU Sector*. The lower forecast for CED 2013 is a result of the lower historical consumption estimates that are reflective of the recent economic downturn.

The Proposed Project site is currently served by SDG&E. The SDG&E service area covers 4,100 square miles within San Diego and southern Orange counties. Energy is provided by SDG&E to 3.4 million customers through 1.4 million electric meters and 860,000 natural gas meters (SDG&E 2013). The SDG&E Long Term Procurement Plan (LTPP), as discussed under the Regulatory Setting subheading below, ensures that adequate energy supplies are available to meet existing and projected future demands.

Forecasting future energy consumption demand is performed on a continual basis by SDG&E, primarily from installation of transmission and distribution lines. In situations where projects with large power loads are planned, this is considered together with other loads in the Project vicinity, and electrical substations are upgraded, if required. As shown on Figure 3.1.2-6, *SDG&E Facilities and Transmission Lines*, several transmission lines of varying capacities are near the Project site, including two transmission lines (138 kV and 230 kV) that cross directly through the site. Additionally, eight substations are located within a four mile radius of the Project site, including the Escondido and CalPeak Power Enterprise Substations which are within one mile of the site (CEC 2014c).

[4] Per-capita electricity consumption is the average amount of electricity used by each person within the SDG&E planning area.

Natural Gas

Natural gas continues to play an important and varied role in California. In 2012, nearly 45 percent of the natural gas burned in California was used for electricity generation, and much of the remainder consumed in the residential (21 percent), industrial (25 percent), and commercial (9 percent) sectors (CEC 2013). Natural gas supplies are currently plentiful and relatively inexpensive as a result of technological advances that allow recovery of natural gas from formations such as shale reservoirs that were previously inaccessible. However, potential environmental concerns are causing decision makers to reexamine the development of shale resources and consider tighter regulations, which could affect future natural gas supplies and prices.

Several major generating plants were implemented in the last several years in San Diego County, including the 90-MW Larkspur Energy Facility in Chula Vista in 2001; the 550-MW Palomar Power Plant in Escondido in 2006; and the 513-MW Otay Mesa Center power plant near the U.S.-Mexico border in 2009. In addition, a proposal has been submitted to SDG&E to annex the proposed 558-MW Carlsbad Energy Center to the existing 965-MW Encina Power Plant, for use as a peaking or intermediate power plant.

As shown in Figure 3.1.2-7, *San Diego Regional Natural Gas Consumption Forecast*, the San Diego region currently consumes approximately 581 million therms (MMTh) of natural gas per year (not including gas used for electricity generation, as accounted for above). The majority of natural gas uses are for residential and commercial purposes. Currently, California imports 87 percent of natural gas needs from out of state, while in-state natural gas production is decreasing. Regional gas consumption is expected to increase to 660 MMTh in 2020 and 730 MMTh in 2030, as shown in Figure 3.1.2-7.

Varying demand for natural gas makes reliably predicting future gas prices difficult. Even though the forecast shown in Figure 3.1.2-7 shows a slight increase in natural gas consumption throughout the forecast, as shown in Table 3.1.2-3, *San Diego County Natural Gas Consumption 2007 – 2012*, the CEC found that natural gas consumption within the County of San Diego actually decreased approximately one percent from 2007 to 2012 (CEC 2014b). This discrepancy in projected rates versus actual rates may be a result of unexpected decreases in natural gas consumption associated with construction activity and income, which both experienced downturns between 2007 and 2009.

Water-related Energy

Before it reaches arid San Diego, water is pumped hundreds of miles from either the Sacramento-San Joaquin Bay Delta in northern California or from the Colorado River. Energy is used in the conveyance, treatment and distribution of water; therefore, there is a certain amount of energy use in every unit of water utilized by a project. This is known as the embedded energy for various water uses. Figure 3.1.2-8, *Water Embedded Energy Sources*, illustrates the key segments of the water use cycle. Each unit of water may have a different amount of energy embedded in it depending on how much it is processed or conveyed before it is delivered to the user. This energy is quite different in northern California compared to southern California,

because it depends on pumping requirements related to distance and topography. Treatment and distribution before end use is better defined and fairly consistent across California (CEC 2007a).

The CEC established a benchmark for evaluating the relative values of embedded/proxy energy use per water use, estimating the amount of energy needed for each segment of the water use cycle in terms of the number of kWh needed to collect, extract, convey, treat and distribute one million gallons (MG) of water, and the number of kWh needed to treat and dispose of the same quantity of wastewater. Table 3.1.2-4, *CEC-recommended Water Energy Proxies for Southern California*, shows the CEC's recommended water energy proxies for southern California based on the water-use cycles for indoor and outdoor uses.

As water demand grows in the state, so grows water-related energy demand. Because population growth drives demand for both resources, water and energy demand are growing at about the same rate and, importantly, in many of the same geographic areas (CEC 2007a).

In California, water-related energy use consumes about 19 percent of the state's electricity (3 percent of which is used by the State Water Project to convey water from northern California to southern California [CEC 2007b]), 30 percent of its natural gas and 88 billion gallons of diesel fuel every year. Of this amount, more than 12,000 GWh (26 percent, about 5 percent of the state's total electricity requirements) were deemed attributable to energy used by water and wastewater systems and their operations. The balance of water-related energy was attributed to the amount of energy needed to apply and use water for agricultural, residential, commercial and industrial purposes.

Figure 3.1.2-9, *Water-related Energy Use in California*, shows how and where power is used in the state's water systems (CEC 2007a). Total water-related electrical consumption for the state amounts to approximately 52,000 GWh. Electricity to pump water by the water purveyors in the state amounts to 20,278 GWh. The remaining 32,000 GWh represent electricity that customers use to move, heat, pressurize, filter and cool water (CEC 2007b). Water supply-related electrical demands exceed 2,000 MW on summer peak days in California. Agricultural groundwater and surface water pumping represent 60 percent of the total water supply-related peak day electrical demand, with water agency demands representing the remaining 40 percent. Over 500 MW of water agency electrical demand is used for providing water/sewer services to residential water customers.

The CEC's Water Supply Related Electricity Demand in California study (CEC 2007b) examined electrical demand necessary to treat water and get it to the customer, to take the wastewater from the customer and dispose of it, and to provide groundwater pumping and surface water pumping for the agricultural community. The study examined the water supply-related peak day demands of the California investor-owned utilities (IOUs): Pacific Gas & Electric (PG&E), Southern California Edison (SCE) and SDG&E.

Within the SDG&E planning area, within which the Proposed Project is located, the predominant water-related demand is for urban water supply. Approximately 20 percent of water supply-related electricity use is due to agricultural pumping, with the remaining 80 percent being provided by the water/sewer agencies.

SDG&E has the lowest embedded residential peak water supply-related electrical demand of any of the utility service areas. The San Diego area is at the end of the pipeline. Almost all of its water is treated somewhere else (generally in the SCE service area at the big MWD treatment plants) and shipped to the San Diego area. Residential water demand in the San Diego area results in electrical-demand increases in the SCE area for treatment and shipping. However, collaboration between SDG&E and the region's water agencies has resulted in most of the treatment (fresh water and sewer) facilities in this area having their own self-generation, dramatically reducing electrical demand by the water sector as the treatment facilities produce most of their own electricity (CEC 2007b).

As discussed in Section 3.1.7, *Utilities and Service Systems*, Rincon MWD would provide water service to the Proposed Project. Table 3.1.2-5, *Historical and Projected Water Energy Consumption in the Rincon del Diablo MWD*, illustrates the amount of energy associated with the historical and projected total water use within the service area.

Wastewater Service

As further discussed in Section 3.1.7, the Proposed Project is not located in any of the local sanitation or maintenance districts. Wastewater generation is included in the California Emission Estimator Model (CalEEMod) data for water, discussed above under *Water-related Energy*. Additionally, energy demand related to wastewater treatment is accounted for in the CEC's recommended water-energy proxies based on the water-use cycles for indoor and outdoor uses, as described above (CEC 2007a).

Transportation

Automobiles and trucks consume gasoline and diesel fuel, nonrenewable energy products derived from crude oil. In addition to energy consumption associated with on-road vehicle use, energy is consumed in connection with construction and maintenance of transportation infrastructure. The transportation sector consumes relatively minor amounts of natural gas and electricity, but, propelled by air quality laws and regulations, technological innovations in transportation are expected to increasingly rely on compressed natural gas and electricity as energy sources. Biodiesel, derived from plant sources such as used vegetable oils, is a small but growing source of transportation fuel.

As shown in Figure 3.1.2-10, *San Diego Regional Projected On-road Fuel Consumption 1990-2030*, passenger cars and light-duty trucks are by far the largest consumers of transportation fuel, accounting for approximately 1.6 billion gallons of gasoline and diesel fuel per year (SANDAG 2009). Without changes in policy or behavior, on-road consumption of petroleum-based fuels is expected to increase considerably by 2020 and through 2030.

Based on the CARB EMFAC Emissions Database, the average fuel economy of the 2013 vehicle fleet in the County is estimated as 18.5 miles per gallon (mpg) for gasoline and 8.2 mpg for diesel. Based on the CARB EMFAC2011 vehicle fleet type breakdown for the County, approximately 95 percent of the VMT is from gasoline-powered vehicles and approximately five percent is from diesel-powered trucks. The energy consumption rates for gasoline- and diesel-powered vehicles are 6,759 and 17,011 BTU per VMT, respectively.

Table 3.1.2-6, *Fuel Economy and Energy Consumption Rates for Autos and Trucks in the County (2013),* presents the fuel economy and energy consumption rates associated with existing conditions in the County. The total automobile and truck-related energy usage in the County in 2013 was approximately 227 trillion BTU per year.

Energy Efficiency Potential

Infrastructure Development

Several challenges exist to siting major energy infrastructure projects in San Diego. In addition, there is a lack of suitable sites away from populous areas and near transmission lines. Power plants, particularly coastal plants that restrict public access to coastal areas, are not perceived as ideal neighbors. Additionally, the transmission and distribution infrastructure required to support power plants create aesthetic, health, and quality of life concerns with residents in the local community. Lastly, siting is more problematic for water-cooled plants than dry-cooled due to the effects of power plant cooling systems on the ecosystem (SANDAG 2009).

In addition, the SDAB (which encompasses San Diego County) is currently classified as a nonattainment area for ozone and particulate matter (PM_{10} and $PM_{2.5}$) under state standards and eight-hour ozone is in marginal nonattainment for the federal standard as well (refer to Subchapter 2.2, *Air Quality*). This means that all new major emission sources of ozone and particulate matter must be mitigated through the purchase of offsets (credits for reduction of emissions) from other sources within the County. The SDAPCD requires emission offsets, and limited availability of emission reduction credits is a barrier to the building of new power plants. Several strategies could be used to create the needed emissions credits. These include repowering existing power plants, allowing mobile offsets to be used for stationary power plants, and creating inter-border pollution offsets.

Energy Demand Reductions

Estimates vary on what level of future energy reductions will be attributed to efficiency programs and standards over the next decade, depending on the assumptions used. The CPUC estimates that in the San Diego region, efficiency programs will achieve gross savings of 1,514 GWh and 52 MMTh between 2012 and 2020, the largest contributor to energy reductions over this period (University of San Diego Energy Policy Initiative Center [EPIC] 2009).

A 2009 study intended to determine the remaining potential for energy efficiency programs in California included a detailed, bottom-up study of energy efficiency program potential in San Diego County (University of San Diego EPIC 2009). The primary objective of the work underlying this report was to produce estimates of remaining potential energy savings that might be obtainable in the near (2007-2016) and foreseeable (2017-2026) future through publicly funded energy efficiency programs in the existing and new residential, industrial, and commercial sectors. The study focused on providing a reasonable proxy of the remaining potential for implementation of local government policies to affect energy savings.

Study results show that the residential sector has the highest remaining potential for energy program reductions, representing 49 percent of the total potential, followed by the commercial

(34 percent) and industrial (17 percent) sectors. Existing buildings represent 89 percent of the energy reduction estimate, while new construction represents 11 percent.

Table 3.1.2-7, *Summary of Potential Energy Efficiency Through Local Policies, 2020 Forecast, San Diego County*, details the anticipated remaining energy efficiency potentials for various land uses in San Diego County through the year 2020.

Regulatory Setting

Energy consumption is a large source of GHGs and regulations to address energy also address GHGs; therefore, there is some overlap in the discussions in this subsection and Section 3.1.1, *Global Greenhouse Gases*. In addition to the federal, state, and local regulations directed at reducing GHG emissions through increased efficiencies presented in Section 3.1.1 and EIR Appendix J (i.e., CAFE Standards; California Code of Regulations, Title 24, Part 6: California Energy Code; California Code of Regulations, Title 24, Part 11; EO S-01-07; SB 1078, EO S-14-08, and S-21-09; AB 32; AB 1493; SB 97; SB 375; SB 1368; the CEC New Solar Homes Partnership; the CARB Scoping Plan; and the SANDAG Climate Action Strategy), energy efficiency regulations that have the potential to considerably influence the Proposed Project are discussed below.

Federal Energy Regulations

Energy Independence and Security Act of 2007

House of Representatives Bill 6 (HR 6), the federal Energy Independence and Security Act of 2007, established new standards for a few equipment types not already subjected to a standard, and updated some existing standards. Perhaps the most substantial new standard that HR 6 established is for general service lighting that will be deployed in two phases. First, by 2012 through 2014 (phasing in over several years), common light bulbs are required to use about 20 to 30 percent less energy than present incandescent bulbs. Second, by 2020, light bulbs must consume 60 percent less energy than today's bulbs; this requirement will effectively phase out the incandescent light bulb.

Energy Improvement and Extension Act of 2008

The formerly entitled "Renewable Energy and Job Creation Act of 2008," or Division B of HR 1424, was signed into law by President Bush in October 2008. The signed bill contains $18 billion in incentives for clean and renewable energy technologies, as well as for energy efficiency improvements.

California Energy Regulations

Assembly Bill 811

Assembly Bill (AB) 811 is a property tax bill that gives all California cities and counties the ability to offer low-interest loans for energy-efficiency projects and solar panels to homeowners and small businesses.

California Code of Regulations, Title 24, Part 6: California Energy Code

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24; Energy Code) were first 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. In 2013, the Title 24 standards were updated, and became effective on July 1, 2014. Energy-efficient buildings require less electricity, natural gas and other fuels.

Title 24 of the CCR comprises the state Building Standards Code. Part 6 of Title 24 is the California Energy Code, which includes the building energy efficiency standards. The standards include provisions applicable to all buildings, residential and non-residential, which describe requirements for documentation and certificates that the building meets the standards. These provisions include mandatory requirements for efficiency and design of the following types of systems, equipment, and appliances:

- Air conditioning systems
- Heat pumps
- Water chillers
- Gas- and oil-fired boilers
- Cooling equipment
- Water heaters and equipment
- Pool and spa heaters and equipment
- Gas-fired equipment including furnaces and stoves/ovens
- Windows and exterior doors
- Joints and other building structure openings ("envelope")
- Insulation and cool roofs
- Lighting and control devices

The standards include additional mandatory requirements for space conditioning (cooling and heating), water heating and indoor and outdoor lighting systems and equipment in non-residential, high-rise residential and hotel or motel buildings.

Mandatory requirements for low-rise residential buildings cover indoor and outdoor lighting, fireplaces, space cooling and heating equipment (including ducts and fans), and insulation of the structure, foundation and water piping.

California's Electricity Loading Order

The loading order, adopted by the CEC in 2003, calls for California's electricity needs to be met with (1) increased energy efficiency and demand response; (2) new generation from renewable energy and distributed generation resources; and (3) clean fossil-fueled generation and infrastructure improvements.

CEC Tier II Energy Efficiency Goals

Under state law, the CEC is required to establish eligibility criteria, conditions for incentives and rating standards to qualify for ratepayer-funded solar energy system incentives in California. As part of this effort, the CEC establishes energy efficiency standards for homes and commercial structures, and requires new buildings to exceed current building standards by meeting Tier Energy Efficiency goals. CEC Tier II Energy Efficiency goals will continue to be updated to achieve energy efficiency best practices, and are consistent with what is needed to meet the

CPUC Strategic Plan goals of zero net-energy buildings. CEC proposed guidelines for the solar energy incentive program recommend a Tier II goal for residential and commercial projects of a 30 percent reduction in building combined space heating, cooling and water-heating energy, compared to the 2008 Title 24 Standards.

Senate Bill 1

This 2006 bill enacted Governor Schwarzenegger's Million Solar Roofs program with the overall goal of installing 3,000 MW of new solar photovoltaic systems by 2017.

CEQA Guidelines – Appendix F

Section 15126.4 (a)(1) of the CEQA Guidelines states that an EIR shall describe feasible measures which could minimize significant adverse impacts, including, where relevant, inefficient and unnecessary consumption of energy.

CEQA Guidelines Appendix F, Energy Conservation, provides guidance for EIRs regarding potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing the inefficient, wasteful and unnecessary consumption of energy. In addition, though not described as thresholds for determining the significance of impacts, Appendix F seeks inclusion of information in the EIR addressing the following impacts:

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

Regional

SANDAG 2009 San Diego Regional Energy Strategy

The Regional Energy Strategy (RES) is an important and integral part of the larger San Diego Regional Comprehensive Plan, intended to contain an integrated set of public policies, strategies and action plans to promote a smarter, more sustainable growth for the San Diego region. The following goals set forth by the RES are relevant to the Proposed Project:

1. Energy Efficiency and Conservation

   GOAL: Reduce per capita electricity consumption in the residential and commercial sectors by 20 percent by 2030 in order to keep total electricity consumption flat between now and 2030.

2. Renewable Energy

   GOAL: Support the development of renewable energy resources to meet or exceed a 33 percent RPS by 2020 and a 45 percent RPS by 2030.

3. Distributed Generation

   GOAL: Increase the total amount of clean distributed generation (renewable and non-renewable) to reduce peak demand and diversify electricity resources in the San Diego region.

4. Energy and Water

   GOAL: Reduce water-related energy use.

5. Peak Demand

   GOAL: Implement cost-effective steps and incentives to utilize demand response and energy efficiency measures to reduce peak demand.

6. Transportation Fuels

   GOAL: Substantially increase the deployment of alternative transportation fuels and vehicles.

San Diego Gas & Electric Long Term Procurement Plan

As required by the CPUC, utility companies such as SDG&E must prepare a LTPP to ensure that adequate energy supplies are available to maintain a reserve margin of 15 percent above the estimated energy demand. These plans outline any future energy needs and how those needs can be met. In December 2006, SDG&E filed its LTPP with the CPUC, which included a 10-year energy resource plan that details its expected portfolio of energy resources over the planning horizon of 2007 through 2016. The projections included in the current LTPP were based on the CEC's California Energy Demand 2008-2018 Forecast, dated November 2007. The most recent CEC Energy Demand Forecast (2014-2024), however, shows that projections are now lower than what was anticipated in 2007.

County

General Plan

The Land Use and Conservation and Open Space (COS) Elements contain goals and policies relevant to energy conservation. These elements provide a framework to accommodate future development within the County in an efficient and sustainable manner, and include goals and policies to encourage efficient use of water and other natural resources, efficient energy use in

buildings and infrastructure, renewable energy production, and land use development patterns and transportation choices that would reduce pollutants and energy use. Refer to Section 3.1.4, *Land Use*, for a more detailed discussion of relevant goals and policies as they relate to the Proposed Project.

Strategic Energy Plan 2013-2015

The purpose of the Strategic Energy Plan is to provide energy and sustainability objectives and goals in the following areas: energy and water conservation and efficiency, sustainable design, energy supply, distributed generation, vehicular transportation, energy and sustainability education and outreach, energy consumer choice, recycling and landfill diversion, and greenhouse gas emissions reductions. The following community goals of the Strategic Energy Plan are applicable to the Proposed Project relative to energy conservation (County 2013d):

- Community Goal #1: Reduce Energy Consumption. Reduce per capita energy consumption of County communities by 20 percent from 2007 to 2030 through a comprehensive approach that addresses new construction, existing buildings, and water use. Energy efficiency in existing buildings is the key to achieving cost-effective carbon reductions on a mass scale in the time frame that is required. Existing residential buildings in particular represent the largest potential for energy performance improvements in our region.

- Community Goal #2: Renewable Energy. Facilitate the development of at least 200 residential/commercial photovoltaics projects per year and the development of commercial renewable energy in the unincorporated County with the goal of at least 50 MW of production by 2015.

- Community Goal #4: Transportation and Land Use. Reduce petroleum demand through reduced vehicle demand and vehicle miles traveled, and by encouraging deployment of alternative fuel vehicles.

- Community Goal #5: Education and Outreach. Provide resources to the residents of the unincorporated County so they can be readily informed of steps they can take to reduce their energy consumption and improve energy efficiency at their homes and businesses.

- Community Goal #6: Recycling. Reduce energy use associated with first generation manufacturing and distribution through increased recycling and reuse.

3.1.2.2 *Analysis of Project Effects and Determination as to Significance*

Guideline for the Determination of Significance

Guideline Source

CEQA Guidelines Appendix G does not contain specific thresholds to identify when a significant energy-use impact would occur. CEQA Guidelines Appendix F, Energy Conservation, provides direction as to the type of information, analysis and mitigation that should be considered in evaluating a proposed project, but does not provide specific energy conservation thresholds.

In accordance with CEQA Guidelines Appendix F and for the purposes of this EIR, the Proposed Project would result in a significant impact to energy conservation if it would:

- Substantially increase the consumption of electricity, natural gas, gasoline, diesel or other non-renewable energy types such that the construction of new facilities and sources of energy or major improvements to local infrastructure would be required; or

- Cause the use of large amounts of electricity and natural gas in a manner that is wasteful or otherwise inconsistent with adopted plans or policies.

Analysis

Per CEQA Guidelines Appendix F, energy conservation impacts were analyzed by estimating Project energy requirements by amount and type, and evaluating Project compliance with regulatory requirements. These data were used to evaluate the Project's effects on energy resources and the degree to which the Project would comply with existing energy standards.

The Proposed Project site is currently vacant with the exception of one residential structure and the equestrian center. Existing generation of electric, natural gas, water, wastewater or other energy demands by the existing uses is considered negligible. Therefore, this analysis conservatively uses a baseline demand of zero for these energy uses. The analysis included in this section utilizes the results of the CalEEMod run for the air quality and GHG analyses to evaluate energy impacts (refer to EIR Appendices C and J, respectively).

Substantially Increase Consumption of Non-Renewable Energy

Construction Impacts

Proposed Project construction would require the use of construction equipment for grading, hauling and building activities, as well as construction workers and vendors traveling to and from the Project site. Construction equipment requires gasoline, diesel and potentially other fuel sources to operate. To assess construction-related energy consumption for development of the Project, a worst-case analysis assessing the most construction-intensive year was assumed. Construction data used in CalEEMod (refer to Subchapter 2.2, *Air Quality*, for details) was utilized to determine that 2017 would be the most energy-intensive construction year. Data in the model was also used to determine energy consumption associated with the proposed construction activities.

Construction energy was calculated based on the fuel consumption rates from the SCAQMD CEQA Air Quality Handbook for each piece of off-road heavy-duty equipment (SCAQMD 1993). Fuel economy (i.e., gasoline and diesel) for all off-road equipment was determined using values provided in the CARB's OFFROAD2011 model. Fuel economy for on-road vehicles was determined by using the average fuel economy in the County for 2013 (estimated as 18.5 mpg for gasoline and 8.2 mpg for diesel) based on the CARB EMFAC Emissions Database. The analysis did not assume increases in fleet fuel economy due to changes in technology, as the effects on the average fuel economy of the future years' equipment and vehicle fleet remain uncertain.

Table 3.1.2-8, *Worst-case Annual Energy Consumption from Construction Equipment and Vehicles*, presents the amount of energy in BTU required for the worst-case construction year of the Proposed Project, during 2017. Energy consumption from construction equipment and off-road vehicles would be approximately 33.8 billion BTU. Construction workers and vendors are estimated to generate approximately 366,000 VMT during the worst-case construction year; this would result in approximately 2.7 billion BTU. Therefore, the total estimated amount of energy consumption required during the worst-case construction year is approximately 36.4 billion BTU.

Construction of the Proposed Project would incorporate on-site energy conservation features. The following practices would be implemented during Project construction to reduce waste and energy consumption:

- Require the construction fleet to use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize CARB/USEPA Engine Certification Tier 4, or other equivalent methods approved by the CARB;

- Follow maintenance schedules to maintain equipment in optimal working order and rated energy efficiency, which would include, but not be limited to, regular replacement of filters, cleaning of compressor coils, burner tune-ups, lubrication of pumps and motors, proper vehicle maintenance, etc.;

- Reduce on-site vehicle idling;

- Divert at least 50 percent of on-site construction waste and ongoing operational waste from landfills through reuse and recycling, in accordance with CalGreen criteria and state and local laws;

- Incorporate recycled materials for flooring, and certified sustainable wood products and other recycled or rapidly renewable building materials where possible; and

- Utilize building products that have at least a ten percent recycled content.

The Proposed Project's peak construction-related energy usage is temporary in nature (i.e., occurring in year 2017 with all other years being less) and would not represent a significant demand on energy resources because construction is estimated to last approximately 42 months and be complete in 2019. Additionally, with implementation of the on-site energy conservation features, Project construction would not result in energy consumption that is wasteful. Therefore, the Project's construction-phase energy impacts would be **less than significant**.

Operational Impacts

Electricity and natural gas demand, as well as anticipated VMT associated with the operation of the Proposed Project, were calculated in the CalEEMod model for the unmitigated (without Project Design Features) scenario (refer to EIR Appendix J) using features such as Project size and location. Project-related water demand and wastewater generation were obtained from the Project's Conceptual Water Study and Conceptual Sewer Study, respectively (see

Appendices P and Q for more details). Table 3.1.2-9, *Projected Annual Energy Consumption at Buildout*, summarizes this information and converts the values to kWh and BTU for energy comparison purposes. As shown in Table 3.1.2-9, the Proposed Project would result in approximately 29.6 GWh or 101.2 billion BTU of energy demand annually under the unmitigated scenario.

This scenario was then compared to the Project with Project Design Features, which incorporated several energy reduction measures. Measures include reducing overall energy consumption by exceeding year 2008 Title 24 standards by 15 percent (the Project would comply with 2013 Title 24 standards, however, the modeling conservatively uses 2008 Title 24 standards), installing Energy Star appliances in all residential units, and implementing a water conservation plan (refer to Chapter 1, *Project Description*, for a complete list of Project design features). As shown in Table 3.1.2-9, the Proposed Project with Project Design Features would result in approximately 29.0 GWh or 99.1 billion BTU of energy demand annually, a reduction of 2.1 percent (0.6 GWh or 2.1 billion BTU) from the unmitigated scenario.

Stationary Energy. Stationary energy demands include electricity, natural gas, water and wastewater. The total demand associated with these uses with implementation of Project Design Features is estimated at approximately 5.9 GWh or 20 billion BTU annually. It should be noted that the energy consumption associated with the Proposed Project's water demand (including wastewater treatment and conveyance) was estimated using the CEC-recommended water energy proxies for southern California (refer to Table 3.1.2-4), which include substantial energy usage associated with water conveyance and distribution. Since the Project includes an on-site WTWRF with on-site utilization of reclaimed water, the Project's water-related energy demand is likely overstated.

As discussed in Subsection 3.1.2.1, in 2012, the County's electricity use was approximately 19,443 GWh (equivalent to 66.4 trillion BTU) and natural gas usage was approximately 541 MMTh (equivalent to 54.1 trillion BTU). The projected energy usage from the Project represents an increase from 2012 County usage of 0.01 percent for electricity and 0.02 percent for natural gas.

While the Proposed Project would increase the consumption of energy related to electricity, natural gas, water and wastewater, the increase is consistent with the energy projections for the state and the region, as described in Subsection 3.1.2.1. The Project Design Features would also reduce the energy usage as compared to the BAU scenario, as shown above. Additionally, as illustrated in Figure 3.1.2-6, adequate energy facilities are located within the vicinity of the Project site. Thus, the incremental increase associated with implementation of the Project would not require the construction of new energy facilities and sources of energy that would not otherwise be needed to serve the region. It is anticipated that these services would be provided from existing utilities on the site, or from extensions from existing facilities immediately abutting the site. Based on the location of existing infrastructure across and adjacent to the Project site, it is anticipated that the Project would not require major improvements to local energy infrastructure. Impacts would, therefore, be **less than significant**.

Mobile Energy. Energy is used for transportation in the form of fuel for vehicular trips. Based on the CARB EMFAC Emissions Database, the average fuel economy of the vehicle fleet in the

County for 2013 is estimated as 18.5 mpg for gasoline and 8.2 mpg for diesel. This analysis utilizes the year 2013 and does not assume increases in vehicle fuel economy due to changes in technology, as the effects on the average fuel economy of the future years' vehicle fleet remain uncertain. However, as described further below, due to anticipated increases in fuel economy standards driven by legislated deadlines, the actual average fuel economy at Project buildout would likely be much higher than that included in this analysis.

Trip generation rates provided in the Project TIA were used in the CalEEMod model (refer to EIR Appendix H) to estimate the annual total number of VMT. As shown in Table 3.1.2-9, VMT was estimated to be 10.8 million miles per year or 89 VMT per du per day.

Table 3.1.2-10, *Fuel Economy and Energy Consumption Rates for Autos and Trucks*, presents the fuel economy and energy consumption rates for the Project-related automobile and truck use. As shown, the total estimated direct annual energy consumption from Project-related automobile and truck use (both gasoline and diesel combined) would be approximately 78.9 billion BTU per year at buildout.

It should be noted that state and federal regulatory requirements addressing fuel efficiency are expected to increase fuel efficiency over time as older, less fuel-efficient vehicles are retired. As discussed in Section 3.1.1, the federal CAFE standards, EO S-1-07 Low Carbon Fuel Standard (LCFS), and AB 1493 fuel efficiency standard (analogous to the federal CAFE standard), as well as light/heavy vehicle efficiency/hybridization programs, all contribute to increased fuel efficiency, and therefore, would reduce vehicle fuel energy consumption rates over time. Thus, the annual vehicular energy consumption calculated for the Proposed Project is considered a conservative estimate, since 2013-level fuel efficiency was used in the calculation. While the Project would increase the consumption of gasoline and diesel proportionately with projected population growth, the increase is consistent with the energy projections for the state and the region, as described in Subsection 3.1.2.1. Thus, this percentage increase would not require the construction of new regional facilities and sources of energy. Because gasoline and diesel are transported via truck to individual service stations, the increase in demand also is not anticipated to require major improvements to local fueling infrastructure. Therefore, energy impacts related to vehicular energy during Project operations would be **less than significant**.

Waste Non-renewable Energy or be Inconsistency with Adopted Plans and Policies

The Proposed Project is located within the SDG&E planning area which is covered by the LTPP. As discussed in Section 3.1.1, the current LTPP plans for higher levels of demand than has actually occurred (i.e., the projections contained in the current LTPP are approximately nine percent higher than current estimates). Thus, the Project would not result in an unanticipated increase of energy demand beyond what is already planned for and included in the LTPP.

The Proposed Project would be required to comply with city, state and federal energy conservation measures related to Project construction and operations. Many of the regulations regarding energy efficiency are focused on increasing building efficiency and renewable energy generation, as well as reducing water consumption and VMT. The Proposed Project includes several energy conservation measures to meet and exceed these regulatory requirements. Table 1-4, *Project Design Features*, contains a complete list of Project design features that would be implemented to

ensure that the Proposed Project would not use energy in a wasteful manner or conflict with adopted energy conservation plans.

A major objective of many of the energy-related regulations involves increasing renewable energy generation. The Proposed Project proposes to include on-site renewable energy systems in the form of solar power, which would provide a minimum of 30 percent of residential electricity demand through solar panels, as well as 19 percent of water heating needs through solar water heaters. This inclusion would decrease the Project's reliance on regional energy sources and would support the federal, state and local goals associated with renewable energy.

The California Energy Code building energy efficiency standards include provisions applicable to all buildings, residential and non-residential, which are mandatory requirements for efficiency and design. The Proposed Project would comply with Title 24 (2013) through implementation of energy-reduction measures, such as energy efficient lighting and appliances.

The County's Strategic Energy Plan includes energy efficiency standards for new development, renewable energy generation, water conservation measures, transportation measures to reduce trips and VMT and waste diversion programs. This document serves as a companion document to the County's General Plan and provides the framework for land-based policy decisions to improve energy efficiency in existing and future development. The Proposed Project would be consistent with the Strategic Energy Plan as discussed below.

As described in Section 3.1.1, the Proposed Project would be consistent with applicable energy conservation goals and policies within the General Plan. In addition to the goals and policies discussed in Section 3.1.1, the Project would also be consistent with the goals and policies described in this section. The goal of efficient use of water and other natural resources would be met through implementation of a water conservation plan to reduce potable water usage, as well as utilization of reclaimed water produced on site for parks, streetscapes and other landscaping. The goal of efficient energy use in buildings and infrastructure would be met through the Project's energy efficiency measures and sustainable building practices that comply with 2013 Title 24 requirements. The goal of renewable energy production would be met by the inclusion of solar PV systems, which would provide a minimum of 30 percent of residential electricity needs. The Project would meet the goal of reducing pollutants and energy by encouraging non-vehicular forms of mobility, through land use development patterns (e.g., increased density) and transportation choices (e.g., traffic calming measures and a multi-use trail network). In addition, the Project is within relatively short distances to nearby destinations that would encourage short vehicle trips or the use of non-vehicular travel (i.e., bicycling and walking). For example, Palomar Medical Center and associated medical offices are located approximately 1.9 miles away by road; the Nordahl SPRINTER rail station is located approximately 1 mile away by road; California State University, San Marcos is located approximately 3.6 miles away by road; employment centers are located as close as 0.3 mile away by road; and major shopping centers are located approximately 2.3 miles away by road. Additional details regarding Project consistency with General Plan goals and policies are provided in Section 3.1.4.

Through implementation of energy conservation measures and sustainable practices, the Proposed Project would not use large amounts of energy in a manner that is wasteful or

otherwise inconsistent with adopted plans or policies; therefore, impacts would be **less than significant**.

3.1.2.3 *Cumulative Impact Analysis*

Short-term and long-term cumulative development is expected to result in an increase in the demand for energy sources throughout the County. Sixty-six cumulative projects in the vicinity of the Proposed Project were identified in Table 1-5. Several County programs and policies and SDG&E initiatives would serve to reduce total energy demand among cumulative projects. Additionally, minimum standards for energy efficiency are outlined in California's Energy Efficiency Standards for Residential and Non-residential Buildings. To exceed these standards, SDG&E and state and federal agencies offer incentive programs to encourage developers to exceed Title 24 standards. These programs encourage the use of Energy Star appliances, automatic light sensors, extra insulations and other measures to reduce energy consumption.

The Proposed Project design features and conservation strategies that are proposed as part of the Project would result in energy consumption that is not wasteful, inefficient, or unnecessary. The Project is anticipated to generate energy use demand of 99.1 billion BTU or 29.0 GWh per year. Consistent with the analysis in Section 3.1.7, the Proposed Project's contribution to long-term cumulative demands on energy resources and services **is not considerable** and would not be anticipated to require the construction of new energy facilities or require improvements to local infrastructure.

Therefore, the energy consumed by the Proposed Project (e.g., electricity, oil, and natural gas), along with other cumulative projects, would not be substantial in relation to regional energy consumption and available energy supply.

3.1.2.4 *Significance of Impacts*

Energy consumption impacts under CEQA Appendix F would be **less than significant**.

Table 3.1.2-1
CALIFORNIA ENERGY SOURCES 2010

Fuel Type	Percent of California Power
Natural Gas	53.4
Nuclear	15.7
Large Hydro	14.6
Coal	1.7
Renewable	14.6
Total	**100.00**

Source: CEC 2011

Table 3.1.2-2
SAN DIEGO COUNTY ELECTRICITY CONSUMPTION 2007 – 2012
(GWh)

Year	2007	2008	2009	2010	2011	2012
Usage	19,568.84	19,907.89	19,426.78	18,800.70	18,875.48	19,442.75
Percent Change (Annual)	--	1.73	-2.42	-3.22	0.40	3.01

Source: CEC 2014b
Notes: GWh = gigawatt hours

Table 3.1.2-3
SAN DIEGO COUNTY NATURAL GAS CONSUMPTION 2007 – 2012
(MMTh)

Year	2007	2008	2009	2010	2011	2012
Usage	547.03	541.37	514.88	560.78	537.94	541.37
Percent Change (Annual)	--	-1.03	-4.89	8.91	-4.07	0.64

Source: CEC 2014b
Notes: MMTh = million therms

Table 3.1.2-4
CEC-RECOMMENDED WATER ENERGY PROXIES
FOR SOUTHERN CALIFORNIA

Water-Use Cycle	Indoor Uses (kWh/MG)	Outdoor Uses (kWh/MG)
Water Supply and Conveyance	9,727	9,727
Water Treatment	111	111
Water Distribution	1,272	1,272
Wastewater Treatment	1,911	0
Regional Total	**13,021**	**11,110**

Source: CEC 2007a
kWh = kilowatt hours; MG = million gallons

Table 3.1.2-5
HISTORICAL AND PROJECTED WATER ENERGY CONSUMPTION IN THE RINCON DEL DIABLO MWD

Year	Acre Feet per Year	kWh per Year	BTU per Year
2005	7,819.6	28,308,589	96,617,214,855
2010	9,558.4	34,603,409	118,101,435,683
2015	9,583.0	34,692,466	118,405,387,738
2020	9,823.0	35,561,317	121,370,773,635
2025	10,041.0	36,350,522	124,064,332,492
2030	10,263.0	37,154,209	126,807,314,448
2035	10,371.0	37,545,191	128,141,738,102

Source: Adapted from Rincon MWD 2011

Table 3.1.2-6
FUEL ECONOMY AND ENERGY CONSUMPTION RATES FOR AUTOS AND TRUCKS IN THE COUNTY (2013)

Vehicle Type	Fuel Economy (mpg)	VMT per day	VMT per year	Energy Consumption Factor (BTU/vehicle mile)	BTU per year
Passenger Vehicles	18.49	80,696,170	29,454,102,010	6,759	199,080,957,008,885
Heavy Trucks	8.17	4,430,535	1,617,145,181	17,011	27,509,700,243,480
				Total	**226,590,657,252,365**
Total Mobile Energy Consumption Per Year = 226.6 Trillion BTU					

Source: HELIX 2015f and CARB EMFAC2011b

Table 3.1.2-7
SUMMARY OF POTENTIAL ENERGY EFFICIENCY THROUGH LOCAL POLICIES 2020 FORECAST, SAN DIEGO COUNTY

Sector	Natural Gas (MMTh)	Natural Gas MMT CO_2e	Electric (GWh)	Electric (MMT CO_2e)	Total (MMT CO_2e)
Commercial - Existing	0.4	0.002	352	0.1	0.1
Commercial - New Construction	2.0	0.01	108	0.03	0.04
Industrial - Existing	10.2	0.06	69	0.02	0.1
Industrial - New Construction	N/A	N/A	2	0.001	0.001
Residential - Existing	12.0	0.1	505	0.1	0.2
Residential - New Construction	0.2	0.00	9	0.002	0.003
TOTAL	**24.8**	**0.13**	**1,045**	**0.28**	**0.41**

Source: USD EPIC 2009
MMTh = million therms; MMT CO_2e = million metric tons carbon dioxide equivalent; GWh = Gigawatt Hours;
N/A = not available

Table 3.1.2-8
WORST-CASE ANNUAL ENERGY CONSUMPTION
FROM CONSTRUCTION EQUIPMENT AND VEHICLES

Equipment	Qty	Diesel Fuel (gallons)	BTU
Air Compressors	2	2,920.77	405,986,929.92
Bore/Drill Rig	2	3,263.04	453,562,560.00
Cranes	7	25,465.04	3,539,640,932.52
Excavators	4	5,200.59	722,881,843.20
Forklifts	22	24,520.43	3,408,339,158.40
Generator Sets	7	27,602.02	3,836,681,291.52
Graders	4	5,606.83	779,349,648.00
Off-Highway Trucks	2	13,804.03	1,918,760,448.00
Other Material Handling Equipment	1	3,033.25	421,622,361.60
Pavers	5	14,976.78	2,081,772,887.04
Paving Equipment	5	13,346.66	1,855,185,361.92
Plate Compactors	1	49.04	6,816,648.96
Rollers	5	8,710.99	1,210,827,087.36
Rubber Tired Dozers	10	11,848.32	1,646,916,480.00
Scrapers	7	21,743.63	3,022,364,759.04
Signal Board	2	46.76	6,499,595.52
Tractors/Loaders/Backhoes	34	49,272.77	6,848,915,202.36
Trenchers	2	2,416.39	335,878,488.00
Welders	7	9,191.79	1,277,659,310.40
Construction Equipment Total		**243,019.14**	**33,779,660,993.76**
Construction Workers and Vendors		**365,536 VMT**	**2,665,713,480.35**
Total Worst-Case Annual Construction Energy Expenditure = 36.4 Billion BTU			

Source: HELIX 2015f

Table 3.1.2-9
PROJECTED ANNUAL ENERGY CONSUMPTION AT BUILDOUT
(OPERATIONAL)

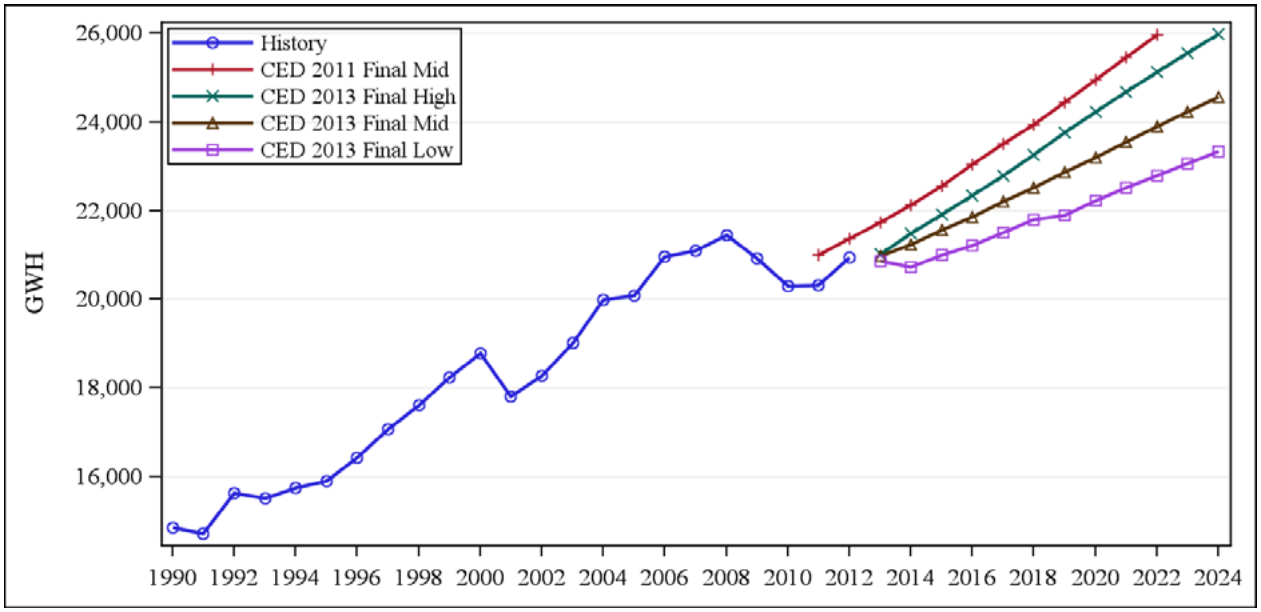
Source	Demand (Available Unit)	kWh	BTU
Proposed Project without Project Design Features			
Electricity	2,573,910.00 kWh	2,573,910.00	8,784,754,830.00
Natural Gas	9,490,934.00 kBTU	2,780,818.63	9,490,934,000.00
Water	206,187.50 GPD	836,121.24	2,853,681,794.25
Wastewater	71,810.00 GPD	341,288.87	1,164,818,925.77
Transportation	10,815,030.65 VMT	23,108,660.89	78,869,859,620.31
	Total	29,640,799.64	**101,164,049,170.33**
Proposed Project with Project Design Features			
Electricity	2,456,655.00 kWh	2,456,655.00	8,384,563,515.00
Natural Gas	8,382,314 kBTU	2,455,995.90	8,382,314,000.00
Water	164,950 GPD	668,896.99	2,282,945,435.40
Wastewater	71,810 GPD	341,288.87	1,164,818,925.77
Transportation	10,815,030.65 VMT	23,108,660.89	78,869,859,620.31
	Total	29,031,497.65	**99,084,501,496.48**
Total Annual Energy Consumption = 29.0 GWh or 99.1 Billion BTU			
Total Reduction from Project Design Features = 0.6 GWh or 2.1 Billion BTU			

Source: HELIX 2015f

Table 3.1.2-10
FUEL ECONOMY AND ENERGY CONSUMPTION RATES
FOR PROJECT-RELATED AUTOS AND TRUCKS
(OPERATIONAL)

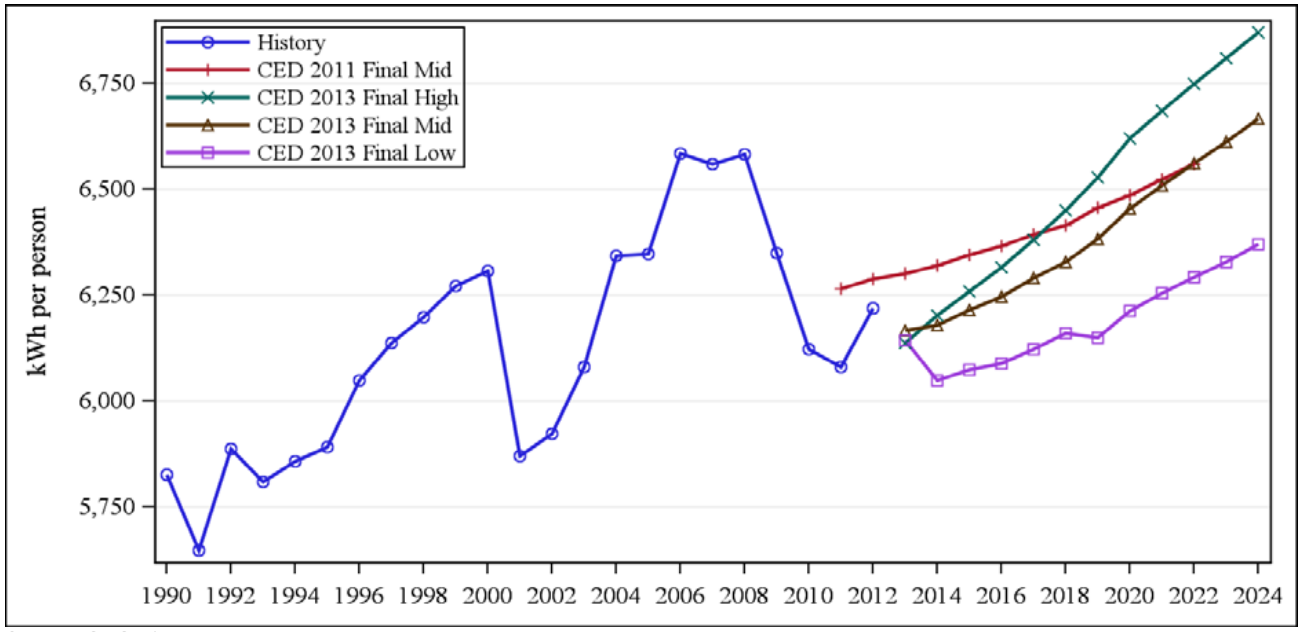
Vehicle Type	Fuel Economy (mpg)	VMT per year	Energy Consumption Factor (BTU/vehicle mile)	BTU per year
Passenger Vehicles	18.49	10,252,148	6,759	69,294,503,678
Heavy Trucks	8.17	562,883	17,011	9,575,355,942
			Total	**78,869,859,620**
Total Mobile Energy Consumption Per Year = 78.9 Billion BTU				

Source: HELIX 2015f and CARB EMFAC2011b



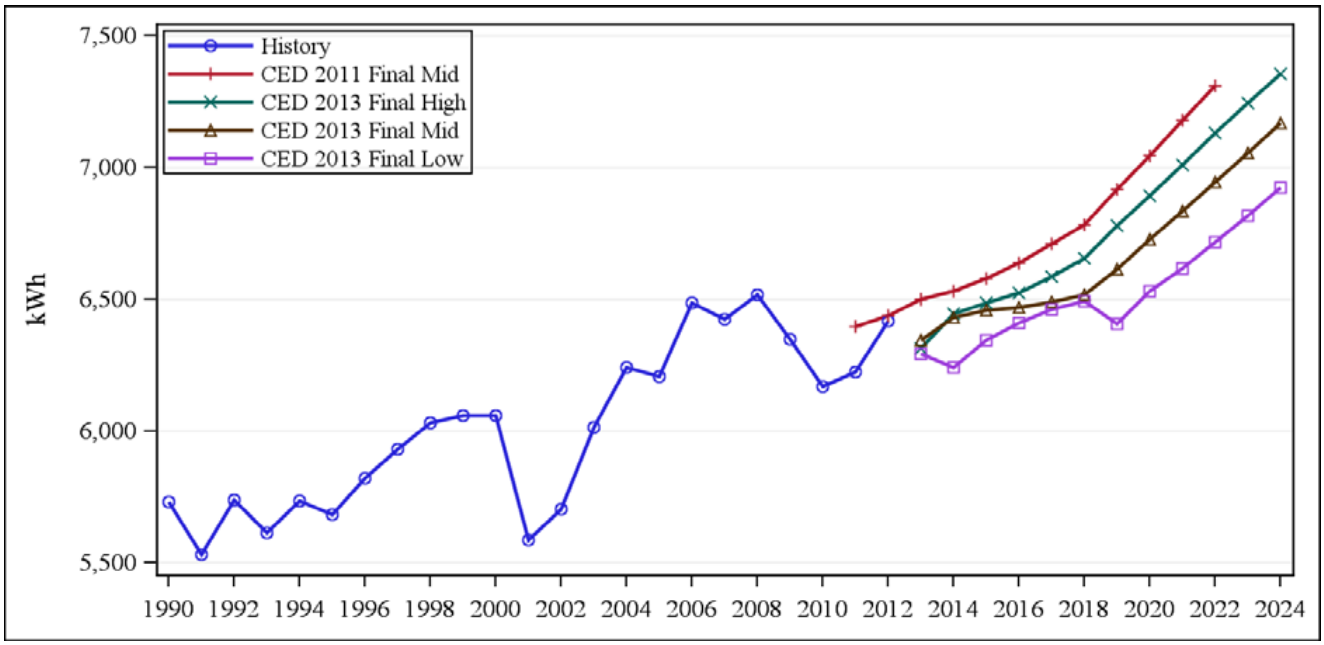
Source: CEC 2014a

SDG&E ELECTRICITY FORECAST
Figure 3.1.2-1



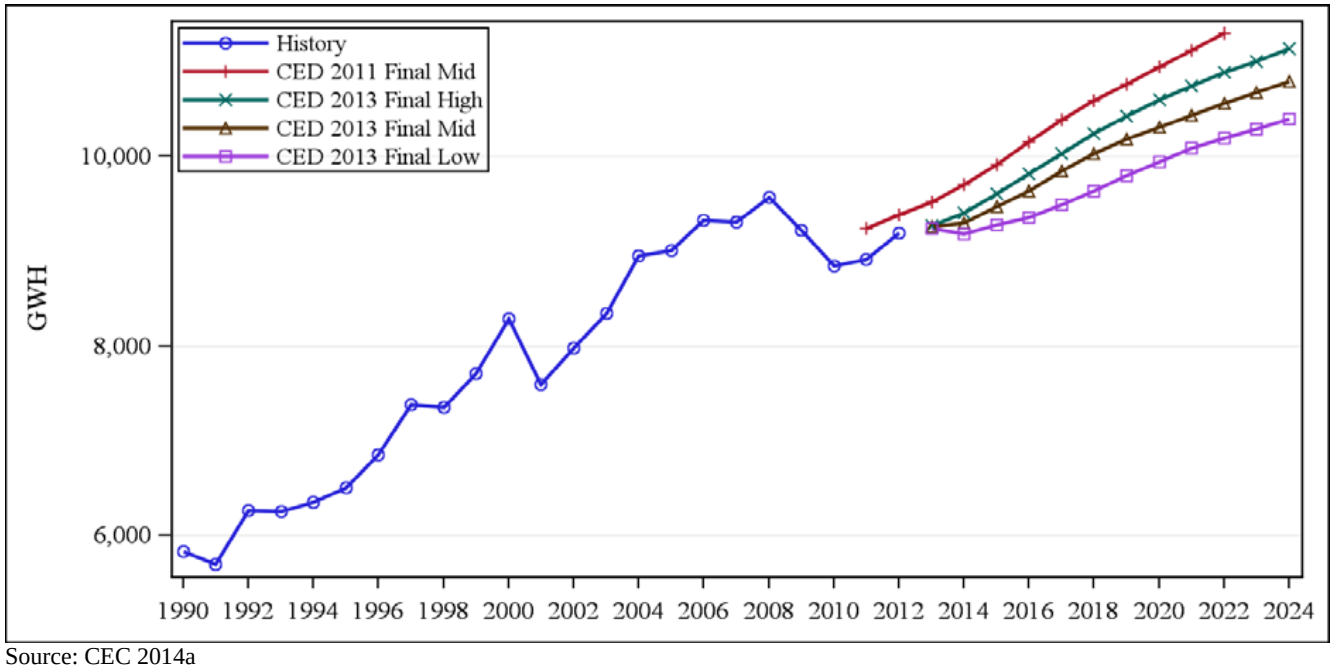
Source: CEC 2014a

SDG&E PER CAPITA ELECTRICITY CONSUMPTION
Figure 3.1.2-2



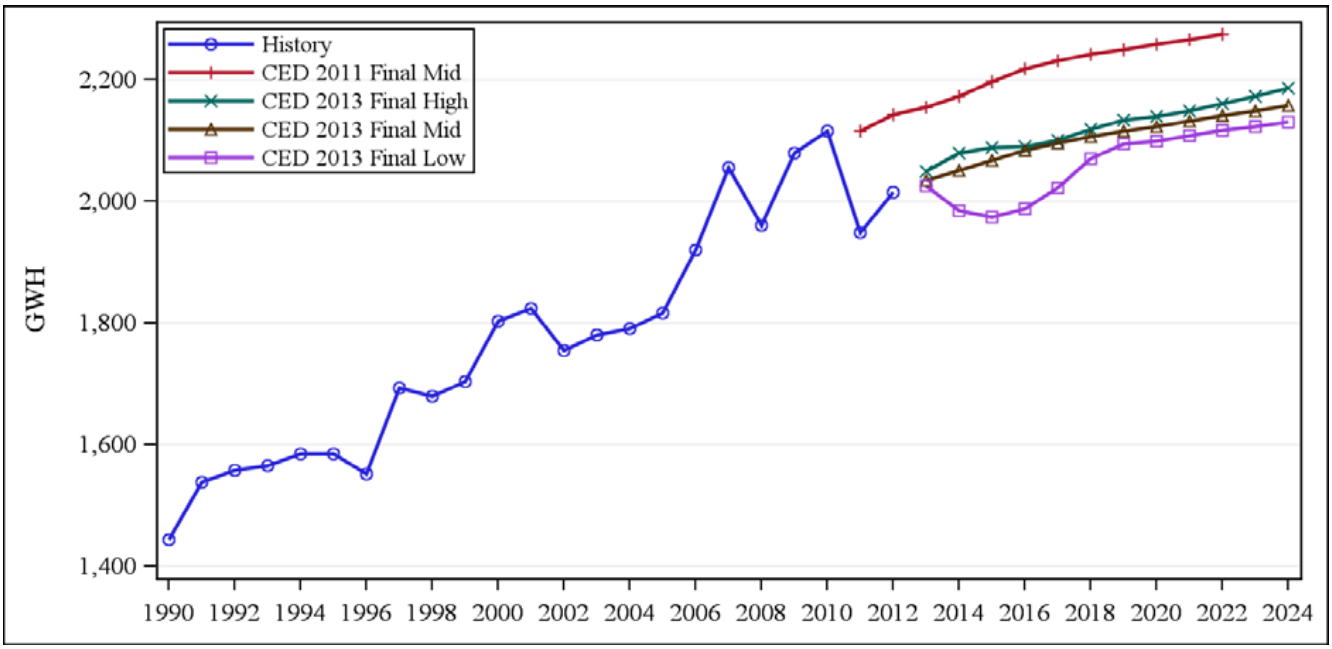
Source: CEC 2014a

SDG&E ELECTRICITY CONSUMPTION PER HOUSEHOLD
Figure 3.1.2-3



Source: CEC 2014a

SDG&E ELECTRICITY CONSUMPTION FOR COMMERCIAL USES
Figure 3.1.2-4



Source: CEC 2014a

SDG&E ELECTRICITY CONSUMPTION FOR THE TCU SECTOR
Figure 3.1.2-5

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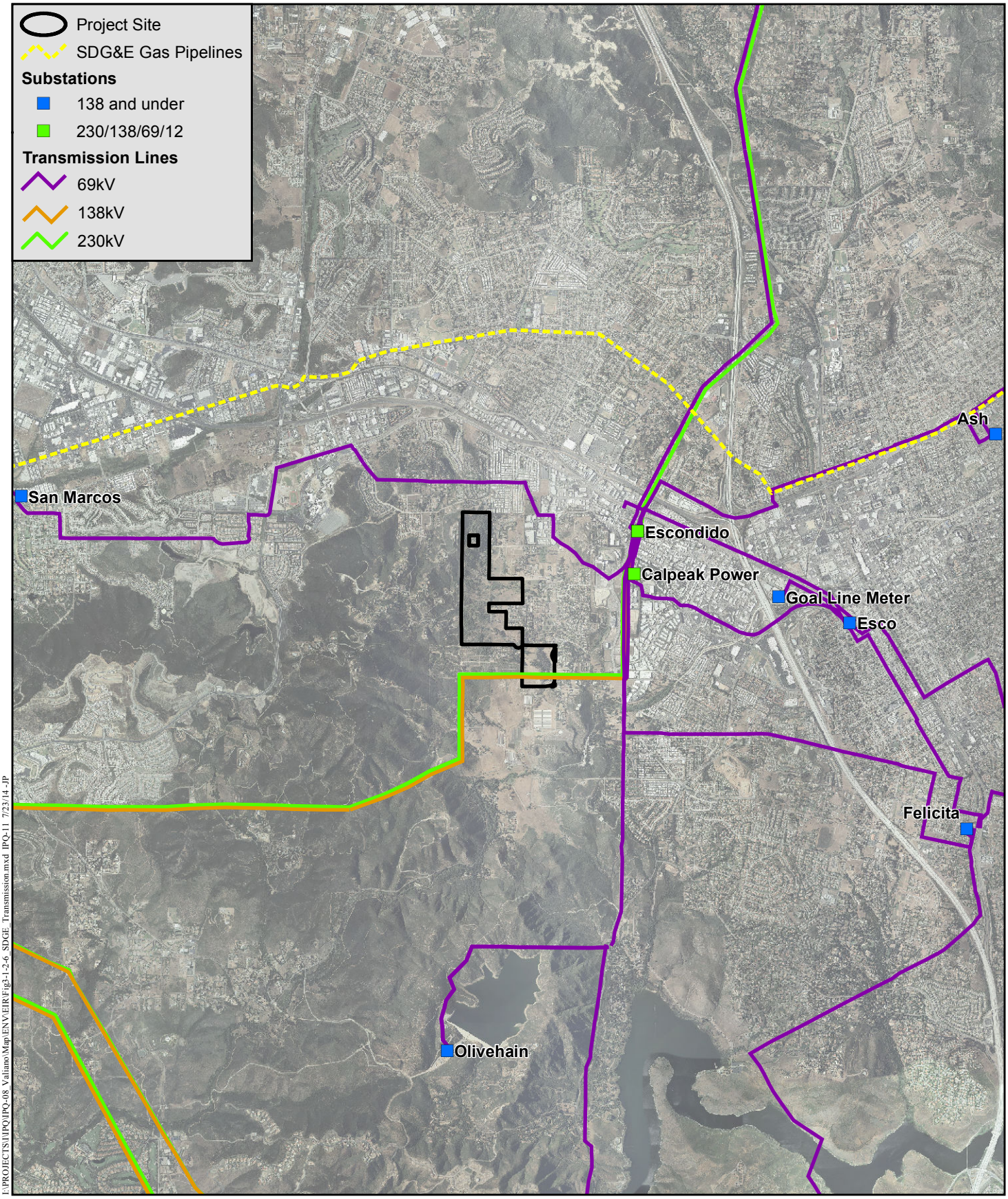

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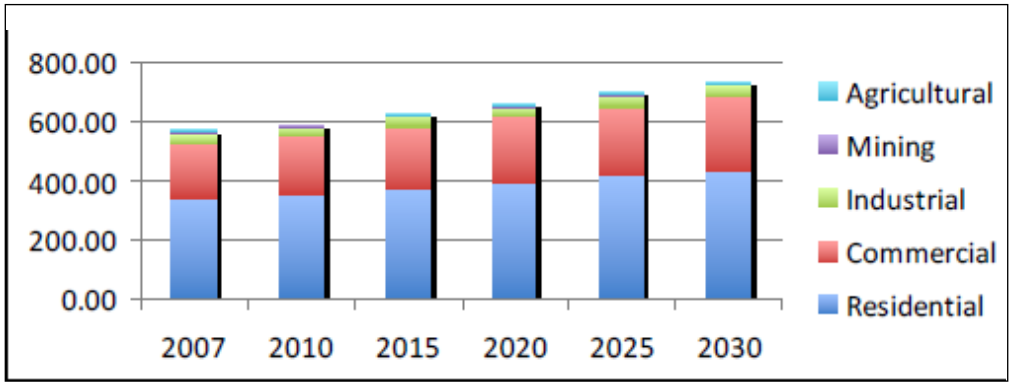
SDG&E Facilities and Transmission

VALIANO

HELIX Environmental Planning

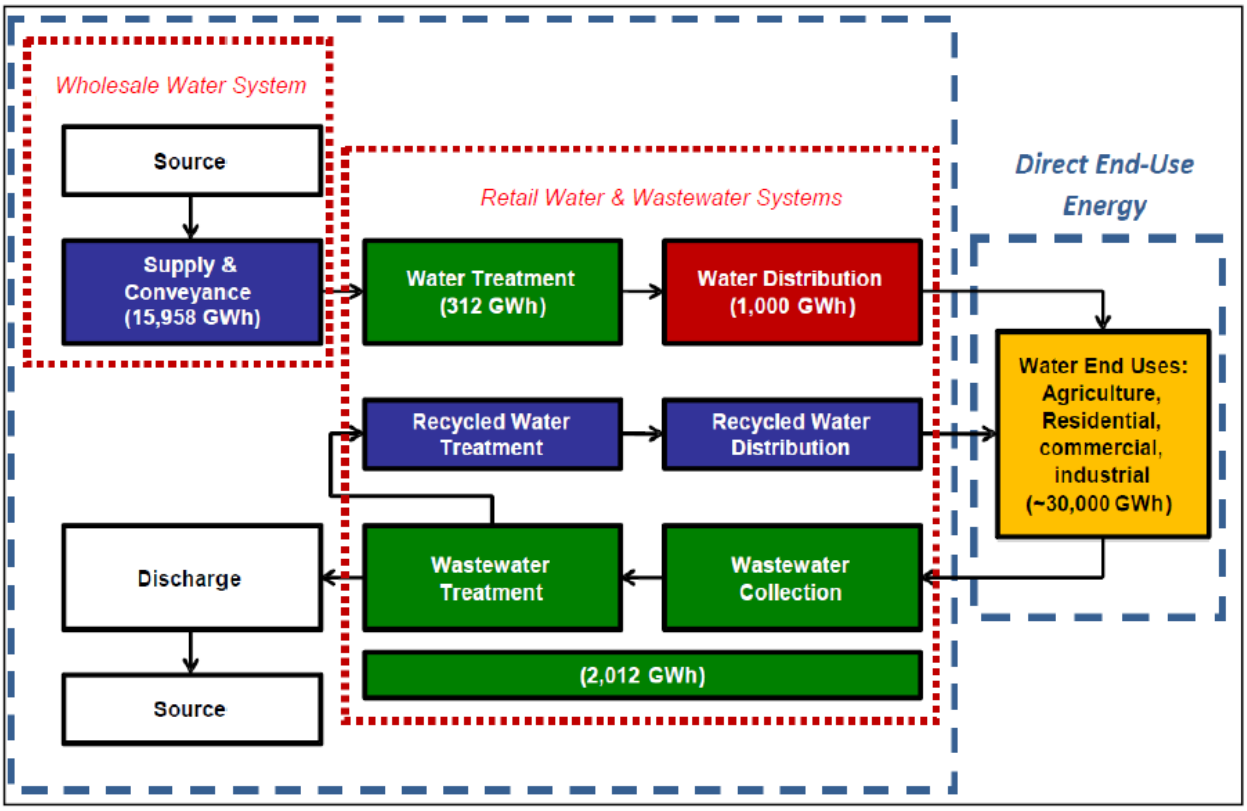
0 1 Miles

Figure 3.1.2-6



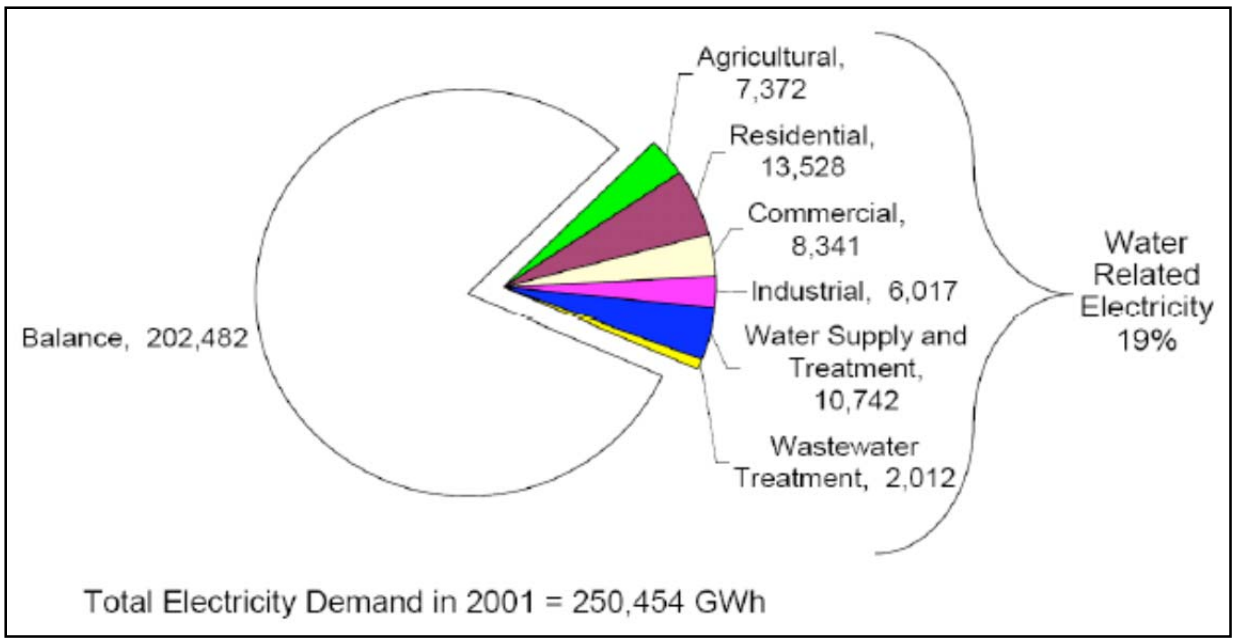
Source: SANDAG 2009
Note: Natural gas consumption shown in MMTh.

SAN DIEGO REGIONAL NATURAL GAS CONSUMPTION FORECAST
Figure 3.1.2-7



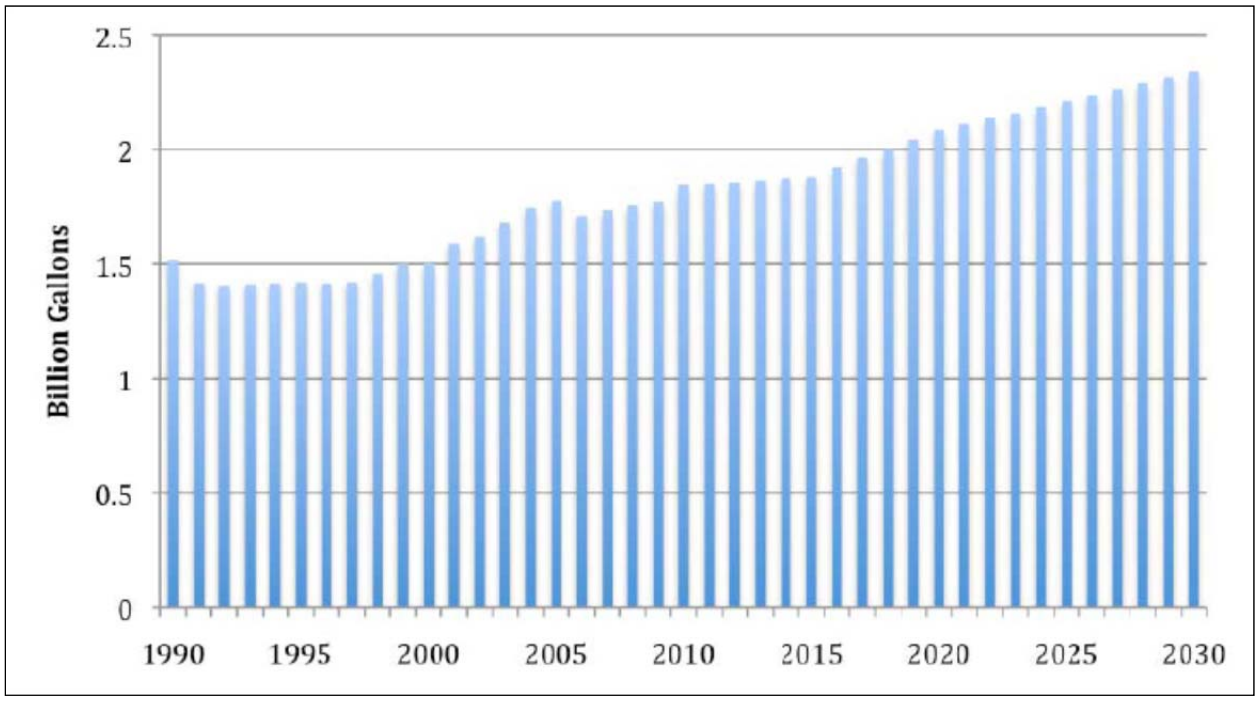
Source: Adapted from CPUC 2010

WATER EMBEDDED ENERGY SOURCES
Figure 3.1.2-8



Source: CEC 2007a

WATER-RELATED ENERGY USE IN CALIFORNIA
Figure 3.1.2-9



Source: SANDAG 2009

SAN DIEGO REGIONAL PROJECTED ON-ROAD FUEL CONSUMPTION 1990 – 2030
Figure 3.1.2-10