

3.6 ENERGY

This section of the 2024 PEIR describes the existing conditions related to energy in the SCAG region, sets forth the regulatory framework that addresses energy, and analyzes the significance of the potential energy impacts that could occur from development of Connect SoCal 2024. In addition, this PEIR provides regional-scale mitigation measures, as well as project-level mitigation measures that can and should be considered and implemented by lead agencies for subsequent, site-specific environmental review to reduce identified impacts as appropriate and feasible. Issues regarding greenhouse gas (GHG) emissions associated with energy production and consumption are addressed in Section 3.8, *Greenhouse Gas Emissions*, of this 2024 PEIR.

3.6.1 ENVIRONMENTAL SETTING

DEFINITIONS

Definitions of terms used in the regulatory framework, characterization of baseline conditions, and impact analysis for energy follow:

- *Natural gas*: Natural gas is a naturally occurring hydrocarbon mixture consisting primarily of methane that was formed when layers of decomposing carbon material is exposed to intense heat under the earth's surface over millions of years.
- *Petroleum*: Petroleum is a naturally occurring liquid mixture of hydrocarbons found in geological formations beneath earth's surface and is refined into various types of fuels including gasoline, kerosene, and diesel oil.
- *Renewable energy*: Renewable energy is a form of energy that is collected from renewable resources that are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves, and geothermal heat. Renewable energy often provides energy for electricity generation, air and water heating/cooling, transportation, and off-grid energy services.
- *Acre-feet*: Unit of volume used to reference large-scale water resources, such as reservoirs, aqueducts, canals, and river flows. One acre-foot is equivalent to approximately 326,000 gallons or enough water to cover an acre of land by 1 foot.
- *British thermal units (Btu)*: The amount of heat required to raise the temperature of one pound of water by one-degree Fahrenheit.
- *Clean Air Vehicles*: Vehicles that produce zero or near-zero emissions and utilize renewable or alternative fuels including but not limited to electricity, hydrogen, biofuels, or renewable diesel.
- *Therms*: Unit of heat equivalent to 100,000 Btu.
- *Watt*: Unit of power equivalent to one joule per second, corresponding to the power in an electric circuit.
- *Watt-hour*: Unit of energy equivalent to one watt of power expended for one hour of time.

ENERGY SUPPLY

ELECTRICITY

Electricity produced within California in 2019 was from natural gas (43 percent), renewable resources (32 percent), large hydroelectric (17 percent), nuclear (8 percent), and coal and oil (<1 percent). California uses energy

generated in-state and imports electricity from the Southwest or Pacific Northwest of the United States. The State's electric generation mix, based on in-state generation and out-of-state purchases in 2019 was comprised of natural gas (34 percent), renewable resources (32 percent), large hydroelectric (15 percent), coal and oil (3 percent), nuclear (9 percent), and additional unspecific sources of power (7 percent) (California Energy Commission [CEC] 2019a). In 2019, the total electrical system power generated was 277,704 GWh, which is down about 2.7 percent from 2018's total system electric generation of 285,488 GWh (CEC 2019a). This results in a per capita electricity use of approximately 7.02 MWh/person/year (U.S. Census Bureau 2020).

NATURAL GAS

In 2019, the total natural gas usage across California was 12,779 million therms. The six counties making up the SCAG region used approximately 4,901 million therms in 2019, approximately 38 percent of the state's total usage for the year (CEC 2019b).

Natural gas production across the country increased with technological advances in horizontal drilling and hydraulic fracking. However, in Southern California, natural gas production has steadily declined. In 2016, Governor Jerry Brown declared a state of emergency in Porter Ranch due to a natural gas leak that sickened people and forced the relocation of approximately 7,000 homes and several schools (Los Angeles Times 2016; U.S. Energy Information Administration [USEIA] 2018). In 2018, it was announced that NRG Energy would close three natural gas plants in Southern California, including: Etiwanda in Rancho Cucamonga, Ormond Beach in Oxnard, and Ellwood in Goleta (Clean Technica 2018).

PETROLEUM BASED FUEL

In 2019, 15.4 billion gallons of gasoline (non-diesel) were sold statewide (CEC 2019c). In 2019, California also reported a total of 36,423,657 registered vehicles, including automobiles (72 percent), trucks (17 percent), trailers (7.5 percent) and motorcycles (2.4 percent) (California DMV 2019). In 2019, refineries in the state of California sold approximately 4,397 thousand gallons of gasoline a day, steadily decreasing since peaking at selling 8,712.3 thousand gallons per day in 2002 (USEIA 2022).

NUCLEAR POWER

After closure of the San Onofre Nuclear Generating Station in 2012, California has one operating nuclear power plant, Diablo Canyon. Diablo Canyon is located near San Luis Obispo and can generate approximately 2,160 megawatts (MW) from two units. The operating license expires in 2024 for Unit 1 and 2025 for Unit 2. In 2018, Pacific Gas and Electric's (PG&E) application to close Diablo Canyon was approved by the California Public Utilities Commission (CPUC). Also in 2018, PG&E withdrew its application to the Nuclear Regulatory Commission for a licensing extension (CEC 2020).

HYDROELECTRIC POWER

California has 270 hydroelectric facilities with an installed capacity of 14,009 MW. The amount of hydroelectricity varies each year due to snowmelt runoff and rainfall. Within the SCAG region, Imperial, Orange, Los Angeles, Riverside, San Bernardino, Riverside, and Ventura have a combined hydroelectric capacity of approximately 2,596 MW (CEC 2018).

RENEWABLE ENERGY

Renewable energy includes biomass, geothermal plants, small hydroelectric (under 30 MW), solar, and wind. In 2019, California produced 64,336 GWh of electricity in renewable energy (in-state generation), 44 percent of which was solar (CEC 2019a). California has met the goal of 33 percent renewable energy by 2020 and is working towards achieving 60 percent renewable energy by 2030 (CPUC 2021). More recent data for 2020 indicates that California had a power mix of approximately 33 percent of electricity from renewable sources when including both in-State generation and imports (CEC 2021). The 2022 Building Energy Efficiency Standards went into effect on January 1, 2023, and requires most new residences to install solar panels which will decrease demand on electrical suppliers (CEC 2022). The SCAG region includes a large number of renewable energy sources which include solar, wind, and biomass, as shown in **Map 3.6-1, Energy Facilities in the SCAG Region**.

ENERGY AND WATER

Water and energy are dependent on one another as water is essential in the production of electricity and electricity is required to pump, treat, and heat water.

In electricity generation, water is essential to hydropower (although hydro power does not result in consumption of water), thermoelectric power plants, as well as oil and gas extraction. In order to decrease thermoelectric power production's reliance on water many coastal power plants are changing from "once-through cooling" methods to "closed-cycle wet cooling" or "dry cooling" in order to reuse water. Moreover, the state's shift toward producing electricity from more renewables will decrease water use as few renewables require water. The SCAG region includes a number of hydroelectric and other power plants, as illustrated in Map 3.6-1.

California's water system requires electricity and accounts for approximately 20 percent of the state's total electrical consumption. While California's agricultural sector uses almost four times as much water as cities, cities use most of the water-related energy. Water heating makes up 90 percent of water-energy use and the pumping, conveying, and treating of water and wastewater make up the remaining 10 percent. As California moves to increase water efficiency, many measures will in turn reduce energy requirements. As discussed in the water supply discussion in Section 3.19, *Utilities and Service Systems*, of this 2024 PEIR, Southern California is increasing local water supply through investments in desalination and water recycling. While both processes are energy intensive, they would replace a portion of the water being pumped from Northern California, creating an overall decrease in the energy required (PPIC Water Policy Center 2016).

3.6.2 REGULATORY FRAMEWORK

FEDERAL

ENERGY POLICY AND CONSERVATION ACT

The Energy Policy and Conservation Act of 1975 (EPCA; Public Law 94-163, 89 Stat. 871, enacted December 22, 1975) was enacted for the purpose of serving the nation's energy demands and promoting conservation methods when feasibly obtainable.

The EPCA was amended to (US Legal Inc., 2023):

- Grant specific authority to the President to fulfill obligations of the U.S. under the international energy program;
- Provide for the creation of a Strategic Petroleum Reserve capable of reducing the impact of severe energy supply interruptions;
- Conserve energy supplies through energy conservation programs, and the regulation of certain energy uses;
- Provide for improved energy efficiency of motor vehicles, major appliances, and certain other consumer products;
- Provide a means for verification of energy data to assure the reliability of energy data; and
- Conserve water by improving the water efficiency of certain plumbing products and appliances.

CORPORATE AVERAGE FUEL ECONOMY STANDARDS

Established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) Standards (49 CFR Parts 531 and 533) reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and USEPA jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the “maximum feasible level” with consideration given for (1) technological feasibility, (2) economic practicality, (3) effect of other standards on fuel economy, and (4) need for the nation to conserve energy. When these standards are raised, automakers respond by creating a more fuel-efficient fleet. In 2012, NHTSA established final passenger car and light truck CAFE standards for model years 2017 through 2021, which the agency projects will require in model year 2021, on average, a combined fleet-wide fuel economy of 40.3 to 41.0 miles per gallon (mpg). Fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by USEPA and NHTSA. The Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018, and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type (USEPA 2011). USEPA and NHTSA have also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type (USEPA 2018a).

In March 2020, USEPA and NHTSA issued the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule that would maintain the CAFE standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE standards for model year 2020 are 43.7 mpg for passenger cars and 31.3 mpg for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. However, consistent with President Biden’s executive order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, USEPA and NHTSA evaluated whether and how to replace the SAFE Rule (U.S. District Court for the District Court of Columbia 2021). In February 2022, USEPA issued the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (USEPA 2021a, 2021b). This final rule revises current GHG standards beginning for vehicles in model year 2023 and through model year 2026 and establish the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021a).

In February 2022, USEPA issued the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (USEPA 2021b). This final rule revises current GHG standards beginning with vehicles in model

year 2023 through model year 2026, and it established the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles.

NATIONAL ENERGY ACT

In response to the energy crisis in the 1970s, Congress passed the National Energy Act of 1978 (NEA) to establish energy efficiency programs, tax incentives, tax disincentives, energy conservation programs, alternative fuel programs, and regulatory and market-based initiatives. It includes five statutes:

- Public Utility Regulatory Policies Act (PURPA) (Public Law 95–617)
- Energy Tax Act (Public Law 95–618)
- National Energy Conservation Policy Act (NECPA) (Public Law 95–619)
- Power Plant and Industrial Fuel Use Act (Public Law 95–620)
- Natural Gas Policy Act (Public Law 95–621)

Of the five statutes, one, PURPA, is relevant to the consideration of the Plan and is therefore discussed in detail below.

PUBLIC UTILITY REGULATORY POLICIES ACT

PURPA was passed in response to the unstable energy climate of the late 1970s. PURPA sought to promote conservation of electric energy. Additionally, PURPA created a new class of nonutility generators, small power producers, from which, along with qualified cogenerators, utilities are required to buy power.

PURPA was in part intended to augment electric utility generation with more efficiently produced electricity and to provide equitable rates to electric consumers. Utility companies are required to buy all electricity from “Qfs” (qualifying facilities) at avoided cost (avoided costs are the incremental savings associated with not having to produce additional units of electricity). PURPA expanded participation of nonutility generators in the electricity market and demonstrated that electricity from nonutility generators could successfully be integrated with a utility’s own supply. PURPA requires utilities to buy whatever power is produced by Qfs (usually cogeneration or renewable energy). Utilities want these provisions repealed, critics argue that it will decrease competition and impede development of the renewable energy industry. The Fuel Use Act of 1978 (FUA) (repealed in 1987) also helped Qfs become established. Under FUA, utilities were not allowed to use natural gas to fuel new generating technologies but Qfs, which were by definition not utilities, were able to take advantage of abundant natural gas and abundant new technologies (such as combined cycle). The technologies lowered the financial threshold for entrance into the electricity generation business as well as shortened the lead time for constructing new plants (Reclamation 1978).

ENERGY POLICY ACT

The Energy Policy Act of 1992 (EPACT92) (Public Law 102-486) is a United States government act. It was passed by Congress and set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 established regulations requiring certain federal, state, and alternative fuel provider fleets to build an inventory of alternative fuel vehicles (AFV). It was amended several times in the Energy Conservation and Reauthorization Act of 1998 and in 2005 via the Energy Policy Act of 2005 (EPAct), which emphasized alternative fuel use and infrastructure development (USDOE, Undated[a]). President George W.

Bush signed the EPAct (Public Law 109-58) into law on August 8, 2005. This comprehensive energy legislation contains several electricity-related provisions that aim to:

- Help ensure that consumers receive electricity over a dependable, modern infrastructure;
- Remove outdated obstacles to investment in electricity transmission lines;
- Make electric reliability standards mandatory instead of optional; and
- Give federal officials the authority to site new power lines in DOE-designated national corridors in certain limited circumstances.

The Renewable Fuel Standard (RFS) program was created under the EPAct and established the first renewable fuel volume mandate in the United States. The program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders. As required under EPAct, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012.

ENERGY INDEPENDENCE AND SECURITY ACT

The Energy Independence and Security Act (EISA) (Public Law 110-140) was signed into law by President George W. Bush on December 19, 2007. The Act's goal is to achieve energy security in the United States by increasing renewable fuel production, improving energy efficiency and performance, protecting consumers, improving vehicle fuel economy, and promoting research on GHG capture and storage. Under the EISA, the RFS program (RFS2) was expanded in several key ways:

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

RFS2 lays the foundation for achieving significant reductions of GHG emissions from the use of renewable fuels, for reducing imported petroleum, and encouraging the development and expansion of our nation's renewable fuels sector.

The EISA also includes a variety of new standards for lighting and for residential and commercial appliance equipment. The equipment includes residential refrigerators, freezers, refrigerator-freezers, metal halide lamps, and commercial walk-in coolers and freezers.

MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of these regulations.

HEAVY-DUTY VEHICLE PROGRAM

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of these regulations.

EXECUTIVE ORDER 13514, FEDERAL LEADERSHIP IN ENVIRONMENTAL, ENERGY, AND ECONOMIC PERFORMANCE

Executive Order (EO) 13514 was signed by President Obama on October 5, 2009. It expands on the energy reduction and environmental performance requirements for federal agencies identified in EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management. The goals of EO 13514 are as follows:

- Reduce petroleum consumption by 2 percent per year through FY2020 (applies to agencies with fleets of more than 20 vehicles) (Baseline FY2005).
- Reduce by 2 percent annually:
 - Potable water intensity by FY2020 (26 percent total reduction) (Baseline FY2007).
 - Industrial, landscaping, and agricultural water intensity by FY2020 (20 percent total reduction) (Baseline FY2010).
- Achieve 50 percent or higher diversion rate:
 - Non-hazardous solid waste by FY2015.
 - Construction and demolition materials and debris by FY2015.
- Ensure at least 15 percent of existing buildings and leases (>5,000 gross square feet) meet the Guiding Principles by FY2015, with continued progress towards 100 percent.
- Ensure 95 percent of all new contracts, including non-exempt contract modifications, require products and services that are energy-efficient, water-efficient, bio-based, environmentally preferable, non-ozone depleting, contain recycled-content, non-toxic or less-toxic alternatives (The White House 2009).

EXECUTIVE ORDER 13693, PLANNING FOR FEDERAL SUSTAINABILITY IN THE NEXT DECADE

EO 13693 was signed by President Obama on March 19, 2015, and revoked EO 13514. The goal of EO 13693 is to maintain federal leadership in sustainability and GHG emissions reductions. EO 13693 promotes building energy conservation, efficiency, and management by reducing agency building energy intensity measured in British thermal units per gross square foot by 2.5 percent annually through the end of FY 2025, relative to the baseline of the agency's building energy use in FY 2015 and taking into account agency progress to date. EO 13693 also sets agency water use efficiency standards and management practices as well as mandates a fleet-wide per-mile GHG emissions reduction from agency fleet vehicles.

EXECUTIVE ORDER 13834, EFFICIENT FEDERAL OPERATIONS

President Trump issued EO 13834 on May 17, 2018, which revokes EO 13693. EO 13834 confirms that it is US policy that federal agencies meet energy and environmental performance statutory requirements to increase efficiency, optimize performance, eliminate unnecessary use of resources, and protect the environment and includes the following goals for the agencies:

- Achieve and maintain annual reductions in building energy use and implement energy efficiency measure that reduce costs;
- Meet statutory requirements relating to the consumption of renewable energy and electricity;

- Reduce potable and non-potable water consumption, and comply with stormwater management requirements;
- Utilize performance contracting to achieve energy, water, building modernization, and infrastructure goals;
- Ensure that new construction and major renovation conform to applicable building energy efficiency requirements and sustainable design principles; consider building efficiency when renewing or entering into leases; implement space utilization and optimization practices; and annually assess and report on building conformance to sustainability metrics;
- Implement waste prevention and recycling measures and comply with all federal requirements with regard to solid, hazardous, and toxic waste management and disposal;
- Acquire, use, and dispose of products and services, including electronics, in accordance with statutory mandates for purchasing preference, Federal Acquisition Regulation requirements, and other applicable federal procurement policies; and
- Track and report on energy management activities, performance improvements, cost reductions, GHG emissions, energy and water savings, and other appropriate performance measures (Fed Center 2019).

FUEL ECONOMY STANDARDS

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CODE OF FEDERAL REGULATIONS CHAPTER 40, PARTS 1039, 1065, AND 1068

The Code of Federal Regulations established tiered emissions standards for construction equipment in order to phase in cleaner burning equipment that will reduce NO_x and particulate matter emissions from exhaust. After 2014, all construction equipment manufactured in the United States is required to meet the highest tier of emission standards, Tier 4. USEPA oversees the implementation of these regulations (USEPA 2018b).

STATE

ASSEMBLY BILL 2076, REDUCING DEPENDENCE ON PETROLEUM

CEC and the California Air Resources Board (CARB) are directed by law, AB 2076 (2000), to develop and adopt recommendations for reducing dependence on petroleum. A performance-based goal is to reduce petroleum consumption to 15 percent below 2003 demand by 2020. The options include the following (CARB 2003):

- Mid-Term Options (could be fully implemented in the 2010–2020 timeframe):
 - Double fuel efficiency of current model light duty vehicles to 40 miles/gallon; and
 - Use natural gas-derived Fischer-Tropsch fuel as a 33 percent blending agent in diesel.
- Long-Term Options:
 - Introduce fuel cell light duty vehicles in 2012, increasing to 10 percent of new vehicle sales by 2020, and 20 percent by 2030.

- Recommendations include (CARB 2003):
 - The Governor and Legislature should adopt the recommended statewide goal of reducing demand for on-road gasoline and diesel to 15 percent below the 2003 demand level by 2020 and maintaining that level for the foreseeable future;
 - The Governor and Legislature should work with the California delegation and other states to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks and SUVs; and
 - The Governor and Legislature should establish a goal to increase the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Since this bill was passed, California has set stricter standards for many of the goals laid out in AB 2076. For example, in January 2018, Governor Jerry Brown issued EO B-48-18 that guarantees \$2.5 billion dollars to help Californians buy electric vehicles and expand a network of charging stations in order to have 5 million electric cars on the road by 2030 (California Fuel Cell Partnership 2018). Moreover, as stated under *Federal* above, California worked with four major automotive manufacturers to announce that the state would have a fleet of vehicles averaging approximately 50 mpg by 2026 (The Washington Post 2019).

WARREN-ALQUIST ACT

The Warren-Alquist Act was passed in 1974 to establish CEC to respond to the energy crisis in the early 1970s and to address the state's unsustainable growing demand for energy resources. The CEC's Chief Counsel's Office publishes updated versions of the Warren-Alquist Act every two years. The most recent version was approved in February 2019 (CEC 1974).

ASSEMBLY BILL 1007, ALTERNATIVE FUELS PLAN

The Alternative Fuels Plan adopted in 2007 by the State Energy Resources Conservation and Development Commission and the State Air Resources Board as required under state law, AB 1007, recommends that the governor set targets on a gasoline gallon equivalent basis for use of 10 different alternative motor fuels in the on-road and off-road sectors by 9 percent by 2012, which has been achieved, and 11 percent by 2017 and 26 percent by 2022. These targets do not apply to air, rail or marine fuel uses. These goals will require a dramatic expansion in the use of such fuels as electricity, compressed natural gas, hydrogen, renewable diesel, bio-diesel and ethanol in motor vehicles.

Also built into the Alternative Fuels Plan, is a multi-part strategy to develop hybrid and electric vehicle technologies; build the infrastructure to deliver the alternative fuels; increase the blending of more biofuels into gasoline and diesel; improve the fuel efficiency of vehicles; and reduce vehicle miles traveled by California motorists with more effective land use planning.

ASSEMBLY BILL 758 ENERGY: ENERGY AUDIT

New state law promulgated under AB 758 mandates CEC to develop a comprehensive energy efficiency program for existing buildings. This bill will be implemented in three phases. In phase I, during the American Recovery and Reinvestment Act of 2009 (ARRA) implementation period (2010–2012), CEC used ARRA funds to do state and local upgrade programs, workforce training, financing, and an outreach campaign. CEC published the Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report and adopted the AB 758 Action Plan. Phase II will focus on implementing the roadmap necessary for foundational No Regrets Strategies to take hold and Voluntary

Pathways to scale to achieve energy efficiency goals, partnerships, and market development. Phase III will develop and institute Mandatory Approaches that will move energy efficiency practices into the mainstream. Transformation and maturation of the energy efficiency marketplace will require the formation of partnerships and cooperation among all stakeholders (CEC 2012).

On December 14, 2016, CEC published the updated version of the Existing Buildings Energy Efficiency Action Plan. The Plan provides a 10-year roadmap to activate market forces and transform California's existing residential, commercial, and public building stock into high-performing and energy-efficient buildings. The results of this effort will be accelerated growth of energy efficiency markets, more effective targeting and delivery of building upgrade services, improved quality of occupant and investor decisions, and vastly improved performance of California's buildings. Equally important, this effort will deliver substantial energy savings and GHG emissions reductions, contributing to the collective goal of reducing the impacts of climate change while improving the resilience of the state's built environment and economy (CEC 2016).

ASSEMBLY BILL 525 (2021)

On September 23, 2021, the CEC adopted AB 525 requires the CEC, in coordination with specified agencies, to work with stakeholders, state, local, and federal agencies, and the offshore wind energy industry to identify suitable sea space for wind energy areas in federal waters sufficient to accommodate the offshore wind planning goals for 2030 and 2045. The bill also requires the CEC, in coordination with relevant state and local agencies, to develop a plan to improve waterfront facilities that could support a range of floating offshore wind energy development activities, to assess the transmission investments and upgrades necessary to support the offshore wind planning goals for 2030 and 2045, as specified, to develop and produce a permitting roadmap that describes timeframes and milestones for a permitting process for offshore wind energy facilities and associated electricity and transmission infrastructure off the coast of California, and identify potential impacts on coastal resources, fisheries, Native American and Indigenous peoples, and national defense, and strategies for addressing those potential impacts, to be included in the strategic plan, as specified.

In August 2022, the CEC adopted a report establishing offshore wind goals of 5,000 MW by 2030 and 25,000 MW by 2045 in an effort to transition to 100% clean electricity. The CEC developed the report in coordination with federal, state, and local agencies and stakeholders including Tribal governments, fisheries and other ocean users. It is the first of several products the CEC must prepare to create a strategic plan for offshore wind energy development as required by Assembly Bill 525. (CEC 2022b)

ASSEMBLY BILLS 32, 197, AND 1493

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of these regulations.

ADVANCED CLEAN CARS PROGRAM

Refer to Section 3.3, *Air Quality* [OR] Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CARB SMARTWAY/PHASE I AND PHASE II HEAVY-DUTY VEHICLE GREENHOUSE GAS REGULATION

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

RENEWABLE PORTFOLIO STANDARD

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CALIFORNIA APPLIANCE EFFICIENCY REGULATIONS

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

TITLE 24, BUILDING STANDARDS CODE AND CALGREEN CODE

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CALIFORNIA SOLAR INITIATIVE

On January 12, 2006, CPUC approved the California Solar Initiative (CSI) (R.04-03-017), which provides \$2.9 billion in incentives between 2007 and 2017. CPUC oversaw a \$2.5 billion program for commercial and existing residential customers, funded through revenues and collected from gas and electric utility distribution rates. Furthermore, CEC managed \$350 million targeted for new residential building construction, utilizing funds already allocated to CEC to foster renewable projects between 2007 and 2011.

On March 2, 2006, CPUC opened a proceeding to develop rules and procedures for the CSI and to continue consideration of policies for the development of cost-effective, clean, and reliable distributed generation. On August 21, 2006, the governor signed SB 1, which directed CPUC and CEC to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation and directed CPUC and CEC to create 3,000 MW of new, solar-produced electricity by 2017. Through the end of 2021, approximately 11,106 MW of solar capacity has been installed, which exceeds the goal of 3,000 MW by roughly 370 percent (CPUC 2022).

CALIFORNIA CAP AND TRADE PROGRAM

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CARB'S CLIMATE CHANGE SCOPING PLAN

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of this regulation.

CARB'S ANNUAL EVALUATION OF FUEL CELL ELECTRIC VEHICLE DEPLOYMENT AND HYDROGEN FUEL STATION NETWORK DEVELOPMENT

The development of supporting charging and fueling infrastructure is necessary to achieve California's targets for GHG emission reductions and air quality improvement. Assembly Bill 8 (AB 8) (Perea) extended CEC's Clean Transportation Program to support hydrogen fueling stations network development that enables the deployment of light-duty fuel cell electric vehicles (FCEV) in California. The program is currently authorized through January 1, 2024. Per AB 8, CARB annually completes an analysis of the current progress and projected future development of California's hydrogen fueling station network and deploying FCEVs. The annual reports are based on information provided by auto manufacturers, station developers, and collaborating State agencies like CEC and discuss the location, estimated number of FCEVs currently on the road and projected for future deployment, the coverage and capacity provided by the currently available and future hydrogen fueling network (based on known projects in development), and recent developments in hydrogen fueling station technology and standards.

EXECUTIVE ORDER S-06-06

Governor Arnold Schwarzenegger signed EO S-06-06 into law on April 25, 2006, which requires the state to meet the following targets regarding bioenergy production and use (Office of the Governor 2006):

- The state produces a minimum of 20 percent of its own biofuel within California by 2010, 40 percent by 2020, and 75 percent by 2050; and
- The state meets a 20 percent target within the established state goals for renewable generation for 2010 and 2020.

EXECUTIVE ORDER B-18-12

Governor Edmund G. Brown Jr. signed EO B-18-12 into law on April 25, 2012, which directs state agencies to reduce their grid-based energy purchases by at least 20 percent by 2018, as compared to a 2003 baseline. Pursuant to EO B-18-12, all new state buildings and major renovations beginning design after 2025 shall be constructed as Zero Net Energy facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50 percent of the square footage of existing state-owned building area by 2025. Further, the following measures relevant to energy are required (California Green Buildings 2012):

- Any proposed new or major renovation of state buildings larger than 10,000 square feet shall use clean, on-site power generation, such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible;
- New or major renovated state buildings and build-to-suit leases larger than 10,000 square feet shall obtain LEED "Silver" certification or higher, using the applicable version of LEED;
- New and existing buildings shall incorporate building commissioning to facilitate improved and efficient building operation; and
- State agencies shall identify and pursue opportunities to provide electric vehicle charging stations, and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

EXECUTIVE ORDER B-48-18

On January 26, 2018, Governor Edmund G. Brown Jr. signed EO-48-18 to boost the use of zero-emissions vehicles (ZEV), electric vehicle charging infrastructure, and hydrogen refueling infrastructure in California. The order will implement the Governor's target of 5 million ZEVs on the road by 2030 and 250,000 vehicle charging stations and 200 hydrogen refueling stations by 2025 (California Fuel Cell Partnership 2018).

EXECUTIVE ORDERS B-30-15, N-19-19, S-1-07, S-14-08, AND S-21-09

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of these regulations.

SENATE BILLS 32, 107, 100, 350, 375, 1078, AND 1368

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a detailed discussion of these regulations.

PUBLIC SAFETY POWER SHUTOFFS

In 2012, CPUC ruled that California Public Utilities Code Sections 451 and 399.2(a) give the electric investor-owned utilities (IOU) authority to shut off the electric power to protect public safety (CPUC 2023). This allows the electric IOUs (San Diego Gas & Electric, Pacific Gas and Electric, Southern California Edison, Liberty Utilities, Bear Valley Electric Service, and PacifiCorp) to shut off power to prevent catastrophic wildfires when strong winds, heat events, and related conditions are present. This effort is called a public safety power shutoff (PSPS). PSPS events can leave communities and essential facilities without power, which brings its own risks and hardships, especially for vulnerable communities and individuals. In the event of a PSPS, SCE and other IOUs typically have a plan beginning days to weeks before expected outages. SCE considers PSPS when weather and fire experts forecast dangerous conditions five days in advance. Three days before an expected severe weather event, SCE will continue monitoring the situation, field crews will look for factors that could increase risk of fire, and decision makers will review options for supplying power from different circuits to keep residents energized. If the weather pattern has not shifted two days before the severe weather event, SCE will notify customers who require critical care or rely on electric-powered medical devices. On the day of a severe weather event, SCE will monitor the weather every ten minutes and will shut off power as necessary until the weather event ceases (SCE 2021).

REGIONAL

Many of the cities and counties within the region address energy in their general plans. Sections devoted to energy or utilities discuss the current state of energy procurement and utilization within specific jurisdictions and the local plans to improve current methods and move towards cleaner, renewable energy sources.

CLEAN CITIES PROGRAM

The U.S. Department of Energy's Clean Cities Program promotes voluntary, locally based government/industry partnerships for the purpose of expanding the use of alternatives to gasoline and diesel fuel by accelerating the deployment of AFVs and building a local AFV refueling infrastructure. The mission of the Clean Cities Program is to advance the nation's economic, environmental and energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption. The Clean Cities Program carries out this mission through a network of more than 80 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction (USDOE, Undated[b]).

The Southern California/SCAG Clean Cities Coalition was first designated by the U.S. Department of Energy on March 1, 1996. SCAG directly administers the SCAG Clean Cities Program. This coalition supports government and industry partnerships to expand AVFs and infrastructure throughout the SCAG region.

SCAG FUTURE COMMUNITIES FRAMEWORK

The Future Communities Framework was developed to improve data collection, analysis, and application across Southern California. New technologies are critical to policy-making and planning decisions and the Framework presents SCAG with strategic recommendations for addressing big data and new technologies and the potential adoption of innovative policies. Advanced efficiency and innovation are especially critical when considering energy generation and utilization, as the state transitions to a clean energy future. The Framework outlines the potential for SCAG to increase outreach and data sharing with agencies within the region on climate adaptation, environmental, and energy data.

COUNTIES

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a comprehensive discussion of County plans related to GHG emissions and energy efficiency programs.

LOCAL

Many cities within the SCAG region have established green plans or climate action plans (CAP) that include goals and policies to reduce energy use and the associated emissions to meet AB 32 and SB 32 climate goals. Refer Section 3.8, *Greenhouse Gas Emissions*, Table 3.8-6 for a comprehensive list of local jurisdictions' sustainability plans, CAPs, energy action plans, and other related plans. Major cities within the SCAG region that have prepared plans that will reduce energy use include Los Angeles and Riverside, these plans are discussed below.

LOS ANGELES GREEN NEW DEAL

In April 2019, Mayor Eric Garcetti announced Los Angeles' Green New Deal to set goals for the city's sustainable future. Los Angeles' Green New Deal commits to uphold the Paris Climate Agreement (see Section 3.8, *Greenhouse Gas Emissions*), deliver environment justice through an inclusive green economy, planning to ensure every City resident has the ability to join the green economy, and a determination to lead by example within City government. The goals and targets of the Green New Deal related to energy include:

- Building a zero-carbon electricity grid – reaching an accelerated goal of 80 percent renewable energy supply by 2036 as Los Angeles leads California toward 100 percent renewable by 2045.
- Mandating that all new municipally owned building and major renovations be all-electric, effective immediately, and that every building in Los Angeles – from skyscrapers to single-family homes – become emissions free by 2050.
- Recycling 100 percent of our wastewater by 2035; sourcing 70 percent of our water locally – a significant increase from our existing pathway; and nearly tripling the maximum amount of stormwater captured.

Refer to Section 3.8, *Greenhouse Gas Emissions*, for a comprehensive discussion of Los Angeles' Green New Deal.

CITY OF RIVERSIDE GREEN ACTION PLAN

The City of Riverside's Green Action Plan aims to reduce the City's environmental impact by increasing the City's renewable energy production and reduce the City's GHG emissions, waste, and water consumption. Regarding energy, the Green Action Plan includes goals to install at least 20 MW of photovoltaic systems by 2020, reduce the City's peak electrical load demand by 10 percent, and meet 33 percent of electricity demand from renewable sources by 2050 (City of Riverside 2012).

3.6.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

For the purposes of this 2024 PEIR, SCAG has determined that implementation of Connect SoCal 2024 could result in significant impacts related to energy if the Plan would exceed the following significance criteria, in accordance with California Environmental Quality Act (CEQA) Guidelines Appendix G:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation;
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

METHODOLOGY

Chapter 2, *Project Description*, describes the Plan's vision, goals, forecasted regional development pattern, policies and strategies, and individual transportation projects and investments. The Plan aims to increase mobility, promote sustainability, and improve the regional economy. Although land use development is anticipated to occur within the region even without the Plan, the Plan could influence growth, including distribution patterns. To address this, the 2024 PEIR includes an analysis on the implementation of policies and strategies as well as potential projects and evaluates how conditions in 2050 under the Plan would differ from existing conditions. The analysis of energy considered public comments received on the NOP and feedback and discussions at the various public and stakeholder outreach meetings.

This section includes a discussion of the potential energy impacts of the proposed policies, programs, and projects included in the Plan, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy, identifies mitigation measures for the impacts, and evaluates the residual impacts. Energy resources, including non-renewable energy consumption, residential and commercial building energy consumption, water-related energy consumption, and transportation related fuel consumption, were evaluated in accordance with Appendix G of the 2023 CEQA Guidelines. In addition, Appendix F of the 2023 CEQA Guidelines, which generally provides direction on how an EIR can address energy and outlines how projects can demonstrate energy conservation, was used to guide the analysis.

Energy resources within the SCAG region were evaluated at a programmatic level of detail, in relation to the General Plans of six counties and 191 cities within the SCAG region; data available from USEIA for California (USEIA 2021); and review of related literature germane to the SCAG region.

The methodology for determining the significance of energy consumption includes the use of SCAG's Scenario Planning Model (SPM) in order to provide a conservative estimate of regional energy consumption for purposes of comparison of land use-related energy consumption with respect to electricity, natural gas, water, and transportation. The SPM was used to compare existing conditions (2019) to the Plan horizon year (2050). Total estimated energy consumption in the Plan horizon year of 2050 is expected to represent the most conservative (i.e., highest energy consumption of any year in the Plan) because population and employment are projected to be higher in 2050 than in any earlier year, and future conservation efforts may not be fully quantified at this time. SCAG's SPM is described in Section 3.0, *Introduction to the Analysis*.

SPM calculates building energy use based on anticipated demand for electricity and natural gas combustion from residential and commercial buildings. Water-related energy use refers to the two main water-related energy use categories: a) system use, including the transport and treatment of residential water consumed; and b) end uses, including all uses of water that occur within homes (e.g., water heating). SPM calculates energy use for the water system uses only. The per-gallon energy use factors associated with the system uses are based on the SCAG regional average for urban water system energy intensity from Next 10 and Pacific Institute's *The Future of California's Water-Energy-Climate Nexus* report. (Next 10 & Pacific Institute, 2021) Energy associated with end use water is captured as part of building energy demand.

CEQA does not require a full lifecycle analysis of potential environmental effects. This is because the impact analysis in CEQA is subject to the rule of reason. Moreover, CEQA only requires analysis of impacts that are directly or indirectly attributable to the project under consideration (CEQA Guidelines Section 15064(d)). Lifecycle analysis in general may not be consistent with CEQA because the term 'lifecycle' could refer to emissions beyond those that could be considered 'indirect effects' of a project under CEQA Guidelines Section 15358.

The Natural Resources Agency has indicated that a lifecycle analysis is not necessary to adequately analyze a project's energy or GHG impacts. Pursuant to the Natural Resources Agency's Final Statement of Reasons for the Regulatory Action Amendments to the State CEQA Guidelines, the energy impact analysis in CEQA is subject to the "rule of reason" (CEQA Guidelines Section 15126.2(b)):

"This analysis of energy impacts is subject to the rule of reason and must focus on energy demand caused by the project."

This was added to the CEQA Guidelines to place a reasonable limit on the analysis and signal that a full lifecycle analysis will generally not be required. Therefore, a "lifecycle" analysis of the Plan's energy impacts is not prepared.

As discussed in Chapter 2, *Project Description*, and Section 3.0, *Introduction to the Analysis*, Connect SoCal 2024 includes Regional Planning Policies and Implementation Strategies some of which will effectively reduce impacts in the various resource areas. Furthermore, compliance with all applicable laws and regulations (as set forth in the Regulatory Framework) would be reasonably expected to reduce impacts of the Plan (see CEQA Guidelines Section 15126.4(a)(1)(B)). As discussed in Section 3.0, *Introduction to the Analysis*, where remaining potentially significant impacts are identified, SCAG mitigation measures are incorporated to reduce these impacts. If SCAG cannot mitigate impacts of the Plan to less than significant, project-level mitigation measures are identified which can and should be considered and implemented by lead agencies as applicable and feasible.

IMPACTS AND MITIGATION MEASURES

IMPACT ENR-1 Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

Significant and Unavoidable Impact – Mitigation Required

Implementation of the Plan has the potential to result in wasteful, inefficient, or unnecessary energy consumption. The Plan includes transportation projects (e.g., bikeway and pedestrian projects, rail projects, transit projects, Transportation System Management [TSM] and Transportation Demand Management [TDM] projects, etc.) that

would improve the availability of alternative transportation modes and help reduce VMT, congestion, and resultant air pollutants in the SCAG region as compared to a future without Plan implementation. As described in Chapter 2, *Project Description*, the Plan includes over \$200 billion in transit-related expenditures and active transportation investments.

Beyond reductions in VMT, many of the Plan's transportation projects promote the use and generation of renewable energy, reducing the need for fossil fuel energy. For example, the Plan includes the installation of concrete pavement solar panels at a rest area in Los Angeles/Kern County; construction of a solar power plant, charging stations, and related equipment to introduce zero-emissions buses, vans, and support vehicles in western Riverside County; and installation of solar power generation and battery storage facilities at existing transit maintenance facilities in Montclair and San Bernardino (see the Project List Technical Report in the Plan). Furthermore, the Plan's policies and strategies encourage development in PDAs. The Plan would result in a reduction of per capita VMT, combined with federal and state policies that require reductions in fossil fuel consumption (see S-06-06 and EO B-48-18), and increased renewable energy use and availability (see EO B-18-12), and increased building efficiency (EO 13834). However, the SCAG region includes a diverse set of jurisdictions with varying levels of regulation and enforcement. Adoption of policies and construction of infrastructure would not occur unilaterally and/or at the same speed, and SCAG does not have implementation authority over transportation projects or any land use authority. As such, the Plan could result in variable application of policies leading to differing energy use efficiencies across the region. Therefore, implementation of the Plan could result in wasteful, inefficient, or unnecessary consumption of energy and energy impacts from construction and operations.

CONSTRUCTION

TRANSPORTATION PROJECTS

Construction of transportation projects would result in short-term consumption of energy resulting from the use of construction equipment and processes. Transportation projects under the Plan include electric and hydrogen vehicle charging stations, recycling facilities for batteries as combustion engines are phased out and near-zero and zero-emissions vehicles are adopted, and modification of existing facilities to accommodate alternative-fueled vehicles. In addition, roadway and transit construction materials, such as asphalt, concrete, surface treatments, steel, rail ballast, as well as building materials, require energy to be produced, and would likely be used in projects that involve new construction or replacement of older materials. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, construction would be temporary and limited in magnitude, such that a reasonable amount of energy would be expended. In addition, in this case, the temporary expenditure of energy is to, in the long-term, allow for a transition for the transportation and construction sectors to use less energy. Energy use during construction would likely not be wasteful, inefficient, or unnecessary. However, given the large geographic area of the SCAG region and potential for unforeseen circumstances to occur through the 2050 Plan horizon, it is possible that wasteful energy consumption associated with construction for any new or modified facilities or infrastructure projects could occur.

Construction of individual transportation projects within the SCAG region under the Plan also use energy resources, such as petroleum or alternative fuels to operate off-road construction equipment. USEPA set Tier 4 construction engine standards in order to reduce NO_x and particulate matter emissions; however, Tier 4 standards also provide greater energy efficiency and productivity (Diesel Technology Forum). CARB received authorization from USEPA on September 13, 2013, to enforce the Off-Road regulation's restrictions on fleets adding vehicles with older tier engines and began enforcing on January 1, 2014 (CARB 2016). CARB is in the process of developing

potential amendments to the off-road diesel engine standards, which are referred to as the Tier 5 rulemaking and aims to reduce NO_x, PM₁₀, and PM_{2.5} emissions from new, off-road compression-ignition engines compared to what is allowed by the current most stringent Tier 4 emissions standards. CARB plans to bring a rulemaking proposal in 2025 with implementation of the Tier 5 standards expected to begin in 2028 (CARB 2023). Construction also requires heavy duty truck trips for vendor trips or to remove grading and demolition debris from individual sites. In order to address GHG emissions from these heavy-duty trucks, CARB set regulations in 2008 to increase the fuel efficiency of heavy-duty trucks through improving the trailer aerodynamics and using low rolling resistance tires (see *Regulatory Framework*, above). This policy is expected to have reduced diesel fuel consumption in heavy duty trucks by 500 million gallons in California from 2010 to 2020 (CARB 2013). Additionally, in an effort to reduce diesel particulate matter (DPM), NO_x, and other criteria air pollutant emissions from vehicles, CARB issued the Truck and Bus Regulation in 2008 and the Advanced Clean Truck Regulation in 2020. The regulation requires nearly all trucks and buses to have 2010 or newer model year engines by January 1, 2023 (CARB 2019).

LAND USE DEVELOPMENT

Implementation of the Plan with respect to land use development has the potential to result in short-term consumption of energy. The California Green Building Standards Code (CALGreen Code) (California Building Standards Commission 2022) includes specific requirements related to recycling, construction materials and energy efficiency standards, which would apply to construction of land use projects, which would help to minimize waste and energy consumption.

Similar to transportation projects, construction of development projects would use energy resources, such as petroleum fuel to operate on- and off-road construction equipment and vehicles. As noted above, USEPA Tier 4 construction engine standards provide greater energy efficiency and productivity (Diesel Technology Forum).

OPERATION

TRANSPORTATION PROJECTS

The SCAG region is anticipated to grow by nearly 2.1 million new residents between 2019 and 2050. Due to decreases in per capita petroleum fuel and energy consumption through rising utility prices and efficiency improvements, residential and building energy consumption is expected to decrease. A discussion of residential energy use, building energy use, petroleum usage, and energy and water-related energy consumption with the Plan is provided below.

Daily operation of the regional transportation system uses energy in the form of fuel consumed by propulsion of passenger vehicles (see discussion below) as well as other forms of transportation (buses, planes, ships, and trains). As discussed in Section 3.17, *Transportation*, in this 2024 PEIR, the Plan would not reduce total VMT but would reduce VMT per capita. The Plan invests in the expansion of critical highways and road improvements which would increase vehicle capacity, and overall efficiency of the transportation network. Increases in motor vehicle trips are primarily a combined function of population and employment growth. Population growth and growth in VMT would occur within the region regardless of whether the Plan is implemented, but under the Plan more efficient use of the transportation system is anticipated resulting in a lower VMT per capita. The Plan would result in greater availability of public transit and other alternative modes of transportation, such as complete streets and active transportation, that would facilitate a more energy efficient region. The reduction in overall congestion resulting from these service level improvements would reduce fuel consumption and promote fuel efficiency (see analysis of fuel consumption below with respect to anticipated development). New transportation facilities that require

energy for operation, such as signal lighting, roadway or parking lot lighting and electronic equipment will increase energy demand. New landscaping irrigation of transportation projects also incrementally increases energy demand through water pumping and treatment. In addition, statewide policies targeted at improving the fuel efficiencies of on-road vehicle petroleum fuel consumption by light-, medium-, and heavy-duty vehicles are anticipated to result in decreased petroleum use by 2050. However, increased demand and consumption of alternative fuel sources such as electricity and hydrogen is anticipated in response to zero-emissions and near-zero-emissions vehicle regulations.

LAND USE DEVELOPMENT

RESIDENTIAL ENERGY USE

Growth pursuant to the policies, strategies, and growth vision in the Plan has the potential to increase residential energy consumption due to the increase in total households by 2050. It is expected that the SCAG region would add approximately 1.6 million households from 2019 to 2050. The residential energy consumption per household is expected to decline from 61.2 million Btu in 2019 to 44.6 million Btu in 2050 with implementation of the Plan (**Table 3.6-1, Residential Energy Use and Cost per Household**). The Plan includes policies and strategies intended to increase sustainable and energy efficient residential development (compact development is more energy efficient). As a result, it is projected that the Plan would result in a 27-percent reduction in per household energy consumption and an estimated 18-percent reduction in residential electricity consumption per household compared to 2019 (Table 3.6-1). Due to the reductions in per household energy and electricity consumption, the overall energy consumption is expected to decrease by approximately 8.2 percent.

TABLE 3.6-1 Residential Energy Use and Cost per Household

| | 2019 | PLAN 2050 | PERCENTAGE DIFFERENCE FROM 2019 TO PLAN |
|--|-----------|-----------|---|
| Residential energy use per household (Btu in millions) | 61.2 | 44.7 | -27.0% |
| Residential electricity use per household (kWh) | 6,962 | 5,161 | -25.9% |
| Number of households | 6,193,000 | 7,798,000 | 25.9% |
| Residential energy use (Btu in trillions) | 379 | 348 | -8.2% |
| Residential energy cost (in billions \$) | 9.0 | 11.0 | 22.2% |

Residential energy costs are expected to increase from \$9 billion in 2019 to \$11 billion in 2050 across the SCAG region. While overall costs are expected to increase in the region the cost per household is expected to decrease by approximately \$42 from 2019 to 2050 (**Table 3.6-2, Residential Energy and Water Cost per Household**). Lower energy costs, despite increasing electricity and natural gas per unit costs, can be explained by lower energy use per household. Table 3.6-2 shows there would be an estimated 3.2-percent decrease in household cost compared to the 2019 base year. The total utility cost per household, including both energy and water cost is expected to decrease by \$56 from 2019 to 2050. Energy costs are anticipated to decrease, but do not proportionally decrease as much as water costs.

TABLE 3.6-2 Residential Energy and Water Cost per Household

| | (2019) | 2050 PLAN | PERCENTAGE DIFFERENCE FROM 2019 TO PLAN |
|--|----------------|----------------|---|
| Residential energy cost per household | \$1,453 | \$1,411 | -2.9% |
| Residential water cost per household | \$308 | \$294 | -4.6% |
| Total utilities (energy + water) cost per household | \$1,761 | \$1,705 | -3.2% |

Although the total population is expected to increase by nearly 11 percent over the lifetime of the Plan, the overall energy use is expected to decrease with large increases in per household energy and electricity efficiency. These increases in efficiency are due in part to California building regulations. For example, through the 2022 Title 24 Building Energy Efficiency Standards, California will require every new home to be equipped with solar power (The New York Times 2018; CEC 2022). Therefore, all new single-family homes and multifamily homes up to three stories in height, constructed over the duration of the Plan will have solar panels. Additionally, the Plan includes policies and strategies to promote transit-oriented development, which tends to be more energy efficient as it moves more people per mile. Further, many transit agencies use natural gas, electricity, or other clean energy for their fleet. Finally, increases in energy cost will drive down demand. However, as discussed above, the SCAG region includes a diverse set of jurisdictions with varying levels of regulation and enforcement. It would be speculative to assume that all jurisdictions would realize consistent energy savings across the region. Therefore, residential energy use could result in wasteful, inefficient, or unnecessary energy consumption.

BUILDING ENERGY CONSUMPTION

By 2050, the SCAG region is expected to add nearly 2.1 million people. Due to population growth and the associated development, building energy consumption is projected to increase. The Plan encourages compact land use patterns with a focus on urban infill growth and walkable, mixed-use communities. Mixed-use, walkable, and urban infill development combined with transportation investments that increase active transportation opportunities and improved facilities would be expected to accommodate more growth in more energy-efficient housing types. Examples of energy efficient housing types include townhomes, apartments, and smaller single-family homes, as well as more compact commercial building types. Overall, development under the Plan would result in an increase in total building energy consumption, however, buildings will be more energy efficient in 2050 (**Table 3.6-3, Building Energy Consumption – Residential and Commercial**). Total residential and commercial building energy consumption (electricity and natural gas) is expected to decrease by 7.7 percent under the Plan (Table 3.6-3). The residential and commercial sectors would use less energy in the future (8.1 percent decrease and 7.3 percent decrease, respectively); the commercial sector would use the same amount of energy in the future.

TABLE 3.6-3 Building Energy Consumption – Residential and Commercial

| | BASE YEAR (2019) | PLAN (2050) | PERCENTAGE DIFFERENCE FROM BASE YEAR |
|---|------------------|-------------|--------------------------------------|
| Residential electricity consumed (GWh) | 43,116 | 40,249 | -6.6% |
| Residential natural gas consumed (therms in billions) | 2.3 | 2.1 | -9.1% |
| Residential energy consumed (Btu in trillions) | 379 | 348 | -8.1% |
| Commercial electricity consumed (GWh) | 81,589 | 68,802 | -15.7% |
| Commercial natural gas consumed (therms in billions) | 2.6 | 2.6 | 1.7% |
| Commercial energy consumed (Btu in trillions) | 536 | 497 | -7.3% |
| Total energy consumed (Btu in trillions) | 915 | 845 | -7.7% |

As shown above, total building energy consumed in the SCAG region over the lifetime of the Plan is anticipated to decrease by 1.9 percent. According to SCAG, the population in 2019 is approximately 18.8 million people, resulting in a per capita building energy use 48.6 million Btu/person. The population is estimated to reach almost 20.9 million people by 2050, resulting in a 2050 per capita building energy use of 40.4 million Btu/person. Therefore, per capita building energy use will decrease by 8.2 million Btu/person. As a result, building energy efficiency will increase. However, as mentioned above, the SCAG region includes a diverse set of jurisdictions with varying levels of regulation and enforcement. It would be speculative to assume that all jurisdictions would realize consistent energy savings across the region. Therefore, total energy use could result in wasteful, inefficient, or unnecessary energy consumption.

PETROLEUM FUEL

Petroleum fuel consumption is associated with energy consumed by cars and other light duty vehicles as a result of people traveling between the various land uses. Fuel consumption is expected to decrease by 30.6 percent from 7.6 billion gallons in 2019 to the projected 5.3 billion gallons in 2050 (**Table 3.6-4, SCAG Region Estimated Transportation Fuel Consumption**).

TABLE 3.6-4 SCAG Region Estimated Transportation Fuel Consumption

| | FUEL CONSUMED | | PERCENTAGE REDUCTION COMPARED TO 2019 |
|-----------|--------------------------|--------------------------|---------------------------------------|
| | BILLION GALLONS PER YEAR | THOUSAND GALLONS PER DAY | |
| 2019 | 7.6 | 20,838 | — |
| 2050 Plan | 5.3 | 14,462 | -30.6% |

Source: SCAG 2023b

As the SCAG region gains employment and population, total VMT will increase (see discussion in Section 3.17, *Transportation*, of this 2024 PEIR). The Plan’s policies, strategies and investments to encourage carpooling, increase transit use and active transportation opportunities, and promote more walkable and mixed-use communities would help reduce per capita VMT but reductions would not be enough to offset total VMT increases for all vehicles compared to existing conditions (2019). Despite an increase in total VMT, total fuel consumption would be reduced through improved fuel economy and increased efficiency in the overall network (measured as total

hours of delay), and more alternative fuel and zero-emissions vehicle types on the road. In accordance with EO B-48-18, at least 5 million ZEV's are expected to be on California roadways by 2030. Additionally, CARB's fuel efficiency regulations have reduced diesel fuel consumption in heavy-duty trucks by 500 million gallons in California from 2010 to 2020 through improvements in tractor and trailer aerodynamics, which would reduce fuel consumption during both the construction and operation of a project (CARB 2013). Furthermore, USEPA and NHTSA Phase 2 program establishing fuel efficiency standards for medium- and heavy-duty vehicles would improve the fuel efficiency of heavy-duty vehicles (fuel consumption of tractor trailers alone is anticipated to decrease by 24 percent). The Phase 2 standards begin in model year 2021 (model year 2018 for trailers and 2021 for NHTSA's trailer standards) and culminate in standards for model year 2027 and would reduce fuel consumption during both the construction and operation of a project (USEPA 2016). However, as mentioned above, the SCAG region includes a diverse set of jurisdictions with varying levels of regulation and enforcement. It would be speculative to assume that all jurisdictions would realize consistent fuel savings across the region. Therefore, petroleum fuel use could result in wasteful, inefficient, or unnecessary energy consumption.

ENERGY AND WATER-RELATED ENERGY USE

Increasing water efficiencies are anticipated to result in a decrease in residential water use per capita in the future. However, given the increase in population of nearly 2.1 million people by 2050, overall residential and commercial water use in the region is anticipated to increase by 3 percent. While implementation of the Plan would generally support policies to reduce the wasteful, inefficient, or unnecessary energy consumption, given the size of and complexity of energy conditions in the region, variability in application and enforcement of energy rules and regulations, and potential for unforeseen circumstances to occur through the 2050 Plan horizon, it is possible that wasteful energy consumption could occur within the respective jurisdictions in the region. As such, although the Plan would generally support and facilitate implementation of energy and water related infrastructure improvements and achievement of energy efficiency goals, the potential still exists that potential projects under the Plan could result in wasteful, inefficient, or unnecessary energy consumption. Therefore, impacts would be significant requiring the consideration of mitigation measures.

As shown in **Table 3.6-5, Water Use – Residential and Commercial**, water use reductions are expected from the residential sector, which is anticipated to reduce water use over the lifetime of the Plan by approximately 13.3 percent (combined indoor and outdoor). In October 2022 SCAG adopted a Water Action Resolution (Resolution No. 22-647-3) that affirms a drought and water shortage emergency in the SCAG Region and calls on local and regional partners to join together to reduce water use; improve water conservation, reuse, and efficiency; enhance water systems' health and resilience; support climate change mitigation and adaptation efforts, and support investments in water infrastructure and conservation practices that support the region's economic and population growth and fosters planning for the Region's Housing Needs identified in Connect SoCal (SCAG 2022). The Water Action Resolution was incorporated into the Plan. Reductions in the residential sector are anticipated to result from increasing pressures to conserve water as a result of long-term climate change and anticipated reductions in available water. Plan policies would encourage reductions in water use. Most of the anticipated residential water use reductions would come from the reduction in urban landscaping water, which makes up roughly half of all urban water use (PPIC Water Policy Center 2019). Larger reductions are seen in the outdoor water use compared with the indoor water use for residential. This is aligned with potential higher density, multi-family and attached single-family development (which tends to consume less water for outdoor, landscaping uses, compared to lower density development with larger lot sizes) expected from implementation of the Plan that encourages more compact development in PDAs.

TABLE 3.6-5 Water Use – Residential and Commercial

| | 2019 | 2050 PLAN | PERCENTAGE DIFFERENCE FROM 2019 |
|------------------------------------|------------------|------------------|---------------------------------|
| Indoor residential water use (af) | 1,036,742 | 953,744 | -8.0% |
| Outdoor residential water use (af) | 1,024,862 | 834,467 | -18.6% |
| Residential water use (af) | 2,061,604 | 1,788,211 | -13.3% |
| Indoor commercial water use (af) | 574,083 | 879,852 | 53.3% |
| Outdoor commercial water use (af) | 389,728 | 447,352 | 14.8% |
| Commercial water use (af) | 963,811 | 1,327,204 | 37.7% |
| Total water use (af) | 3,025,415 | 3,115,415 | 3.0% |

As shown above, total water use in the SCAG region by 2050 is anticipated to increase by 3 percent. Indoor residential and outdoor residential are anticipated to decrease in water use; however, indoor commercial water use is anticipated to increase by 53.3 percent and outdoor commercial water use is anticipated to increase by 14.8 percent over the lifetime of the Plan. The commercial sector includes offices, hospitals, hotels, restaurants, educational facilities, and industrial land uses. The large increase in water use may be in part to the additional jobs, job types, and commercial uses that will be required for a population increase of nearly 2.1 million new residents between 2019 and 2050.

As noted above, water use is closely tied to the electricity required to transport, distribute, and treat water.¹ Water-related electricity use is expected to increase from 12,475 gigawatt-hours (GWh) to 12,960 GWh in 2050 with the Plan, which represents a 3.9 percent increase in electricity (**Table 3.6-6, Water-Related Energy Use**).

TABLE 3.6-6 Water-Related Energy Use

| | 2019 | 2050 PLAN | PERCENTAGE DIFFERENCE FROM 2019 |
|-------------------------------------|--------|-----------|---------------------------------|
| Water-related electricity use (GWh) | 12,475 | 12,960 | 3.9% |

As demonstrated in the table above, the total water-related electricity use is expected to increase by 3.9 percent over the lifetime of the Plan. Based on SPM data provided (SCAG 2023a), the 2019 per capita water-electricity use is 662 kWh/person for the existing conditions. In 2050, per capita water-related electricity use is expected to be 621 kWh/person. Therefore, the per capita water-related electricity use will decrease by 41 kWh/person. As a result, water-related electricity use efficiency will increase.

As demonstrated above, fuel consumption and total building energy use are expected to decrease over the lifetime of the Plan, however total water use and water-related energy use would increase over the lifetime of the Plan. Although, water use and water-related electricity use efficiency is anticipated to decrease over the lifetime of the Plan. As stated above, the per capita building energy use efficiency is anticipated to increase by 8.2 million Btu/person.

¹ The SCAG region has several desalination projects proposed or under development within the SCAG region, and desal plants are highly energy intensive. However, such projects diversify water supply portfolios and provide for greater reliability. Therefore, if water production relies on a desalination plant in the future, the water-related energy use could increase.

SUMMARY

In summary, construction energy use is anticipated to be more efficient (and less wasteful) in the future as Tier 4 or cleaner construction equipment combined with CARB regulations for reducing fuel use in heavy-duty diesel trucks used for hauling construction materials are implemented. Additionally, the Plan will encourage compact (more efficient) land use and more efficient, less energy intensive modes of transportation (transit, bike, walk) which will likely result in a lower VMT per capita. Similarly, per capita consumption of energy is anticipated to decline, with respect to building energy use and water-related energy use. Nonetheless, given the size and complexity of energy and transportation efficiency conditions in the region, variability in application and enforcement of energy rules and regulations and transportation policies, and potential for unforeseen circumstances to occur through the 2050 Plan horizon, it is possible that individual projects under the Plan could result in wasteful energy consumption could occur within the respective jurisdictions in the region. Therefore, wasteful or inefficient use of energy could occur in the region, and this impact is considered significant and mitigation measures are required.

MITIGATION MEASURES

SCAG MITIGATION MEASURES

See SMM-AQ-1, SMM-GHG-1, and SMM-GHG-2.

PROJECT-LEVEL MITIGATION MEASURES

See PMM-AQ-1, PMM-GHG-1, PMM-TRA-1, and PMM-USWS-1.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

As previously discussed, the Plan's Regional Planning Policies and Implementation Strategies (see Chapter 2, *Project Description*, and Section 3.0, *Introduction to the Analysis*) and compliance with existing laws and regulations would reduce impacts but given the regional scale of the analysis in this 2024 PEIR, it is not possible or feasible to determine if all impacts would be fully mitigated. Therefore, this 2024 PEIR identifies SCAG and project-level mitigation measures. At the project-level, lead agencies can and should consider the identified project-level mitigation measures during subsequent review of transportation and land use projects as appropriate and feasible. While the mitigation measures will reduce the impacts related to wasteful, inefficient, or unnecessary consumption of energy resources, due to the regional nature of the analysis, unknown site conditions and project-specific details, and SCAG's lack of land use authority over individual projects, SCAG finds that the impact could be **significant and unavoidable** even with mitigation.

IMPACT ENR-2 **Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.**

Significant and Unavoidable Impact – Mitigation Required

As discussed above, the Plan would result in a decrease in per capita energy use and would not generally be expected to result in energy used in an unnecessary or wasteful manner. The Plan would not result in the inefficient, wasteful, or unnecessary consumption of energy if it is consistent with existing relevant energy conservation policies. Accordingly, inconsistencies between the Plan and adopted plans and policies related to energy

conservation have not been identified. The discussion below further examines consistency with adopted plans and policies related to energy conservation.

The 1974 Warren-Alquist Act established the California Energy Resource Conservation and Development Commission, now known as CEC, and established a State policy to reduce wasteful, uneconomical and unnecessary uses of energy. Based on the data above, and explained in the conclusion below, the Plan would not result in wasteful, inefficient, or unnecessary use of energy. Therefore, the Plan is consistent with the Warren-Alquist Act policies.

Senate Bill (SB) 1078 as accelerated by SB 350, establishes a renewable portfolio standard for electricity supply, and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide 33 percent of their supply from renewable sources by 2020, which California achieved. SB 100 further accelerated California's Renewable Portfolio Standard and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030, and that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045. The Plan would not conflict with or obstruct achievement of the standards because the Plan's transportation projects promote the use and generation of renewable energy reducing the need for fossil fuel energy.

In addition, the 2017 Integrated Energy Policy Report (IEPR) includes a set of strategies to address California's future energy needs. Key topics covered in the report include electricity resource and supply plans; electricity and natural gas demand forecasts; natural gas outlooks; transportation energy demand forecasts; energy efficiency savings; integrated resource planning; a barriers study; climate adaptation and resilience; renewable gas; distributed energy resources; strategic transmission investment plans; and existing power plan reliability issues. The Plan would not conflict with these policies. Refer to Section 3.8, *Greenhouse Gas Emissions*, for a discussion of GHG emissions reductions related to the Plan.

In addition, many Plan projects promote energy efficiency as they support implementation of the 2010 Clean Air Plan transportation control measures including transportation demand management, transportation system management, commuter and public transit, rail, and bike and pedestrian programs, among others. Furthermore, with respect to transportation fuel demand, the USEPA Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021b). The Plan would not conflict with or obstruct implementation of the standards because the Plan's transportation projects promote a shift away from petroleum-based fueled vehicles toward the use of zero-emissions or near-zero-emissions vehicles and the expansion of the charging station network in the State, which would also further the State's goal of having at least 5 million electric cars on the road by 2030 (California Fuel Cell Partnership 2018).

Land use development is required to be consistent with applicable regulations and policies including the LA County Sustainability Plan, the LA Green New Deal, as well as Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura County General Plans. These plans encourage the use of renewable energy, energy conservation and energy efficiency techniques in all new building design, orientation and construction and support of alternative transportation and fuels. As described above, the Plan includes TDM intended to improve the efficiency and effectiveness of the transportation system, reducing fuel consumption, transit and other alternative modes of transportation, such as new pedestrian and bicycle facilities and promotes mixed use and infill development.

The Plan's growth forecasts prioritize growth in Priority Development Areas (PDAs) and minimize growth in GRRAs; new renewable energy projects are sometimes developed in sensitive environments, requiring careful study and mitigation of associated biological impacts (see Section 3.4, *Biological Resources*, in this 2024 PEIR). In addition, as PDAs densify, there is the potential for shading of existing solar panels.

While implementation of the Plan would generally support and not conflict with local energy plans or policies, given the size of and complexity of energy conditions in the region, variability in application and enforcement of energy rules and regulations and transportation policies, and potential for unforeseen circumstances to occur through the 2050 Plan horizon, it is possible that noncompliance may occur for individual projects under the Plan within the respective jurisdictions in the region. As such, although the Plan would generally support and facilitate implementation of energy and water related infrastructure improvements and achievement of energy efficiency goals, the potential still exists that implementation of individual projects as a result of the Plan could result in some inconsistencies with local energy plans and policies. Therefore, the impact related to conflict with state and local plans for renewable energy or efficiency is considered significant and mitigation measures are required.

MITIGATION MEASURES

SCAG MITIGATION MEASURES

See SMM AQ-1, SMM GHG-1, SMM GHG-2, and SMM LU-1.

PROJECT-LEVEL MITIGATION MEASURES

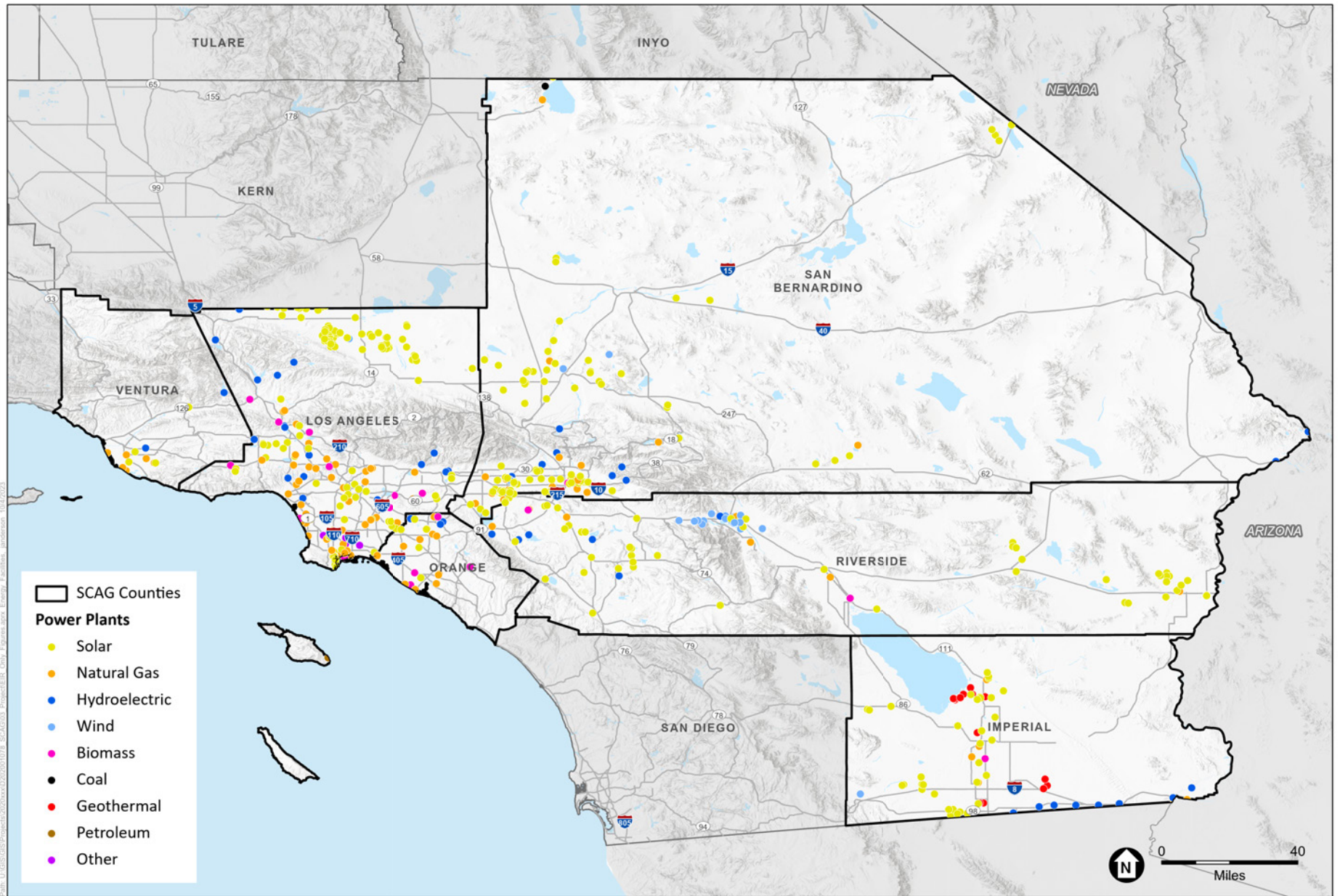
See PMM-AQ-1, PMM-GHG-1, PMM-TRA-1, and PMM-USWS-1.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

As previously discussed, the Plan's Regional Planning Policies and Implementation Strategies (see Chapter 2, *Project Description*, and Section 3.0, *Introduction to the Analysis*) and compliance with existing laws and regulations would reduce impacts but given the regional scale of the analysis in this 2024 PEIR, it is not possible or feasible to determine if all impacts would be fully mitigated. Therefore, this 2024 PEIR identifies SCAG and project-level mitigation measures. At the project-level, lead agencies can and should consider the identified project-level mitigation measures during subsequent review of transportation and land use projects as appropriate and feasible. While the mitigation measures will reduce the impacts related to conflicts with or obstruction of plans for renewable energy or energy efficiency, due to the regional nature of the analysis, unknown site conditions and project-specific details, and SCAG's lack of land use authority over individual projects, SCAG finds that the impact could be **significant and unavoidable** even with mitigation.

CUMULATIVE IMPACTS

Connect SoCal 2024 is a regional-scale Plan comprised of a regional growth forecast and land use pattern, policies and strategies, and individual projects and investments. At this regional-scale, a cumulative or related project to the Plan is another regional-scale plan (such as Air Quality Management Plans within the region) and similar regional plans for adjacent regions. Because the Plan, in and of itself, would result in significant adverse environmental impacts with respect to energy, these impacts would add to the environmental impacts of other cumulative or related projects. Mitigation measures that reduce the Plan's impacts would similarly reduce the Plan's contribution to cumulative impacts.



SOURCE: Energy Information Administration, 2019

Connect SoCal 2024 PEIR

Map 3.6-1
Energy Facilities in the SCAG Region



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