

This section of the Program Environmental Impact Report (PEIR) describes the existing conditions related to energy in the SCAG region, identified the regulatory framework with respect to laws and regulations that address energy, and analyzes the significance of the potential energy impacts that could occur from development of the Connect SoCal Plan (“Connect SoCal” or “Plan”). In addition, this PEIR provides regional-scale mitigation measures, as well as project-level mitigation measures to be considered by lead agencies for subsequent, site-specific environmental review to reduce identified impacts as appropriate and feasible.

3.6.1 ENVIRONMENTAL SETTING

3.6.1.1 Definitions

Terms and criteria used in the assessment of energy are described below.

Natural Gas: Natural gas is a naturally occurring hydrocarbon mixture consisting primarily of methane and 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 which are naturally replenishes 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 one foot.

British Thermal Units (Btu): The amount of heat required to raise the temperature of one pound of water by one-degree Fahrenheit.

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.

3.6.1.2 Energy Supply

Electricity

Electricity produced within California in 2017 was from natural gas (43 percent), renewable resources (30 percent), large hydroelectric (18 percent), nuclear (9 percent), and coal (<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 2017 was comprised of natural gas (34 percent), renewable resources (29 percent), large hydroelectric (15 percent), coal (4 percent), nuclear (9 percent), and additional unspecified sources of power (9 percent)¹. In 2017, the total electrical system power generated was 292,039 GWh, which is up about 0.5 percent from 2016's total system electric generation of 290,567 GWh.² This results in a per capita electricity use of approximately 7.38 MWh/person/year.³

Natural Gas

In 2018, the total natural gas usage across California was 12,638.16 million therms. The six counties making up the SCAG region used approximately 4,600 million therms in 2018, approximately 36% of the state's total usage for the year.⁴

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.^{5, 6} In 2018,

¹ California Energy Commission. 2018. *Total System Electric Generation*. Available online at: https://ww2.energy.ca.gov/almanac/electricity_data/system_power/2017_total_system_power.html, accessed September 3, 2019.

² Ibid.

³ U.S. Census Bureau. *QuickFacts: California*. Available online at: <https://www.census.gov/quickfacts/CA>, accessed September 26, 2019.

⁴ California Energy Commission. *Gas Consumption by County*. Available online at: <http://www.ecdms.energy.ca.gov/gasbycounty.aspx>, accessed September 16, 2019.

⁵ Los Angeles Times. 2016. *Story So Far: Porter Ranch gas leak updates*. Available online at: <https://www.latimes.com/local/lanow/la-me-porter-ranch-gas-leak-live-htlmlstory.html>, accessed September 16, 2019.

⁶ U.S. Energy Information Administration. 2018. *Profile Analysis*. Available online at: <https://www.eia.gov/state/analysis.php?sid=CA>, accessed September 16, 2019.

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.⁷

Petroleum Based Fuel

In 2015, 15.1 billion gallons of gasoline (non-diesel) were sold statewide.⁸ In 2015, California also reported a total of 29,830,797 registered on-road vehicles, including light-duty cars (54 percent), light-duty trucks (43 percent), and medium and heavy-duty trucks (3.3 percent).⁹ In 2015, refineries in the state of California sold approximately 4,341 thousand gallons of gasoline a day, steadily decreasing since peaking at selling 8,452.8 thousand gallons per day in 2006.¹⁰ However, in 2017 and 2018, refinery sales increased to 4,369.6 thousand gallons a day and 4,455.9 thousand gallons per day, respectively.¹¹

Nuclear Power

After closure of the San Onofre Nuclear Generating Station (SONGS) 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). The operating license expires in 2024 and Pacific Gas and Electric (PG&E), the owners of the plant, would be required to apply for a new permit in order to extend the license to 2044.¹²

Hydroelectric Power

California has 270 hydroelectric facilities with an installed capacity of 14,009 megawatts (MW). The amount of hydroelectricity varies each year due to snowmelt runoff and rainfall. From 1983 to 2018, the annual average hydroelectric generation was 271.8 GWh. Within the SCAG region, Imperial, Orange, Los

⁷ Clean Technica. 2018. *NRG Energy Announces 2018 Retirement of 3 Southern California Natural Gas Power Plants*. Available online at: <https://cleantechnica.com/2018/03/14/nrg-energy-announces-2018-retirement-of-3-southern-california-natural-gas-power-plants/>, accessed September 16, 2019.

⁸ California Energy Commission. 2019. *California Gasoline Data, Facts, and Statistics*. Available online at: https://ww2.energy.ca.gov/almanac/transportation_data/gasoline/, accessed September 3, 2019.

⁹ Ibid.

¹⁰ U.S. Energy Information Administration. *California Total Gasoline Retail Sales by Refiners*. Available online at: <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=p&s=a103650061&f=a>, accessed November 1, 2019.

¹¹ U.S. Energy Information Administration. 2019. *Refiner Motor Gasoline Sales Volumes*. Available online at: https://www.eia.gov/dnav/pet/pet_cons_refmg_c_SCA_EPM0_mgalpd_a.htm, accessed November 5, 2019.

¹² California Energy Commission. *Nuclear Energy in California*. 2019. Available online at: <https://ww2.energy.ca.gov/nuclear/california.html>, accessed September 26, 2019.

Angeles, Riverside, San Bernardino, Riverside, and Ventura have a combined hydroelectric capacity of 2,596.2 MW.¹³

Renewable Energy

Renewable energy includes biomass, geothermal plants, small hydroelectric (under 30 MW), solar, and wind. In 2018, California produced 63,028 GWh of electricity in renewable energy, 43% of which was solar.¹⁴ California is on the trajectory to meet the goal of 33% renewable energy by 2020 and is working towards achieving 50% renewable energy by 2030.¹⁵ The 2019 Building Energy Efficiency Standards go into effect on January 1, 2020 and will require most new residences to install solar panels which will decrease demand on electrical suppliers.¹⁶

3.6.1.3 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.

California's water system requires electricity and accounts for approximately 20% 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% of water-energy use and the pumping, conveying, and treating of water and wastewater make up the remaining 10%. As California moves to increase water efficiency, many measures will in turn reduce energy requirements. As discussed in **Section 3.19.3, Water Supply**, Southern California is increasing local water supply

¹³ California Energy Commission. *California Hydroelectric Statistics and Data*. Available online at: https://ww2.energy.ca.gov/almanac/renewables_data/hydro/index cms.php, accessed September 26, 2019.

¹⁴ California Energy Commission. 2018. *Total System Electric Generation*. Available online at: https://ww2.energy.ca.gov/almanac/electricity_data/system_power/2017_total_system_power.html, accessed September 3, 2019.

¹⁵ CARB.

¹⁶ California Energy Commission. 2019. *2019 Building Energy Efficiency Standards*. Available online at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency>, accessed September 26, 2019.

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.¹⁷

3.6.2 REGULATORY FRAMEWORK

3.6.2.1 Federal

Energy Policy and Conservation Act of 1975

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:

- 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.¹⁸

National Energy Act of 1978

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.¹⁹ It includes five statutes:

¹⁷ PPIC Water Policy Center. 2016. *Energy and Water*. Available online at: https://www.ppic.org/content/pubs/report/R_1016AER.pdf, accessed September 18, 2019.

¹⁸ US Legal, Inc. *Energy Policy and Conservation*. Available online at: <http://energylaw.uslegal.com/energy-policy-and-conservation/>, accessed December 13, 2018.

- 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 of 1978 (PURPA)

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 (FUA) of 1978 (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.²⁰

¹⁹ Government Publishing Office. 1978. *Public La 95-619- Nov. 9, 1978*. Available online at: <https://www.govinfo.gov/content/pkg/STATUTE-92/pdf/STATUTE-92-Pg3206.pdf>, accessed August 9, 2019.

²⁰ *Public Utility Regulatory Policies Act of 1978*. Available online at: <https://www.usbr.gov/power/legislation/purpa.pdf>, accessed August 28, 2019.

Energy Policy Act of 1992

The Energy Policy Act (Public Law 102-486; abbreviated as EPACT92) 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. It was amended several times in the Energy Conservation and Reauthorization Act of 1998 and in 2005 via the Energy Policy Act in 2005, which emphasized alternative fuel use and infrastructure development.²¹

Energy Policy Act of 2005

On August 8, 2005, President George W. Bush signed the National Energy Policy Act of 2005 (Public Law 109-58) into law. 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 Energy Policy Act (EPAct) of 2005 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 2012.²²

Energy Independence and Security Act of 2007

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

21 U.S. Department of Energy, Alternative Fuels Data Center. Key Federal Legislation. Available online at: http://www.afdc.energy.gov/laws/key_legislation, accessed December 13, 2018.

22 Government Publishing Office. *Energy Policy Act of 2005*. Available online at: <https://www.govinfo.gov/content/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf>, accessed August 28, 2019.

consumers, improving vehicle fuel economy, and promoting research on greenhouse gas 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 greenhouse gas performance threshold standards to ensure that each category of renewable fuel emits fewer greenhouse gases than the petroleum fuel it replaces.

RFS2 lays the foundation for achieving significant reductions of greenhouse gas 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.²³

Moving Ahead for Progress in the 21st Century

MAP-21 (Public Law 112-141) is the nation's surface transportation program and extended the provisions for fiscal year (FY) 12 with new provisions for FY 13. MAP-21 funded surface transportation programs at over \$105 billion for FY 2013 and FY 2014. It was intended to create a streamlined, performance-based, and multimodal program to address challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 addresses economic growth, accessibility, social equity, energy security and public health by setting transparent performance benchmarks.²⁴

²³ Government Publishing Office. *Energy Independence and Security Act of 2007*. Available online at: <https://www.govinfo.gov/content/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>, accessed August 28, 2019.

²⁴ Federal Highway Administration. 2018. *MAP-21 – Moving Ahead for Progress in the 21st Century*. Available online at: <https://www.fhwa.dot.gov/map21/>, accessed August 28, 2019.

After MAP-21 funding ended in FY 2014, President Obama issued the Fixing America's Surface Transportation Act (Fast Act) that largely maintains the MAP-21 program structure and funding shares and will continue to be implemented by the Federal Motor Carrier Safety Administration.^{25,26}

Heavy-Duty National Program

The Heavy-Duty National Program was adopted on August 9, 2011, to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with the model year 2014.²⁷

Final Rule: Phase 2 Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

In June 2015, the U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) jointly proposed a national program that established the next phase of greenhouse gas (GHG) emissions and fuel efficiency standards for medium- and heavy-duty vehicles. The Phase 2 program significantly reduces carbon emissions and improves the fuel efficiency of heavy-duty vehicles, helping to address the challenges of global climate change and energy security. In October 2016, the final rule was published, and anticipates saving the heavy duty vehicle industry billions of dollars' worth of fuel, reducing the cost of transporting goods, cutting fuel consumption, and reducing GHG emissions by 1 billion metric tons. Fuel consumption of tractor trailers alone is anticipated to decrease by 24 percent. The Phase 2 standards, which begin in the model year 2021 (model year 2018 for trailers and 2021 for NHTSA's trailer standards) and culminate in standards for model year 2027, are the product of a comprehensive assessment of existing and advanced technologies and extensive stakeholder outreach.²⁸

²⁵ U.S. Department of Transportation. 2019. *The Fixing America's Surface Transportation Act or "FAST Act."* Available online at: <https://www.transportation.gov/fastact/>, accessed September 16, 2019.

²⁶ Federal Highway Administration. 2018. *MAP-21 – Moving Ahead for Progress in the 21st Century.* Available online at: <https://www.fhwa.dot.gov/map21/>, accessed August 28, 2019.

²⁷ The White House President Barack Obama. 2011. *President Obama Announces First Ever Fuel Economy Standards for Commercial Vehicles.* Available online at: <https://obamawhitehouse.archives.gov/blog/2011/08/09/president-obama-announces-first-ever-fuel-economy-standards-commercial-vehicles>, accessed August 28, 2019.

²⁸ Environmental Protection Agency. 2016. *Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy- Duty Engines and Vehicles- Phase 2.* October. Available online at: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency>, accessed December 13, 2018.

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% per year through FY2020 (applies to agencies with fleets of more than 20 vehicles) (Baseline FY2005).
- Reduce by 2% annually:
 - Potable water intensity by FY2020 (26% total reduction) (Baseline FY2007).
 - Industrial, landscaping, and agricultural water intensity by FY2020 (20% total reduction) (Baseline FY2010).
- Achieve 50% or higher diversion rate:
 - Non-hazardous solid waste by FY2015.
 - Construction and demolition materials and debris by FY2015.
- Ensure at least 15% of existing buildings and leases (>5,000 gross square feet) meet the Guiding Principles by FY2015, with continued progress towards 100%.
- Ensure 95% 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.²⁹

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

²⁹ The White House President Barack Obama. 2009. *Executive Order 13514 Focused on Federal Leadership in Environmental, Energy, and Economic Performance*. Available online at: <https://obamawhitehouse.archives.gov/the-press-office/president-obama-signs-executive-order-focused-federal-leadership-environmental-ener>, accessed August 28, 2019.

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.³⁰

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 in order 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

³⁰ Government Publishing Office. 2015. *Planning for Federal Sustainability in the Next Decade*. Available online at: <https://www.govinfo.gov/content/pkg/CFR-2016-title3-vol1/pdf/CFR-2016-title3-vol1-eo13693.pdf>, accessed August 28, 2019.

- Track and report on energy management activities, performance improvements, cost reductions, greenhouse gas emissions, energy and water savings, and other appropriate performance measures.³¹

Clean Air Act Waiver for California's GHG Emission Standards for New Motor Vehicles

Due to the unique topography and rapid population increase within the Los Angeles basin, federal standards may not be effective enough to meet clean air standards, therefore the state was granted the ability to create stricter standards than set by the CAA. Utilizing the ability to set stricter emission standards, California was granted a waiver of the CAA in July 2009 so that the state may set its own vehicle emission standards for new motor vehicles in order to reduce GHG and ozone emissions.³² In 2018, the Trump administration announced that the government would ease the federal vehicle fuel standards. As a response, and as a result of the autonomy provided by this waiver, California along with four major antimanufacturing companies pledged to produce vehicle fleets averaging approximately 50 miles per gallon (mpg) by 2026.

On September 19, 2019, under the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) and the U.S. EPA issued the final "One National Program Rule." The rule states that federal law preempts state and local laws regarding tailpipe GHG emissions standards, zero emissions vehicle mandates, and fuel economy for automobiles and light duty trucks. The rule revokes California's Clean Air Act waiver and preempts California's Advanced Clean Car Regulations and may potentially impact SCAG's Connect SoCal and transportation projects in the SCAG region.^{33, 34} On September 20, 2019, California, a coalition of 22 other states, and the cities of Los Angeles, New York and Washington, D.C., filed a lawsuit in the United States District Court for the District of Columbia (Case 1:19-cv-02826) challenging the SAFE Rule

³¹ Fed Center. 2019. *EO 13834*. Available online at: <https://www.fedcenter.gov/programs/eo13834/>, accessed September 16, 2019.

³² Federal Register. 2009. *Environmental Protection Agency: California State Motor Vehicle Pollution Control Standards; Notice of Decision Granting a Waiver of Clean Air Act Preemption for California's 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles; Notice*. Available online at: <https://www.govinfo.gov/content/pkg/FR-2009-07-08/pdf/E9-15943.pdf>, accessed September 18, 2019.

³³ U.S. Department of Transportation and U.S. EPA. 2019. *One National Program Rule on Federal Preemption of State Fuel Economy Standards*. Available online at: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100XI4W.pdf>, accessed October 29, 2019.

³⁴ Southern California Association of Governments. 2019. *Final Federal Safer, Affordable, Fuel-Efficient Vehicles Rule Part I (Supplemental Report)*. Available online at: http://www.scag.ca.gov/committees/CommitteeDocLibrary/EEC_Item8_RC_Item10%20Supplemental%20Report.pdf, accessed October 29, 2019.

and arguing that EPA lacks the legal authority to withdraw the California waiver. As such, at the time of this PEIR, it is unclear whether the SAFE Rule will remain in place.³⁵

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 US is required to meet the highest tier of emission standards, Tier 4. The U.S. EPA oversees the implementation of these regulations.³⁶

3.6.2.2 State

Assembly Bill 2076, Reducing Dependence on Petroleum

The California Energy Commission (CEC) and 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:³⁷

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.

³⁵ If the SAFE Rule remains in place, the State and region would have to develop other means of achieving the NAAQS.

³⁶ U.S. EPA. 2018. *Regulations for Emissions from Heavy Equipment with Compression-Ignition (Diesel) Engines*. Available online at: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression>, accessed September 26, 2019.

³⁷ State of California Air Resources Board. 2003. *Notice of Public Meeting to Consider Adoption of Recommendations to Reduce California's Dependence on Petroleum*. Available online at: <https://ww3.arb.ca.gov/regact/petdeprpt.htm>, accessed August 28, 2019.

Recommendations include:³⁸

- 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 Executive Order B-48-18 that guarantees \$2.5 billion dollars to help Californian's buy electric vehicles and expand a network of charging stations in order to have 5 million electric cards on the road by 2030.³⁹ Moreover, as stated above, see **Section 3.6.2.1, Federal Regulations**, California worked with four major automotive manufacturers to announce that the state would have a fleet of vehicles averaging approximately 50 mpg by 2026.⁴⁰

Warren-Alquist Act

The Warren-Alquist Act was passed in 1974 in order to establish the California Energy Commission to respond to the energy crisis in the early 1970's and to address the state's unsustainable growing demand for energy resources. The Energy Commission's Chief Counsel's Office publishes updated versions of the Warren-Alquist Act every two years. The most recent version was approved in February 2019.⁴¹

³⁸ Ibid.

³⁹ California Fuel Cell Partnership. 2018. *Workshop on Governor's Executive Order B-48-18*. Available online at: <https://cafcp.org/content/workshop-governor-s-executive-order-b-48-18>, accessed September 18, 2019.

⁴⁰ The Washington Post. 2019. *Trump Administration to Revoke California's Power to Set Stricter Auto Emissions Standards*. Available online at: https://www.washingtonpost.com/climate-environment/trump-administration-to-revoke-californias-power-to-set-stricter-auto-emissions-standards/2019/09/17/79af2ee0-d97b-11e9-a688-303693fb4b0b_story.html?noredirect=on, accessed September 18, 2019.

⁴¹ California Energy Commission. *Warren-Alquist Act*. Available online at: <https://www.energy.ca.gov/rules-and-regulations/warren-alquist-act>, accessed September 26, 2019.

Senate Bill 1368, Greenhouse Gas Emissions Performance Standard for Major Power Plant Investments

SB 1368 was passed in September 2006 and requires the CEC to develop and adopt by regulation a GHG emissions performance standard for long-term procurement of electricity by local publicly owned utilities.⁴²

Assembly Bill 32: Global Warming Solutions Act

Governor Arnold Schwarzenegger signed AB 32 (Global Warming Solutions Act) into law on September 27, 2006, requiring that the CARB reduce GHG emissions by 25 percent by 2020. In the interim, CARB will begin to measure the GHG emissions of the industries it determines to be significant emitters. The bill also provides the governor the ability to invoke a safety valve and suspend the emissions caps for up to one year in the case of an emergency or significant economic harm. Pursuant to AB 32, CARB must adopt regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions. The full implementation of AB 32 will help mitigate risks associated with climate change, while improving energy efficiency, expanding the use of renewable energy resources, cleaner transportation, and reducing waste.

AB 32 requires CARB to develop a Scoping Plan which lays out California's strategy for meeting the goals. The Scoping Plan must be updated every five years. In December 2008, CARB approved the initial Scoping Plan, which included a suite of measures to sharply cut GHG emissions. The most recent Climate Change Scoping Plan Update was published in January 2017 and highlights California's progress toward meeting the near-term 2020 GHG emissions reduction goals, highlights the latest climate change science, and provides direction on how to achieve long-term emission reduction goal described in EO S-3-05. As energy is one of the state's largest contributors to GHG emissions, efforts to reduce energy-related emissions are a key component of the Scoping Plan. The actions outlined in the Update also support California's efforts to build a state-of-the-art energy generation, supply and distribution system that is clean, affordable and reliable. A core element of the Update is the effort to reduce greenhouse gas emissions, specifically through low carbon energy, waste and water management, and sustainable agriculture, transportation and industry.⁴³

⁴² California Legislative Information. *Senate Bill No. 1368*.

⁴³ California Legislative Information. *Assembly Bill No. 32*.

Senate Bill 32 (SB 32) and Assembly Bill 197 (AB 197)

On September 8, 2016, California signed into law Senate Bill 32 (SB 32), which adds Section 38566 to the Health and Safety Code and requires a commitment to reducing statewide GHG emissions by 2020 to 1990 levels and by 2030 to 40 percent less than 1990 levels.⁴⁴ SB 32 was passed with companion legislation AB 197 Chapter 250, Statutes of 2016), which provides greater legislative oversight of CARB's GHG regulatory programs, requires CARB to account for the social costs of GHG emissions, and establishes a legislative preference for direct reductions of GHG emissions.⁴⁵

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 nine 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.⁴⁶

Assembly Bill 758 Energy: Energy Audit

New state law promulgated under AB 758 mandates the California Energy Commission (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), the CEC used ARRA funds to do state and local upgrade programs, workforce training, financing, and an outreach campaign. The 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.

⁴⁴ California Legislative Information. 2016. *Senate Bill 32*.

⁴⁵ California Legislative Information. 2016. *Assembly Bill 197*. 2019.

⁴⁶ California Legislative Information. *Assembly Bill No. 1007*..

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.⁴⁷

On December 14, 2016, the 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 greenhouse gas 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.⁴⁸

Assembly Bill 1493 (2009) / Advanced Clean Cars Program

The Advanced Clean Cars Program under AB 1493 (referred to as Pavley I), requires the California Air Resources Board (CARB) to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a “maximum feasible and cost effective reduction” by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as “LEV (Low Emission Vehicle) III GHG” will cover 2017 to 2025.⁴⁹

In January 2012, CARB adopted the Advanced Clean Cars program to extend AB 1493 through model years 2017 to 2025. This program will promote all types of clean fuel technologies such as plug-in hybrids, battery electric vehicles, compressed natural gas (CNG) vehicles, and hydrogen powered vehicles while reducing smog and saving consumers’ money in fuel costs. By 2025, when the rules will be fully implemented:

- New automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

47 California Energy Commission. 2012. *Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report*. August. Available online at: <http://www.aiacc.org/wp-content/uploads/2013/05/Comp-Ener-Efficiency-Programs-CEC-400-2012-01511.pdf>, accessed August 28, 2019.

48 California Energy Commission. 2016. *2016 Existing Buildings Energy Efficiency Plan Update December 2016*.

49 California Air Resources Board. 2017. *Clean Car Standards – Pavley, Assembly Bill 1493*. January. Available online at: <http://www.arb.ca.gov/cc/ccms/ccms.htm>, accessed December 14, 2018.

- Environmentally superior cars will be available across the range of models, from compacts, to SUVs, pickups and minivans.
- Consumer savings on fuel costs will average \$6,000 over the life of the car. The savings more than offsets the average \$1,900 increase in vehicle price for the ultra-clean, high-efficiency technology.⁵⁰

Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation

In December 2008, CARB adopted a new regulation aimed at reducing GHG emissions by improving the fuel efficiency of heavy-duty tractors pulling 53-foot or longer trailers. Increases in fuel efficiency were achieved through improvements in the aerodynamics of the tractor and trailer as well as the use of low rolling resistance tires. The rule went into effect in 2010 and by the end of 2020 is anticipated to have reduced diesel fuel consumption by 500 million gallons in California and 3.3 billion gallons nationwide.⁵¹

Senate Bill 2 Renewable Portfolio Standard

California's Renewable Portfolios Standard (RPS), under Senate Bill (SB) 2 of 2011, sets a procurement goal for electricity retail sellers including investor-owned utilities, electric service providers, and community choice aggregators to 33 percent renewable energy sources by 2020. The RPS has three compliance periods: Period 1 (2011–2013), Period 2 (2014–2016), and Period 3 (2017–2020) as intermediate targets before full compliance in 2020. The CEC is responsible for designating electrical generation facilities as renewable energy sources and enforcing RPS.⁵²

Part 11 of the California Code of Regulations: Green Building Code

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations, is commonly referred to as the CALGreen Code. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The 2010 CALGreen Code is a code with mandatory requirements for state-regulated buildings and structures throughout California beginning on January 1, 2011. The code

50 California Air Resources Board. 2018. *Advanced Clean Car Program*. Available online at: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program>, accessed December 14, 2018.

51 CARB. 2013. *Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation*. Available online at: <https://ww3.arb.ca.gov/cc/hdghg/hdghg.htm>, accessed September 26, 2019.

52 California Public Utilities Commission. *California Renewables Portfolio Standard*. Available online at: <http://www.cpuc.ca.gov/PUC/energy/Renewables/>, accessed December 14, 2018.

requires building commissioning, which is a process for the verification that all building systems, such as heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.⁵³

California Building Energy Efficiency Standards: 2013 Title 24, Part 6 (California Energy Code)

The Code California Energy Code (Title 24, Section 6) was created as part of the California Building Standards Code (Title 24 of the California Code of Regulations) by the California Building Standards Commission in 1978 to establish statewide building energy efficiency standards to reduce California's energy consumption.⁵⁴ These standards include provisions applicable to all buildings, residential and nonresidential, which describe requirements for documentation and certificates that the building meets the standards.⁵⁵ 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 control devices

⁵³ CARB. 2018. *Green Building Standards Code*. Available online at: <https://ww3.arb.ca.gov/cc/greenbuildings/standards.htm>, accessed August 28, 2019.

⁵⁴ California Energy Commission. 2013 Building Energy Efficiency Standards. Available online at: <https://www.energy.ca.gov/title24/2013standards/>, accessed December 14, 2018.

⁵⁵ Ibid.

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. In addition to the mandatory requirements, the standards call for further energy efficiency that can be provided through a choice between performance and prescriptive compliance approaches. Separate sections apply to low-rise residential and to non-residential, high-rise residential, and hotel or motel buildings. In buildings designed for mixed use (e.g., commercial and residential), each section must meet the standards applicable to that type of occupancy.

The performance approach set forth under these standards provides for the calculation of an energy budget for each building and allows flexibility in building systems and features to meet the budget. The energy budget addresses space-conditioning (cooling and heating), lighting, and water heating. Compliance with the budget is determined by the use of a CEC-approved computer software energy model. The alternative prescriptive standards require demonstrating compliance with specific minimum efficiency for components of the building such as building envelope insulation R-values, fenestration (areas, U-factor and solar heat gain coefficients of windows and doors) and heating and cooling, water heating and lighting system design requirements. These requirements vary depending on the building's location in the state's 16 climate zones.

California's Building Energy Efficiency Standards are updated on an approximately three-year cycle as technology and methods have evolved. As a result of new law under AB 970, passed in the fall of 2000 in response to the state's electricity crisis, an emergency update of the standards went into effect in June 2001. The CEC then initiated an immediate follow-on proceeding to consider and adopt updated standards that could not be completed during the emergency proceeding. The 2013 Standards went into effect July 1, 2014. The 2016 Standards went into effect on January 1, 2017, and the 2019 Standards go into effect on January 1, 2020 and will continue to improve upon the current Standards for new construction of, and additions and alterations to, residential and nonresidential buildings.⁵⁶

The 2013 Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, and include requirements that will enable both demand reductions during critical peak periods and future solar electric and thermal system installations.

⁵⁶ California Energy Commission. 2019. *2019 Building Energy Efficiency Standards*. Available online at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency>, accessed August 28, 2019.

California Solar Initiative

On January 12, 2006, the California Public Utilities Commission (CPUC) approved the California Solar Initiative (CSI; R.04-03-017), which provides \$2.9 billion in incentives between 2007 and 2017. The 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, the CEC managed \$350 million targeted for new residential building construction, utilizing funds already allocated to the CEC to foster renewable projects between 2007 and 2011.

On March 2, 2006, the CPUC opened a proceeding to develop rules and procedures for the California Solar Initiative 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 the CPUC and the CEC to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation, and directed the CPUC and the CEC to create 3,000 megawatts of new, solar-produced electricity by 2017. In 2017 alone, customers installed 1,262 MW of solar capacity.⁵⁷

California's 2019 Building Energy Efficiency Standards

In December 2018, the California Building Standards Commission gave the final approval to a solar PV requirement mandating all new buildings under three stories tall be equipped with solar systems. The standards officially take effect on January 1, 2020 and include solar installation, battery storage, and improved energy savings through high-performance walls, attics, and windows.⁵⁸

California Cap and Trade Program

CARB adopted the California Cap and Trade Program final regulations on October 20, 2011. An amended regulation was adopted on September 12, 2012, with the first auction for GHG allowances on November 14, 2012. The cap and trade program is a market-based mechanism to reduce GHG emissions in a cost-effective and economically efficient manner. California is the first multi-sector cap and trade program in North America following the northeast Regional Greenhouse Gas Initiative (RGGI) and the European Union Emission Trading Scheme (EU-ETS). It sets a GHG emissions limit that will decrease by 2 percent each year until 2015 and then 3 percent from 2015 to 2020 to achieve the goals set forth in AB 32. The

⁵⁷ California Public Utilities Commission. 2018. *California Solar Initiative, Annual Program Assessment*. June.

⁵⁸ California Energy Commission. 2019. *2019 Building Energy Efficiency Standards*. Available online at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency>, accessed August 28, 2019.

program initially applied to large electric power plants and large industrial plants, and, in 2015, expanded to include fuel distributors.⁵⁹

CARB's 2017 Update to Climate Change Scoping Plan (November 2017)

CARB's Climate Change Scoping Plan, which functions as a roadmap to achieve the California GHG reductions required by AB 32 and SB 32 through subsequently enacted regulations, is discussed in detail in 3.6, *Greenhouse Gases*. On December 14, 2017, CARB approved the final version of *California's 2017 Climate Change Scoping Plan (2017 Scoping Plan Update)*, which outlines the proposed framework of action for achieving California's new SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels. The 2017 Scoping Plan Update identifies key sectors of the implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. The Scoping Plan references a 2013 study by the CEC that shows 12 percent of the total energy used in the state is related to water, with 10 percent associated with water-related end uses (e.g., heating, cooling, pressurizing, and industrial processes) and 2 percent associated with energy used by water and wastewater systems (e.g., pump, convey, treat). These figures indicate that the greatest potential for water-related energy savings resides with water end users, while water agencies have a role in improving end-user water conservation and in reducing the energy intensity of their portfolios. SB 350 and other regulations are expected to decarbonize the electricity sector over time, which will in turn reduce the consumption of fossil-fuel-based energy to produce water.⁶⁰

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:⁶¹

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

⁵⁹ CARB. 2019. *Cap-and-Trade Regulatory Guidance*. Available online at: <https://ww3.arb.ca.gov/cc/test/cap-and-trade-faq.htm>, accessed August 28, 2019.

⁶⁰ CARB. 2017. *The 2017 Climate Change Scoping Plan Update*. January. Available online at: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed December 14, 2018.

⁶¹ Office of the Governor. 2006. *Executive Order S-06-06*. Available online at: https://ww2.energy.ca.gov/biomass/documents/EXEC_ORDER_S-06-06.PDF, accessed November 1, 2019.

Executive Order S-01-07

Governor Schwarzenegger signed EO S-01-07 into law on January 18, 2007, which establishes a statewide goal to reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020.⁶²

Low Carbon Fuel Standard

Pursuant to EO S-01-07 and AB 32 (discussed in **Section 3.8, Greenhouse Gas**), the California Air Resources Board (CARB) developed the Low Carbon Fuel Standard in order to encourage the use of cleaner low-carbon fuels in California, encourage the production of those cleaner fuels, and therefore, reduce greenhouse gas (GHG) emissions. The program is based on the principle that each fuel has “life cycle” GHG emissions which includes the production, transportation, and consumption of a given fuel. Each fuel is assigned a carbon intensity score, which is then compared to a declining carbon intensity benchmark for each year. Low carbon fuels below the benchmark generate credits, while fuels above the CI benchmark generate deficits. Credits and deficits are denominated in metric tons of GHG emissions. Providers of transportation fuels must demonstrate that the mix of fuels they supply for use in California meets the LCFS carbon intensity standards, or benchmarks, for each annual compliance period. A deficit generator meets its compliance obligation by ensuring that the amount of credits it earns or otherwise acquires from another party is equal to, or greater than, the deficits it has incurred.⁶³

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.⁶⁴

⁶² Office of the Governor. 2007. *Executive Order S-01-07*. Available online at: <https://ww3.arb.ca.gov/fuels/lcfs/eos0107.pdf>, accessed November 1, 2019.

⁶³ CARB. 2019. *Low Carbon Fuel Standard*. Available online at: <https://ww3.arb.ca.gov/fuels/lcfs/lcfs.htm>, accessed November 1, 2019.

⁶⁴ California Climate Change. *Executive Order B-18-12*. Available online at: https://www.climatechange.ca.gov/climate_action_team/documents/Executive_Order_B-18-12.pdf, accessed August 28, 2019.

- 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-emission vehicles (ZEVs), 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 2025.⁶⁵

Executive Order B-30-15

EO B-30-15 reiterates a 2050 GHG emissions target of 80 percent below 1990 levels and sets a new interim target of 40 percent below 1990 levels by 2030. It further orders in relevant part:⁶⁶

- CARB to update the Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent;
- CARB to update every three years the state’s climate adaptation strategy;
- “State agencies shall take climate change into account in their planning and investment decisions, and employ full life-cycle cost accounting to evaluate and compare infrastructure investments and alternatives;”

⁶⁵ California Fuel Cell Partnership. 2018. *Workshop on Governor’s Executive Order B-48-18*. Available online at: <https://cafcp.org/content/workshop-governor’s-executive-order-b-48-18>, accessed September 18, 2019.

⁶⁶ Office of Governor Edmund G. Brown Jr., *Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America*. Available online at: <https://www.ca.gov/archive/gov39/2015/04/29/news18938/>, accessed August 28, 2019.

- “State agencies’ planning and investment shall be guided by the following principles:
 - Priority should be given to actions that both build climate preparedness and reduce greenhouse gas emissions;
 - Where possible, flexible and adaptive approaches should be taken to prepare for uncertain climate impacts;
 - Actions should protect the state’s most vulnerable populations; and
 - Natural infrastructure solutions should be prioritized; and
- OPR to establish a technical advisory group to help state agencies incorporate climate change impacts into planning and investment decisions.

Executive Order N-19-19

On September 20, 2019, Governor Newsom issued Executive Order N-19-19 which requires the redoubling of the state’s “efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy.” EO N-19-19 requires the Department of Finance to create a Climate Investment Framework with a strategy to align the state’s \$700 billion investment portfolio towards industries and sectors that contribute to the reduction of carbon emissions and increased resilience to the impacts of climate change. The State Transportation Agency shall leverage over \$5 billion in annual state transportation spending to reduce fuel consumption and GHG emissions associated with the transportation sector. The Department of General Services shall reduce the state government’s GHG footprint. Finally, the California Air Resources Board (CARB) shall develop new criteria for the clean vehicle incentive programs, propose new strategies to increase demand for zero emission vehicles, and consider strengthening existing or adopting new transportation-GHG reduction regulations in order to meet California’s goal of five million zero emissions vehicle sales by 2030.⁶⁷

Senate Bill 375 (SB 375)

SB 375, adopted in 2008, builds on AB 32, SB 375 (Chapter 728, Statutes of 2008) seeks to coordinate land use planning, housing planning, regional transportation planning, and GHG reductions. SB 375 addresses that reductions can be made through energy conservation and amended Government Code 65583 to

⁶⁷ Adaptation Clearinghouse. 2019. *State of California Executive Order N-19-19*. Available online at: <https://www.adaptationclearinghouse.org/resources/state-of-california-executive-order-n-19-19.html>, accessed October 29, 2019.

ensure the housing element of a sustainable communities strategy provide a proper analysis of energy conservation.⁶⁸ See **Section 3.8, Greenhouse Gas**, for further discussion of SB 375.

Senate Bill 350 (SB 350)

SB 350 was approved by Governor Brown on October 7, 2015. SB 350 does the following: (1) increases the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provides for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) requires the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas end uses of retail customers through energy efficiency and conservation.⁶⁹

Senate Bill 100 (SB 100)

Under SB 350, the state of California committed to reaching 50% renewable energy by December 31, 2030. SB 100, also known as “The 100 Percent Clean Energy Act of 2018,” revises the goals of SB 350 in order to achieve 50% renewable resources target by December 31, 2026 and achieve a 60% target by December 31, 2030 in order to plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy and zero-carbon resources by December 31, 2045. The transition to renewable energy resources is intended to provide the following benefits to California:⁷⁰

- Displacing fossil fuel consumption within the state.
- Adding new electrical generating facilities in the transmission network within the West Electricity Coordinating Council (WECC).
- Reducing air pollution, particularly criteria air pollutant emissions and toxic air contaminants, in the state.

⁶⁸ California Legislative Information. 2008. *Senate Bill 375*.

⁶⁹ California Legislative Information. *Senate Bill No. 350*.

⁷⁰ California Legislative Information. *Senate Bill No. 100*.

- Meeting the state’s climate change goals by reducing emissions of greenhouse gases associated with electrical generation.
- Promoting stable retail rates for electric service.
- Meeting the state’s need for a diversified and balanced energy generation portfolio.
- Assisting with meeting the state’s resource adequacy requirements.
- Contributing to the safe and reliable operation of the electrical grid, including providing predictable electrical supply, voltage support, lower line losses, and congestion relief.
- Implementing the state’s transmission and land use planning activities related to development of eligible renewable energy resources.

3.6.2.3 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 alternative fuel vehicles (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.⁷¹

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 alternative fuel vehicles and infrastructure throughout the SCAG region.

⁷¹ U.S. Department of Energy. *Clean Cities Coalition Network*. Available online at: <https://cleancities.energy.gov/about/>, accessed August 28, 2019.

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.

Los Angeles Countywide Sustainability Plan

The Los Angeles Countywide Sustainability Plan, also named OurCounty, is a regional sustainability plan for Los Angeles focused around the following goals:

- **Goal 1:** Resilient and healthy community environments where residents thrive in place;
- **Goal 2:** Buildings and infrastructure that support human health and resilience;
- **Goal 3:** Equitable and sustainable land use and development without displacement;
- **Goal 4:** A prosperous LA County that provides opportunities for all residents and businesses and supports the transition to a green economy;
- **Goal 5:** Thriving ecosystems, habitats, and biodiversity;
- **Goal 6:** Accessible parks, beaches, recreational waters, public lands, and public spaces that create opportunities for respite, recreation, ecological discovery, and cultural activities;
- **Goal 7:** A fossil fuel-free LA County;
- **Goal 8:** A convenient, safe, clean, and affordable transportation system that enhances mobility while reducing car dependency;
- **Goal 9:** Sustainable production and consumption of resources;
- **Goal 10:** A sustainable and just food system that enhances access to affordable, local, and healthy food;

- **Goal 11:** Inclusive, transparent, and accountable governance that facilitates participation in sustainability efforts, especially by disempowered communities;
- **Goal 12:** A commitment to realize OurCounty sustainable goals through creative, equitable, and coordinated funding and partnerships.⁷²

3.6.2.4 Local

Many cities within the SCAG region have established green plans or climate action plans (CAPs) that include goals and policies to reduce energy use and the associated emissions to meet AB 32 and SB 32 climate goals. 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 Gases**), 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 include:

- Building a zero-carbon electricity grid – reaching an accelerated goal of 80% renewable energy supply by 2036 as Los Angeles leads California toward 100% renewable by 2045.
- Creating a Jobs Cabinet to bring city, labor, educations, and business leaders together to support our effort to create 300,000 green jobs by 2035 and 400,000 by 2050.
- 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.
- Achieving a zero-waste future by phasing out Styrofoam by 2021, ending the use of plastic straws and single-use takeout containers by 2028, and no longer sending any trash to landfills by 2050.
- Recycling 100% of our wastewater by 2035; sourcing 70% of our water locally – a significant increase from our existing pathway; and nearly tripling the maximum amount of stormwater captured.

⁷² County of Los Angeles. *Los Angeles Countywide Sustainability Plan*. Available online at: <https://ourcountyla.org/wp-content/uploads/2019/07/OurCounty-Final-Plan.pdf>, accessed September 12, 2019.

- Planting and maintaining at least 90,000 trees – which will provide 61 million square feet of shade – citywide by 2021 and increasing tree canopy in low-income, severely heat impacted areas by at least 50% by 2028.

The Green New Deal aims to reach a 50% reduction in GHG emissions by 2025 and reach net neutrality by 2050. The Green New Deal builds upon the City’s Sustainable City pLAN, in which the City met or exceeded 90% of the City’s long-term goals on time or early, resulting in a reduction of GHG emissions by 11% in a single year and creating more than 35,000 green jobs.⁷³

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 megawatts (MW) of photovoltaic systems by 2020, reduce the City’s peak electrical load demand by 10%, and meet 33% of electricity demand from renewable sources by 2050.⁷⁴

3.6.3 ENVIRONMENTAL IMPACTS

3.6.3.1 Thresholds of Significance

For purposes of this PEIR, SCAG has determined that adoption of implementation of the Plan could result in significant adverse impacts regarding energy if the Plan would result in any of the following:

- 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

3.6.3.2 Methodology

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

⁷³ City of Los Angeles. 2019. *Mayor Garcetti Launches L.A.’s Green New Deal*. Available online at: <https://www.lamayor.org/mayor-garcetti-launches-la%E2%80%99s-green-new-deal>, accessed September 12, 2019.

⁷⁴ City of Riverside. 2012. *Green Action Plan*. Available online at: https://www.riversideca.gov/utilities/greenriverside/pdf/Green_Action_Plan%202012.pdf, accessed September 12, 2019.

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 2019 California Environmental Quality Act (CEQA) Guidelines. In addition, Appendix F, 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.

Estimated energy consumption in the Plan horizon year of 2045 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 2045 than in any earlier year, and future conservation efforts may not be fully quantified at this time. Building energy and water consumption were estimated for future horizon year 2045 using SCAGs Urban Footprint Scenario Planning Model (SPM).⁷⁵ The SPM is a web-based scenario development, modeling, and data organization tool developed to facilitate informed and collaborative regional planning. Built on open source software platforms, the SPM includes a suite of tools and analytical engines that help to illustrate planning and policy growth scenarios and to estimate and compare, in relatives, potential benefits and effects among scenarios in transportation, environment, fiscal, public health, and community. Moreover, the SPM provides a common data framework within which local planning efforts can be easily integrated and synced with regional plans.

SPM calculates greenhouse gas (GHG) emissions associated with building energy use as a function of energy use and GHG emission rates for electricity generation and natural gas combustion. To correspond with residential and commercial building energy emissions as determined by CARB GHG Inventory, SPM uses a baseline CO_{2e} emission rate derived by dividing California's total emissions attributed to electric power generation in 2016 by total electricity consumption in that year. Future electricity emissions rates are calculated based on projected resource mix that meets the California Renewables Portfolio Standard (RPS) goal of 50% renewable sources by 2030 and remains unchanged thereafter. Emissions from on-site natural gas combustion are assumed to remain constant at the CPUC-approved baseline rate, which already represents a high level of efficiency.

Water-related energy use and greenhouse gas (GHG) emissions refer to those resulting from 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 and emissions for water system uses only. The per-gallon energy use factors associated with the system uses were estimated by the CEC in a 2005 report, *California's Water-*

⁷⁵ Southern California Association of Governments. Accessed 30 October 2015. *Scenario Planning Model*. Available at: <http://sp.scag.ca.gov/Pages/About.aspx>

Energy Relationship, and a 2006 refinement of the report's original factors. The GHG emission rates per kilowatt-hour of water-related electricity use are assumed to be the same as building energy use.

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 the U.S. Energy Information Administration (EIA) for California;⁷⁶ and review of related literature germane to the SCAG region.

The mitigation measures in the PEIR are divided into two categories: SCAG mitigation and project-level mitigation measures. SCAG mitigation measures shall be implemented by SCAG over the lifetime of the Plan. For projects proposing to streamline environmental review pursuant to SB 375, SB 743, or SB 226 (as described in **Chapter 1.0, Introduction**), or for projects otherwise tiering off this PEIR, the project-level mitigation measures described below (or comparable measures) can and should be considered and implemented by Lead Agencies and Project Sponsors during the subsequent, project- or site-specific environmental reviews for transportation and development projects as applicable and feasible. However, SCAG cannot require implementing agencies to adopt mitigation, and it is ultimately the responsibility of the implementing agency to determine and adopt project-specific mitigation.

3.6.3.3 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.

Less than Significant Impact.

Implementation of transportation projects and the land use strategies reflected in the Plan, is not expected to result in wasteful, inefficient, or unnecessary energy consumption. The Plan includes many 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 (see **Table 3.17-11, Major Transit Capital Projects**; **Table 3.17-12, Daily Transit Boarding**; and **Table 3.17-14, Total VMT 2019 and 2045 by County**). As shown in **Table 2.0-3, Connect SoCal Expenditure (in Billions)**, SCAG has programmed more than \$17 billion in active transportation

⁷⁶ U.S. Energy Information Administration. 2018. *State Profile and Energy Estimates: California*. Available online at: <http://www.eia.gov/state/?sid=ca>, accessed December 18, 2018.

projects. 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 purchase of 170 solar-powered bus information signs in Los Angeles as well upgrades to a Los Angeles Metro maintenance facility with up-to-date solar panels and a battery storage system.⁷⁷ The Plan's transportation projects are integrated with the land use strategies that promote HQTAs, livable corridors, and neighborhood mobility areas. 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). Therefore, overall energy use would not be wasteful or inefficient.

Construction

Transportation Projects

Construction of transportation projects would result in short-term consumption of energy resulting from the use of construction equipment and processes. 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.

Construction of individual transportation projects within the SCAG region as a result of the Plan would use energy resources, such as petroleum fuel to operate off-road construction equipment. The EPA 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.⁷⁸ Construction also requires heavy duty truck trips for vendor trips or to remove grading and demolition debris from individual sites. In order to address greenhouse gas emissions from these heavy-duty trucks, the California Air Resources Board (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 **Section 3.6.2.2**). This policy is expected to have reduced diesel fuel consumption in heavy duty trucks by 500 million gallons in California from 2010 to 2020.⁷⁹ 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. The regulation requires nearly all trucks and buses to have 2010 or newer model year engines by

⁷⁷ SCAG. 2019. *Project List*.

⁷⁸ Diesel Technology Forum. *About Clean Diesel Construction*. Available online at: <https://www.dieselforum.org/about-clean-diesel/construction>, accessed September 18, 2019.

⁷⁹ California Air Resources Board. 2013. *Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation*. Available online at: <https://ww3.arb.ca.gov/cc/hdghg/hdghg.htm>, accessed September 18, 2019.

January 1, 2023.⁸⁰

Land Use Development

Similar to transportation projects, construction of development projects would result in short-term consumption of energy resulting from the use of construction equipment. The California Green Building Standards Code (CALGreen Code)⁸¹ 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 off-road construction equipment. As noted above, EPA Tier 4 construction engine standards provide greater energy efficiency and productivity.⁸²

Growth under the Plan

The SCAG region is anticipated to grow by approximately 3.2 million people over the lifetime of the Plan. Due to increases 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). The Plan's transportation projects are not only aimed at reducing VMT (see **Table 13.17-14, Total VMT 2019 and 2045**), the Plan also 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

⁸⁰ CARB. 2019. *Truck and Bus Regulation Compliance Requirement Overview*. Available online at: https://ww3.arb.ca.gov/msprog/onrdiesel/documents/fsregsum.pdf?_ga=2.250600582.1896330852.1574097006-1229197864.1566229390, accessed November 18, 2019.

⁸¹ Building Standards Commission. *CALGreen*. Available online at: <https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen>, available online at: <https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen>, accessed November 1, 2019.

⁸² Diesel Technology Forum. *About Clean Diesel Construction*. Available online at: <https://www.dieselforum.org/about-clean-diesel/construction>, accessed September 18, 2019.

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 2045 (see **Table 3.6-4, SCAG Region Estimated Transportation Fuel Consumption**).

Land Use Development

Residential Energy Use

Growth under the Plan would increase residential energy consumption due to the increase in total households by 2045. It is expected that the SCAG region would add approximately 1.4 million households from 2019 to 2045. The residential energy consumption per household is expected to decline from 56 million British thermal unit (Btu) in 2019 to 44 million Btu in 2045 with implementation of the Plan (**Table 3.6-1, Residential Energy Use and Cost per Household**). Additionally, the Plan includes land use 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 21 percent reduction in per household energy consumption and an estimated 23 percent reduction in residential electricity consumption per household (**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 3 percent.

**Table 3.6-1
Residential Energy Use and Cost per Household**

	2019	No Project 2045	Plan 2045	% Difference from 2019 to Plan
Residential energy use per household (Btu in millions)	56	45	44	-21%
Residential electricity use per household (kWh)	6,877	5,400	5,270	-23%
Number of households	6,212,000	7,722,000	7,722,000	24%
Residential energy use (Btu in trillions)	350	347	338	-3.4%
Residential energy cost (in billions)	\$9.30	\$15.60	\$15.20	63%

Note: Btu = British thermal unit; kWh = kilowatt-hour

Source: SCAG Modeling, 2019.

Residential energy costs are expected to increase from \$9.3 billion in 2019 to \$15.2 billion in 2045 across the SCAG region. This represents an approximately \$479 increase in household energy costs from 2019 to 2045 (Table 3.6-2, Residential Energy and Water Cost per Household). Increased energy costs, despite lower energy use, can be explained by increasing electricity and natural gas per unit costs. Table 3.6-2 shows there would be an estimated 25 percent increase in household cost compared to the 2019 base year. The total utility cost per household, including both energy and water cost is expected to increase by \$498 from 2019 to 2045. Water costs are anticipated to decrease, but do not proportionally decrease as much as energy costs increase.

**Table 3.6-2
Residential Energy and Water Cost per Household**

	(2019)	2045 No Project	2045 Plan	% Difference from 2019 to Plan
Residential energy cost per household	\$1,494	\$2,020	\$1,973	32%
Residential water cost per household	\$403	\$409	\$392	-3%
Total utilities (energy + water) cost per household	\$1,897	\$2,429	\$2,365	25%

Source:

SCAG scenario planning modeling, 2019.

Impact Sciences, 2019

Although the total population is expected to increase by 16 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, by 2020, California will require every new home to be equipped with solar power,^{83, 84} 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 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. As such, residential energy use would not be wasteful.

Building Energy Consumption

By 2045, the SCAG region is expected to add approximately 3.2 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 2045 (**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 2 percent under the Plan (**Table 3.6-3**). The residential sector would use less energy in the future (3 percent decrease); the commercial sector would use the same amount of energy in the future. Since total building energy would decrease under the Plan, the Plan would not result in the wasteful or inefficient use of energy.

⁸³ The New York Times. *California Will Require Solar Power for New Homes*. Available online at: <https://www.nytimes.com/2018/05/09/business/energy-environment/california-solar-power.html>, accessed September 12, 2019.

⁸⁴ California Energy Commission. 2019. *2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. See Section 110.10. Available online at: <https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf>, accessed November 1, 2011.

**Table 3.6-3
Building Energy Consumption – Residential and Commercial**

	Base Year (2019)	No Plan (2045)	Plan (2045)	% Difference from Base Year
Residential electricity consumed (GWh)	42,722	41,701	40,692	-5%
Residential natural gas consumed (therms in billions)	2	2	2	0%
Residential energy consumed (Btu in trillions)	350	347	338	-3%
Commercial electricity consumed (GWh)	49,881	53,161	50,309	1%
Commercial natural gas consumed (therms in billions)	0.5	0.5	0.5	0%
Commercial energy consumed (Btu in trillions)	221	231	221	0%
Total energy consumed (Btu in trillions)	571	578	559	-2%

Note: GWh = gigawatt-hour; Btu = British thermal unit.

Source: SCAG Scenario Planning Modeling, 2019.

As shown above, total building energy consumed in the SCAG region over the lifetime of the Plan is anticipated to decrease by 2%. According to SCAG, the population in 2019 is approximately 19.3 million people, result in a per capita building energy use 29.5 million Btu/person. The population is estimated to reach 22.5 million people by 2045, resulting in a 2045 per capita building energy use of 24.8 million Btu/person. Therefore, per capita building energy use will decrease by 4.7 million Btu/person. As a result, building energy efficiency will increase.

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 19.4 percent from 8.3 billion gallons in 2019 to the projected 6.7 billion gallons in 2045 (**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	8.3	22,865	—
2045 No Project	6.9	18,869	-17.5%
2045 Plan	6.7	18,437	-19.4%

Source: SCAG Transportation Modeling, 2019.

As the SCAG region gains employment and population, total VMT will increase (see **Table 3.17-14, Total VMT 2019 and 2045 by County**). Proposed transportation investments and the land use strategies that encourage carpooling, increase transit use and active transportation opportunities, and promote more walkable and mixed-use communities would help reduce VMT and would reduce per capita VMT but reductions would not be enough to offset total VMT increases. Total VMT would increase in 2045 compared to existing (see **Table 3.17-14**). 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) (see **Table 3.17-17, Total Daily Vehicle Hours of Delay**), and more alternative fuel and zero emissions vehicle types on the road. In accordance with EO B-48-18, five million ZEV's are expected to be on California roadways in 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.⁸⁵ Therefore, the use of petroleum would not be wasteful or inefficient.

Energy and Water-Related Energy Use

Increasing water efficiencies are anticipated to result in a decrease in residential water use in the future. Overall residential and commercial water use in the region is anticipated to decrease by 5 percent. As a result of increasing energy efficiencies and decreases in total water use, water-related energy use would not be wasteful or inefficient and therefore the impact would be less than significant.

As shown in **Table 3.6-5, Water Use—Residential and Commercial**, the majority of water use reductions are expected from the residential sector, which is anticipated to reduce water use over the lifetime of the Plan by approximately 14% (combined indoor and outdoor). Reductions in the residential sector are

⁸⁵ California Air Resources Board. 2013. *Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation*. Available online at: <https://ww3.arb.ca.gov/cc/hdghg/hdghg.htm>, accessed September 18, 2019.

anticipated to result from policies implemented as a result of the 2012-2015 drought. 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.⁸⁶ Larger reductions are seen in the outdoor water use compared with the indoor water use for both residential and commercial. 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's land use strategies that encourage more compact development in existing urbanized areas and opportunity areas.

**Table 3.6-5
Water Use – Residential and Commercial**

	2019	2045 No Project	2045 Plan	% Difference from 2019
Indoor residential water use (AF)	1,200,854	1,152,888	1,121,335	-7%
Outdoor residential water use (AF)	973,387	829,561	791,901	-19%
Residential water use (AF)	2,174,241	1,982,449	1,913,236	-12%
Indoor commercial water use (AF)	708,821	856,138	868,901	23%
Outdoor commercial water use (AF)	390,535	351,650	340,534	-13%
Commercial water use (AF)	1,099,356	1,207,788	1,209,434	10%
Total water use (AF)	3,273,597	3,190,237	3,122,670	-5%

Note: AF = acre-feet.

Source: SCAG scenario planning modeling, 2019.

As shown above, total water use in the SCAG region by 2045 is anticipated to decrease by 5%. Indoor residential, outdoor residential, and outdoor commercial are anticipated to decrease in water use; however, indoor commercial water use is anticipated to increase by 23% 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 commercial uses that will be required for a population increase of 3.2 million people.

⁸⁶ PPIC Water Policy Center. 2019. *Just the Facts: Water Use in California*. Available online at: https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2019/06_June/June2019_Item_12_Attach_2_PPICFactSheets.pdf?la=en&hash=E233EA870DFB826F235B258177849300179E1B64, accessed September 12, 2019.

As noted above, water use is closely tied to the electricity required to transport, distribute, and treat water.⁸⁷ Water-related electricity use is expected to decrease from 13,040 gigawatt-hours (GWh) to 12,544 GWh in 2045 with the Plan, which represents a 4 percent decrease in electricity (**Table 3.6-6, Water-Related Energy Use**).

**Table 3.6-6
Water-Related Energy Use**

	2019	2045 No Project	2045 Plan	% Difference from Baseline
Water-related electricity use (GWh)	13,040	12,672	12,544	-4%

Note: GWh = gigawatt-hour.

Water related energy use does not include heating of water

Source: SCAG scenario planning modeling, 2019.

As demonstrated in the table above, the total water-related electricity use is expected to decrease by 4% over the lifetime of the Plan. Based on data provided by SCAG, the per capita water-electricity use is 674 kWh/person for the existing condition. In a 2045 per capita water-related electricity use is expected to be 557 kWh/person. Therefore, the per capita water-related electricity use will decrease by 117 kWh/person. As a result, water-related electricity use efficiency will increase.

As demonstrated above, fuel consumption, total building energy use, and water related energy use are expected to decrease over the lifetime of the Plan. Water-related electricity use efficiency is also anticipated to decrease over the lifetime of the Plan. However, as stated above, the per capita building energy use efficiency is anticipated to increase by 4.7 million Btu/person.

In summary, construction energy use is anticipated to be more efficient (and less wasteful) in the future as Tier 4 construction equipment combined with CARB regulations for reducing fuel use in heavy-duty diesel trucks used for hauling construction materials are implemented. Additionally, the transportation projects combined with transportation and land use strategies will encourage compact (more efficient) land use and more efficient, less energy intensive transportation (transit, bike, walk) which will result in a lower VMT per capita. Therefore, the Plan would not result in wasteful or inefficient use of energy and this impact is less than significant.

⁸⁷ 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 plants in the future, the water-related energy use could increase.

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

Less than Significant Impact.

As discussed above, the Plan would result in a decrease in per capita energy use and would not 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 the California Energy Commission (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. 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 proposed Plan would not conflict with these policies. Refer to **Section 3.8, Greenhouse Gas Emissions**, for a discussion of greenhouse gas 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, bike and pedestrian programs, among others.

Development under the Plan would be required to be consistent with applicable regulations and policies including the LA County Sustainability Plan, the LA Green New Deal, as well as the 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. In summary, implementation of the Plan would not result in wasteful or inefficient energy consumption within the region and is generally consistent with applicable policies regarding energy conservation and renewable energy. Therefore, impacts would be less than significant.

3.6.4 SOURCES

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