3.6
ENERGY

This section of the Program Environmental Impact Report (PEIR) considers the energy implications of the proposed 2016 Regional Transportation Plan/Sustainable Communities Strategy ("2016 RTP/SCS," "Plan," or "Project"), including a discussion of the potential energy impacts of the proposed policies, programs, and projects included in the 2016 RTP/SCS, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy, identifies mitigation measures for the impacts, and evaluates the residual impacts. Energy resources including non-renewable energy consumption, residential and commercial building energy consumption, and water-related energy consumption were evaluated in accordance with Appendix F of the 2015 California Environmental Quality Act (CEQA) Guidelines. 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;[1] a review of related literature germane to the SCAG region; and review of SCAG's 2012 RTP/SCS PEIR.[2]

The EIA profiles California in relation to energy production and consumption, demonstrating the vast potential for production and one of the most efficient users of energy in the nation:

- "Excluding federal offshore areas, California ranked third in the nation in crude oil production in 2013, despite an overall decline in production rates since the mid-1980s.
- California also ranked third in the nation in refining capacity as of January 2014, with a combined capacity of almost 2 million barrels per calendar day from its 18 operable refineries.
- In 2012, California's per capita energy consumption ranked 49th in the nation; the state's low use of energy was due in part to its mild climate and its energy efficiency programs.
- In 2013, California ranked fourth in the nation in conventional hydroelectric generation, second in net electricity generation from other renewable energy resources, and first as a producer of electricity from geothermal energy.
- In 2013, California ranked 15th in net electricity generation from nuclear power after one of its two nuclear plants was taken out of service in January 2012; as of June 2013, operations permanently ceased at that plant, the San Onofre Nuclear Generating Station.
- Average site electricity consumption in California homes is among the lowest in the nation (6.9 megawatt-hours per year), according to EIA's Residential Energy Consumption Survey."[3]

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1 U.S. Energy Information Administration. Accessed 7 September 2015. *State Profile and Energy Estimates: California.* Available at: http://www.eia.gov/state/?sid=ca

2 Southern California Association of Governments. April 2012. Final Program Environmental Report: 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy. Available at: http://rtpscs.scag.ca.gov/Pages/Final-2012-PEIR.aspx

3 U.S. Energy Information Administration. Accessed 7 September 2015. *State Profile and Energy Estimates: California.* Available at: http://www.eia.gov/state/?sid=ca

3.6.1 REGULATORY FRAMEWORK

This regulatory framework focuses on the federal, state, and local statutes and regulations where the primary objective is energy efficiency, incorporating renewable energy sources, or energy supply/distribution. However, there are other regulations that are focused on reducing greenhouse gas emissions, improving air quality, and transportation improvements, that if accomplished would be expected to contribute to these energy goals. Those regulations have been addressed respectively in **Section 3.3, *Air Quality***; **Section 3.8, *Greenhouse Gas Emissions and Climate Change***; and **Section 3.18, *Transportation, Traffic, and Safety***.

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.[4]

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. It includes five statutes:

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

[4] USLegal, Inc. Accessed 17 August 2015. *Energy Policy and Conservation*. Available at: http://energylaw.uslegal.com/energy-policy-and-conservation/

Of the five statutes, one, PURPA, is relevant to the consideration of the 2016 RTP/SCS.

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.

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.[5]

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU; Public Law 109-159) was signed into law. SAFETEA-LU provides funding for highways, highway safety, and public transportation totaling $244.1 billion, representing the largest surface transportation investment ever. SAFETEA-LU promotes energy efficiency in vehicles and encourages agencies to find ways to reduce fuel use in its transit operations. SAFETEA-LU expired in 2009, but Congress extended the legislation; the most recent extension is known as Moving Ahead for Progress in

[5] U.S. Department of Energy, Alternative Fuels Data Center. Accessed 18 August 2015. *Key Federal Legislation.* Available at: http://www.afdc.energy.gov/laws/key_legislation

the 21st Century (MAP-21). MAP-21 reauthorized most SAFETEA-LU highway, transit and Safety programs through September 2014.

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.

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 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.

Moving Ahead for Progress in the 21st Century

MAP-21 (Public Law 112-141) replaces SAFETEA-LU as the nation's surface transportation program and extended the provisions for fiscal year (FY) 12 with new provisions for FY 13. MAP-21 funds surface transportation programs at over $105 billion for FY 2013 and FY 2014. It is 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. It is anticipated that the following bill will address a broader set of performance measures linking energy consumption to investment dollars.

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.

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

As of June 2015, The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) are jointly proposing a national program that would establish 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. Phase 2 would save the heavy duty vehicle industry billions of dollars' worth of fuel, reduce the cost of transporting goods, cut fuel consumption, and reduce GHG emissions by 1 billion metric tons. Fuel consumption of tractor trailers alone could decrease by 24 percent. The proposed 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.[6]

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:

[6] Environmental Protection Agency. June 2015. *Cutting Carbon Pollution, Improving Fuel Efficiency, Saving Money, and Supporting Innovation for Trucks*. Available at: http://www3.epa.gov/otaq/climate/documents/420f15900.pdf

- 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.

Executive Order 13693, Planning for Federal Sustainability in the Next Decade

EO 13693 was signed by President Obama on October 5, 2009. The goal of EO 13693 is to maintain federal leadership in sustainability and GHG emissions reductions. EO 13693 promotes building energy conservation, efficiency, and management by reducing agency building energy intensity measured in British thermal units per gross square foot by 2.5 percent annually through the end of fiscal year 2025, relative to the baseline of the agency's building energy use in fiscal year 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.

State

Assembly Bill 2075, Reducing Dependence on Petroleum

The CEC and CARB are directed by law, 2000 AB 2075 (2000), to develop and adopt recommendations for reducing dependence on petroleum. A performance based goal is to reduce petroleum demand to 15 percent below 2003 demand. The options include the following:[7]

Near-Term Options (could be fully implemented by 2010):

- Use more fuel efficient replacement tires with proper inflation;
- Improve fuel economy in government fleets; and
- Improve private vehicle maintenance.

Mid-Term Options (could be fully implemented in the 2010–2020 time frame):

- 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.

[7] California Energy Commission and California Air Resources Board. 14 August 2003. *Reducing California's Petroleum Dependence*. Adopted Joint Agency AB 2076 Report, Publication # 600-03-006F. Sacramento, CA.

Long-Term Options:

- Introduce fuel cell light duty vehicles in 2012, increasing to 10 percent of new vehicle sales by 2020, and 20 percent by 2030.

Recommendations include:[8]

- 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.

Senate Bill 1 (Million Solar Roofs)

The Million Solar Roofs program under SB 1 (2006) sets a goal to install 3,000 megawatts of new solar capacity by 2017, moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. This is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. It provides up to $3.3 billion in financial incentives that decline over time.

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.

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.[9] 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,

[8] California Energy Commission and California Air Resources Board. 14 August 2003. *Reducing California's Petroleum Dependence*. Adopted Joint Agency AB 2076 Report, Publication # 600-03-006F. Sacramento, CA.

[9] California Air Resources Board. 5 August 2014. *Assembly Bill 32 Overview.* Available at: http://www.arb.ca.gov/cc/ab32/ab32.htm

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. In May 2014, CARB approved the First Update to the Climate Change Scoping Plan (Update), which builds upon the initial Scoping Plan with new strategies and recommendations.[10] The Update 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 development of a comprehensive greenhouse gas reduction program for the state's electric and energy utilities by 2016. This approach will give utilities, electricity providers and a range of other businesses the flexibility and the right incentives to pursue the most innovative strategies to cut emissions. The Update recommends the following actions for the energy sector in California:

- Thoroughly account for the carbon intensity and air quality impacts of various energy resources, generation technologies, and associated fuels.
- Maximize local and regional benefits of energy facilities.
- Minimize emissions of criteria and toxic air pollutants.
- Avoid disproportionate impacts to disadvantaged communities.
- An enforceable program for all energy and electricity service providers.
- Recordkeeping and reporting mechanisms to monitor and enforce the GHG emissions reduction requirements.

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.

[10] State of California. May 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework Pursuant to AB 32.* Available at: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

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. 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.[11]

On August 28, 2015, the CEC published the final 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.[12]

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. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016.[13]

As of 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:

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[11] California Energy Commission. Accessed September 1, 2015. *Comprehensive Energy Efficiency Program for Existing Buildings.* Available at: http://www.energy.ca.gov/ab758/

[12] California Energy Commission. 28 August 2015. *Existing Buildings Energy Efficiency Action Plan*. Available at: http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-05/TN205919_20150828T153953_Existing_Buildings_Energy_Efficiency_Action_Plan.pdf

[13] California Air Resources Board. 6 May 2013. *Clean Car Standards – Pavley, Assembly Bill 1493*. Available at: http://www.arb.ca.gov/cc/ccms/ccms.htm

- New automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.
- 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.[14]

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.[15]

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 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.

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.[16] These standards include provisions applicable to all buildings, residential and nonresidential, which describe requirements for documentation and certificates that the building meets

[14] California Air Resources Board. Accessed 20 August 2015. *California's Advanced Clean Car Program.* Available at: http://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc.htm

[15] California Public Utilities Commission. 6 April 2015. *California Renewables Portfolio Standard*. Available at: http://www.cpuc.ca.gov/PUC/energy/Renewables/

[16] California Building Standards Commission. Accessed 26 June 2015. *History.* Available at: http://www.bsc.ca.gov/abt_bsc/history.aspx

the standards.[17] 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

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, which will go into effect on January 1, 2017, will continue

[17] California Energy Commission. Accessed 20 August 2015. *2013 Building Energy Efficiency Standards for Residential and Nonresidential Buildings.* Available at: http://www.energy.ca.gov/2012publications/CEC-400-2012-004/CEC-400-2012-004-CMF-REV2.pdf

to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings.

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.

California Senate Bill 350

SB 350 was approved by Governor Brown on October 7, 2015. SB 350 will: (1) increase 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) require 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) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require 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 final end uses of retail customers through energy efficiency and conservation.

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 will oversee 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 will manage $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 directs the CPUC and the CEC to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation and directs the CPUC and the CEC to create 3,000 megawatts of new, solar-produced electricity by 2017.

The CPUC has a rulemaking in progress to reconcile its decisions with SB 1, and it also continues to hold public workshops to continue designing program elements.

Current incentives provide an upfront, capacity-based payment for a new system. The CSI incentive system will change in 2007 when it moves to performance-based payments. In its August 24, 2006, decision, the CPUC shifted the program from volume-based to performance-based incentives and clarified many elements of the program's design and administration.[18]

[18] California Solar Initiative. Accessed 31 October 2007. Website. Available at: http://www.gosolarcalifornia.ca.gov/csi/index.html

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 program initially applies to large electric power plants and large industrial plants, but will include fuel distributors by 2015. By 2015, these rules will apply to 85 percent of all of California's GHG emissions.

Scoping Plan and First Update of the Scoping Plan

Pursuant to AB 32, CARB developed a Scoping Plan to detail the approach towards reducing GHG emissions to 1990 levels by 2020. The Scoping Plan was first considered by CARB in 2008 and must be updated every five years. CARB approved the First Update to the Climate Change Scoping Plan on May 22, 2014.[19] The First Update identifies opportunities to leverage existing and new funds to further drive GHG emissions reductions through strategic planning and targeted low carbon investments. The First Update defines CARB's climate change priorities for the next five years, and also sets the groundwork to reach long-term goals set forth in EO S-3-05 and EO B-16-2012 (below). The Update highlights California's progress toward meeting the "near-term" 2020 GHG emissions reduction goals defined in the initial Scoping Plan. It also evaluates how to align the State's "longer-term" GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.[20]

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed EO S-3-05, which establishes GHG emissions reduction targets for California, and directs the California Environmental Protection Agency Secretary to coordinate the oversight of efforts to achieve them.

The targets established by Governor Schwarzenegger call for a reduction of GHG emissions to 2000 levels by 2010; a reduction of GHG emissions to 1990 levels by 2020; and a reduction of GHG emissions to 80 percent below 1990 levels by 2050.

[19] California Air Resources Board. 13 July 2015. *AB 32 Scoping Plan*. Available at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

[20] California Air Resources Board. 27 May 2014. *First Update to the AB 32 Scoping Plan*. Available at: http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm

Executive Order B-16-2012

EO B-16-2012 establishes long-term targets of reaching 1.5 million zero emission vehicles (ZEVs) on California's roadways by 2025 and sets ZEV purchasing requirements for State Government fleets. EO B-16-2012 also sets a target for 2050 of a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels. In February 2013, an interagency working group developed the ZEV Action Plan, which identifies specific strategies and actions that State agencies will take to meet the milestones of the Executive Order. The ZEV Action Plan states:

> ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.

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:

- 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-30-15

EO B-30-15 reiterates EO S-3-05's 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:

- 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."

- "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."
- OPR to establish a technical advisory group to help state agencies incorporate climate change impacts into planning and investment decisions.

Regional

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.

San Gabriel Valley Energy Efficiency Partnership

In April 2006, SCAG's Regional Council authorized its Executive Director to enter into a partnership with Southern California Edison (SCE) to incentivize energy efficiency programs in the San Gabriel Valley Subregion. The partnership program agreement was fully executed on October 20, 2006, and the program will run through 2008. The main goal of the San Gabriel Valley Energy Wise Program is to save a combined 3,000,000 kilowatt-hours (kWh) by providing technical assistance and incentive packages to cities. This program is funded by California utility customers and administered by SCE under the auspices of the CPUC.

3.6.2 EXISTING CONDITIONS

The production and consumption of energy are closely related to other environmental issues evaluated in this PEIR: **Section 3.8, *Greenhouse Gas Emissions***, **Section 3.17, *Transportation, Traffic and Safety***, and **Section 3.18, *Utilities and Service Systems***. In accordance with Appendix F of the CEQA Guidelines, the existing conditions for Energy are evaluated by energy supply and current patterns of energy use.

Existing Energy Supplies and Consumptions

Traditional Energy Sources

The major energy sources consumed in the United States are petroleum (oil), natural gas, coal, nuclear, and renewable energy. Primary energy includes petroleum, natural gas, coal, nuclear fuel, and

renewable energy. Electricity is a secondary energy source that is generated from these primary forms of energy. The major users are residential and commercial buildings, industry, transportation, and electric power generators.[21]

Total U.S. energy use in 2013 was about 97.5 quadrillion Btu (British thermal units). In physical energy terms, one quad represents 172 million barrels of oil (about 9 days of U.S. petroleum use), 51 million tons of coal (about 5.5 percent of total U.S. coal consumption in 2013), or 1 trillion cubic feet of dry natural gas (about 1.4 percent of total U.S. natural gas use in 2013). Petroleum accounts for the largest share of U.S. primary energy consumption, followed by natural gas, coal, renewable energy (including hydropower, wind, biomass, geothermal, and solar), and nuclear electric power (**Figure 3.6.2-1, *Primary Energy Use by Source, 2013***).[22]

California consumes more energy than any other state except Texas. However, in terms of energy consumption per person, in 2012, California ranks 49th among the 50 states and District of Columbia (**Figure 3.6.2-2, *California Energy Consumption Estimates, 2013***). Current annual energy consumption in California (for all purposes including transportation) is approximately 7,641 trillion Btu, which represents approximately 7.9 percent of the nation's total energy consumption.[23]

Transporting water into California is a very energy intensive process. The California State Water Project (SWP) is the single largest user of energy in the state. The SWP uses approximately 5 billion kWh/year of electricity which is equal to 2 to 3 percent of the total electricity consumed in California. Water-related energy use consumes approximately 20 percent of the total electricity consumed in California.

Petroleum. Petroleum is a broadly defined class of liquid hydrocarbon mixtures including crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crude oil, and natural gas plant liquids.[24] The United States consumes more energy from petroleum than from any other energy source. In 2013, total U.S. petroleum consumption was 18.9 million barrels per day, or 36 percent of all the energy we consumed. Nearly three-fourths of total U.S. petroleum consumption was in the transportation sector.[25] The U.S. relied on net imports for approximately 40 percent of the petroleum (including crude oil and refined petroleum products) that was consumed in 2012. Just over half of these imports came from the Western Hemisphere. About 29 percent of our imports of crude oil and petroleum products came from the Persian Gulf countries of Bahrain, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates. The largest sources of net crude oil and petroleum product imports were Canada and Saudi Arabia. Dependence on foreign petroleum has declined since peaking in 2005. This trend is attributed to a combination of declining consumption and shifts in supply patterns as a result of the economic downturn after the financial crisis in 2008. In addition, increased use of ethanol

[21] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *What Are the Major Sources and Users of Energy in the United States?* Available at: http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm

[22] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *What Are the Major Sources and Users Of Energy in the United States?* Available at: http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm

[23] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *State Profile and Energy Estimates*. Available at: http://www.eia.gov/state/data.cfm?sid=CA

[24] U.S. Department of Energy, Energy Information Administration. Accessed 20 August 2015. *Glossary*. Available at: http://www.eia.gov/tools/glossary/index.cfm?id=P#petro

[25] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *Oil: Crude and Petroleum Products Explained*. Available at: http://www.eia.gov/energyexplained/index.cfm?page=oil_use

Figure 3.6.2-1:

Primary Energy Use by Source, 2013

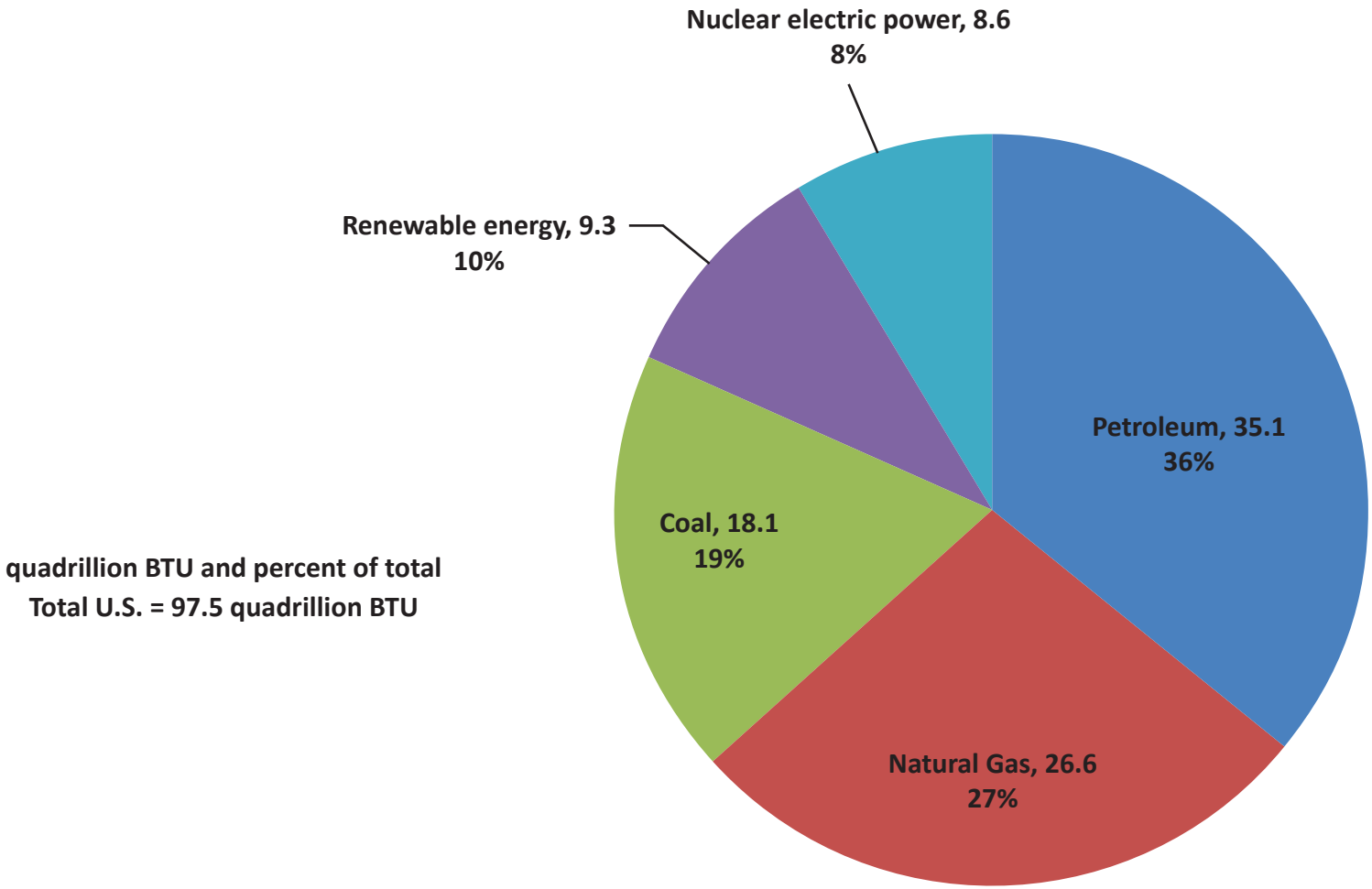
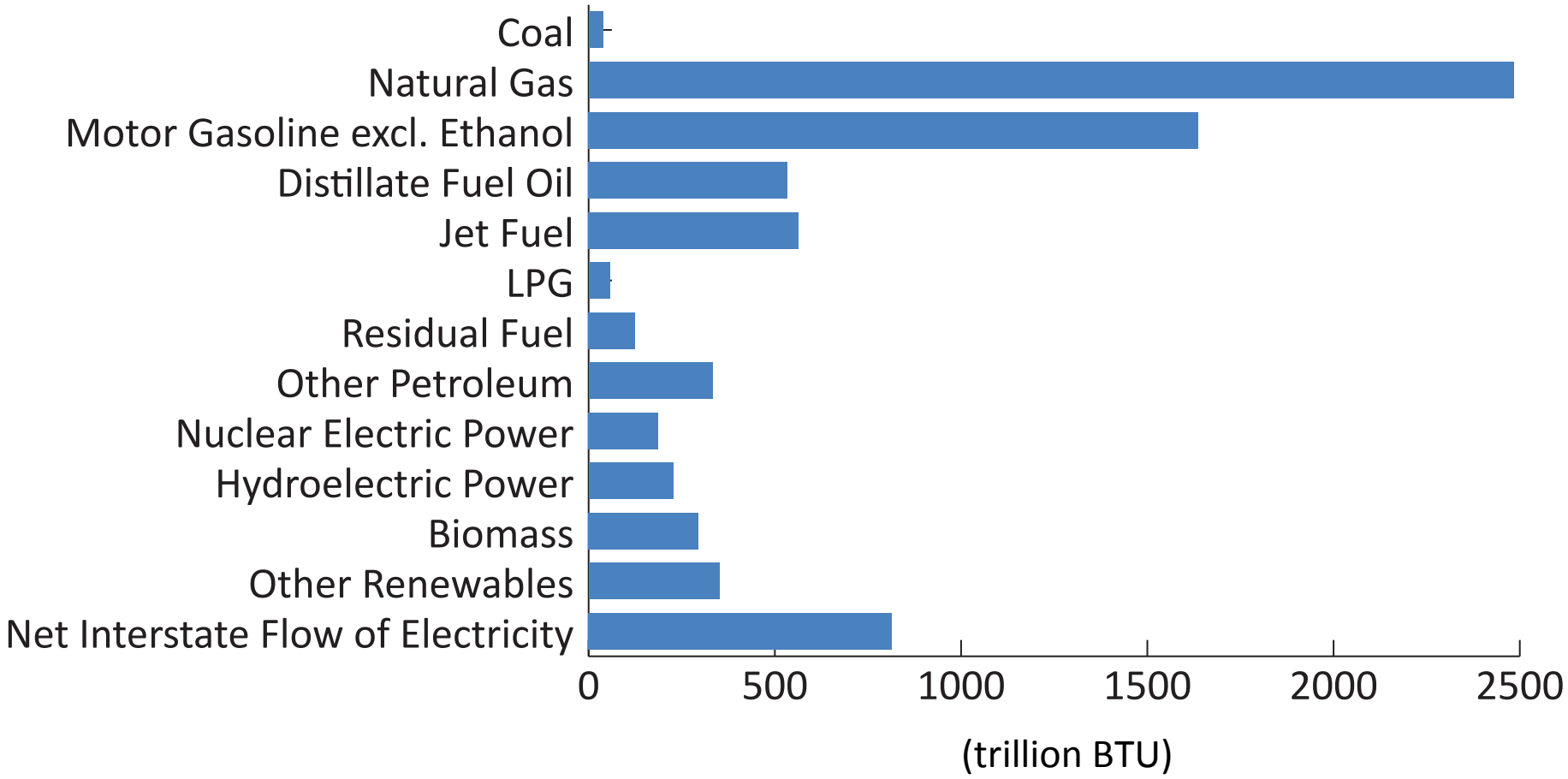


Figure 3.6.2-2:

California Energy Consumption Estimates, 2013



and biodiesel, and gains in production of crude oil and natural gas have expanded domestic supplies and reduced the need for imports.[26]

California as a state ranks third in the U.S. in petroleum-refining capacity as of January 2014, with a combined capacity of almost 2 million barrels per calendar day from its 18 operable refineries. California accounts for more than one-tenth of total U.S. capacity. In 2013, California consumed 628.7 million barrels of petroleum.[27]

Oil is a finite and nonrenewable resource, and it is uncertain how future energy consumption trends will be sustained with the current political, environmental and technological constraints. Our nation's reliance on petroleum for our energy needs is even more problematic because of the global trend toward an inevitable turning point often referred to as "peak oil," the peak and then decline of global oil production. Peak oil is the point of maximum oil production whether from a single well, a country, or the planet as a whole. The maximum point of production is expected to happen when about half or slightly more of the ultimately recoverable oil has been produced. To be clear, peaking does not mean "running out." Rather, it indicates the point where global production can no longer be maintained or increased. Production will begin to decline, year after year. Geophysicist M. King Hubbert correctly predicted the 1971 peak in U.S. oil production and further predicted that sometime between 2005 and 2025, world oil production would reach a peak and begin a sharp decline.[28]

Petroleum in Transportation. In the United States, 28 percent of total U.S. energy consumption is used for transportation. Of the fuels used in transportation, petroleum fuels account for 92 percent, while biofuels contribute 5 percent, natural gas 3 percent, and electricity less than 1 percent in 2014. Gasoline was the most dominant petroleum fuel, accounting for 56 percent of total U.S. transportation energy use in 2014.[29]

In 2013, in California, transportation is the largest end-use sector for energy use, accounting for 37.8 percent of energy consumption.[30] Petroleum fuels account for 96 percent of the state's transportation energy use as the state is a net importer of oil.[31] Within the SCAG region, Southern Californians consumed 9.3 billion gallons of fuel for transportation in 2012.[32] This value is expected to decline as California incorporates alternative fuel technologies and policies. For example, AB 118 created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). ARFVTP is a $100 million public investment fund to help California reach its GHG reduction goals by integrating low carbon fuels such as electricity, hydrogen, biofuels, natural gas and renewable natural gas into the fueling

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[26] U.S. Department of Energy, Energy Information Administration. 10 May 2013. *Petroleum, How Dependent Are We on Foreign Oil?* Available at: http://www.eia.gov/energy_in_brief/article/foreign_oil_dependence.cfm

[27] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *State Profile and Energy Estimates*. Available at: http://www.eia.gov/state/data.cfm?sid=CA

[28] Udall, R., and S. Andrews. January 1999. When Will the Joy Ride End? A Petroleum Primer. *Hubbert Center Newsletter* 99(1): 1–8.

[29] U.S. Department of Energy, Energy Information Administration. Accessed 17 July 2015. *Use of Energy in the United States*. Available at: http://www.eia.gov/Energyexplained/?page=us_energy_transportation

[30] U.S. Department of Energy, Energy Information Administration. Accessed 20 August 2015. *California State Profiles and Energy Estimates*. Available at: http://www.eia.gov/state/?sid=CA#tabs-2

[31] California Energy Almanac. Accessed 19 August 2015. *California Petroleum Statistics and Data*. Available at: http://energyalmanac.ca.gov/petroleum/

[32] SCAG Transportation Modeling, 2015.

infrastructure and vehicle technology development. Other efforts include collaboration between the California Energy Commission and the Governor's Office Zero-emission Vehicle (ZEV) Task Force, Plug-in Electric Vehicle (PEV) Collaborative, CPUC proceedings, and Fuel Cell Partnership.[33]

Natural Gas. Natural gas supply and demand data are compiled by the state's natural gas utilities in the annual California Gas Report and in the CPUC's Integrated Energy Policy Report. Since 1994, California began to rely on natural gas from Canada and the Rocky Mountains region and has seen both the physical amount and the percentage produced within California as well as imported from the Southwest decrease.[34] As with crude oil production, California's natural gas gross production has experienced a gradual overall decline in the past two decades. Reserves and production are located primarily in geologic basins in the Central Valley, the coastal basins onshore in Northern California, and offshore along the Southern California coast. California production accounts for a very small percentage of total U.S. natural gas production and satisfies about one-tenth of state demand.[35]

The SCAG region is served primarily by the investor-owned Southern California Gas Company (SoCalGas), a unit of Sempra Energy. SoCalGas provides natural gas service throughout the SCAG region, except for the southern portion of Orange County, and portions of San Bernardino County. San Diego Gas & Electric Company (SDG&E) provides natural gas service to the southern portion of Orange County. In San Bernardino County, Southwest Gas Corporation provides natural gas service to Victorville, Big Bear, Barstow, and Needles. The Los Angeles Department of Water and Power (LADWP) utilizes natural gas for electrical generation in the City of Los Angeles. **Figure 3.6.2-3, *Gas Utility Service Areas***, shows the gas utility service areas for the SCAG region.

Electricity. Local electricity distribution service is provided to customers within the SCAG region by both Investor-Owned Utilities (IOUs) and Publicly Owned Utilities (POUs) (**Figure 3.6.2-4, *Electric Utility Service Areas***, and **Table 3.6.2-1, *Energy Mix for Electricity Service Providers in the SCAG Region***). The two IOUs operating in the region are SCE and SDG&E. SCE is the largest electricity utility in Southern California with a service area that covers all or nearly all of Orange, San Bernardino, and Ventura Counties, and most of Los Angeles and Riverside Counties. The SCE territory also includes areas outside of SCAG including Inyo, Tulare, and Mono County as well as portions of Kern, Fresno, and Tolumne Counties. SDG&E provides local distribution service to the southern portion of Orange County. In the SCAG region, the Southern California Public Power Authority (SCPPA) members consist of the municipal utilities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, and Vernon, and the Imperial Irrigation District. Together, these municipal utilities deliver electricity to over 2 million customers in the Southern California region that spans an area of 7,000 square miles and has a total population that exceeds 5 million.[36] The LADWP is the largest of the publicly owned electric utilities in Southern California.

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[33] California Energy Commission, Fuels and Transportation Division. Accessed 19 August 2019. Website. Available at: http://www.energy.ca.gov/transportation/

[34] California Energy Commission. Accessed 22 August 2011. *California Natural Gas Supply by Source*. Available at: http://www.energy.ca.gov/naturalgas/statistics/gas_supply_by_source.html

[35] U.S. Department of Energy, Energy Information Administration. Accessed 12 July 2015. *State Profile and Energy Estimates*. Available at: http://www.eia.gov/state/data.cfm?sid=CA

[36] Southern California Public Power Authority. Accessed 12 July 2015. *2012-13 Annual Report*. Available at: http://www.scppa.org/Downloads/Annual%20Report/SCPPA%202013%20Annual%20Report.pdf

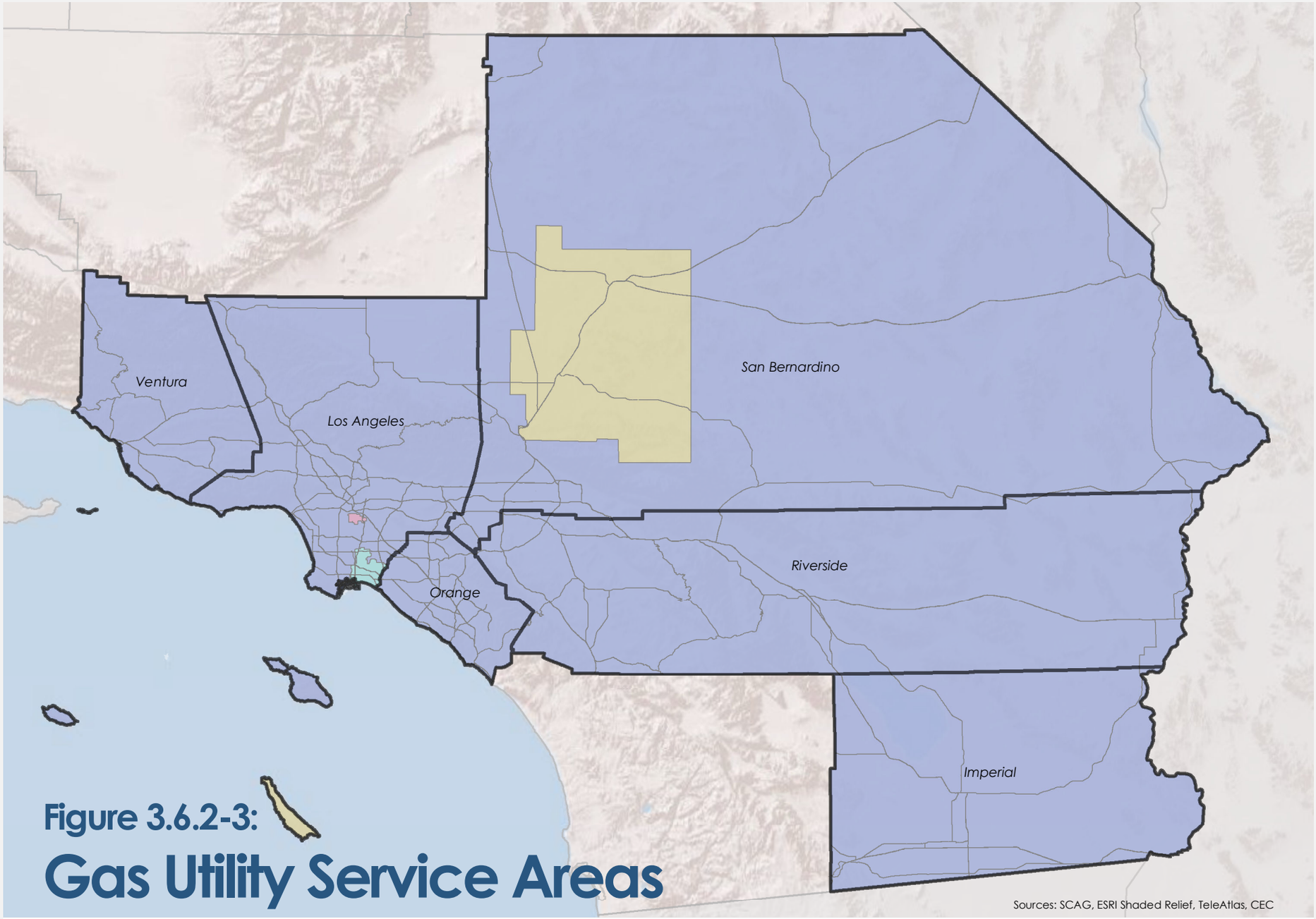

Figure 3.6.2-3:
Gas Utility Service Areas

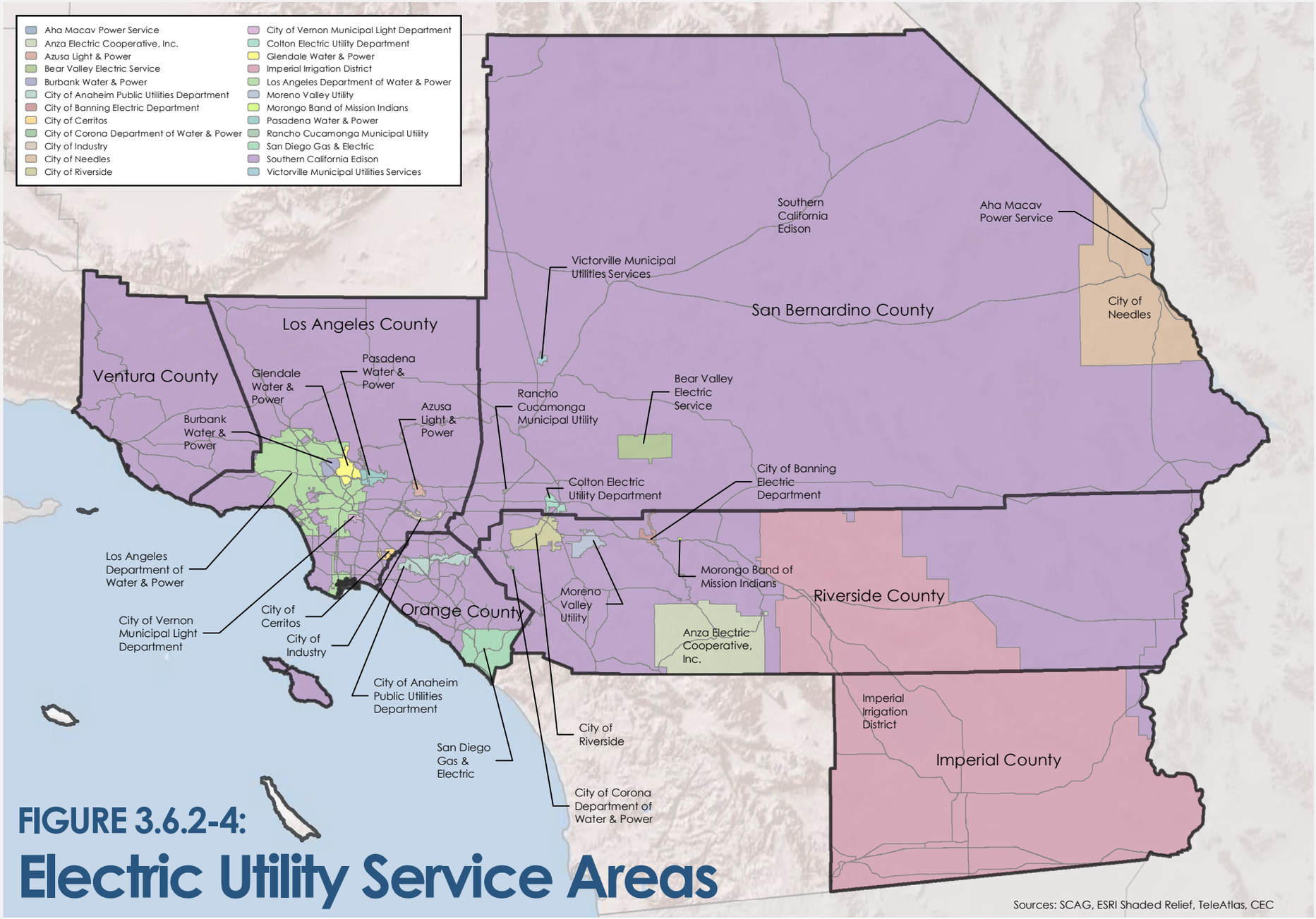

FIGURE 3.6.2-4:
Electric Utility Service Areas

TABLE 3.6.2-1
ENERGY MIX FOR ELECTRICITY SERVICE PROVIDERS IN THE SCAG REGION

Electricity Provider	County	Eligible Renewable					Nonrenewable				
		Biomass and Waste	Geothermal	Small Hydroelectric	Solar	Wind	Coal	Large Hydroelectric	Natural Gas	Nuclear	Unspecified[a]
Imperial Irrigation District	Imperial	11.5%	6.2%	7.7%	4.8%	4.1%	12.3%	3.7%	34.6%	2.9%	12.3%
Azusa Light & Power	Los Angeles	—	—	—	—	13%	74%	2%	—	7%	3%
Burbank Water & Power	Los Angeles	18%	<1%	2%	<1%	4%	43%	2%	14%	6%	11%
City of Cerritos[b]	Los Angeles	—	—	—	—	—	—	—	69%	—	31%
City of Industry	Los Angeles	19%	—	—	—	—	3.5%	7.5%	24.9%	7.5%	37.4%
City of Vernon Municipal Light Department	Los Angeles	8%	—	—	—	6%	—	2%	56%	7%	21%
Glendale Water & Power	Los Angeles	13.4%	—	2.1%	—	12.4%	28.5%	5.5%	25.9%	7.6%	4.6%
Los Angeles Department of Water & Power	Los Angeles	6%	1%	1%	1%	14%	42%	4%	17%	10%	4%
Pasadena Water & Power	Los Angeles	16%	7%	1%	<1%	3%	52%	5%	5%	7%	4%
City of Anaheim Public Utilities Department	Orange	7%	14%	<1%	<1%	11%	34%	2%	17%	—	14%
San Diego Gas & Electric	Orange	3%	2%	—	4%	15%	3%	—	67%	—	6%
Anza Electric Cooperative, Inc.	Riverside	—	—	—	—	—	85%	6%	—	—	6%

TABLE 3.6.2-1
ENERGY MIX FOR ELECTRICITY SERVICE PROVIDERS IN THE SCAG REGION

Electricity Provider	County	Eligible Renewable					Nonrenewable				
		Biomass and Waste	Geothermal	Small Hydroelectric	Solar	Wind	Coal	Large Hydroelectric	Natural Gas	Nuclear	Unspecified[a]
City of Banning Electric Department	Riverside	—	15%	—	—	—	66%	1%	—	5%	13%
City of Corona Department of Water & Power	Riverside	22%	—	—	9%	1%	—	6%	—	—	62%
City of Riverside	Riverside	7%	14%	—	<1%	3%	31%	2%	3%	4%	36%
Moreno Valley Utility	Riverside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Morongo Band of Mission Indians	Riverside	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bear Valley Electric Service	San Bernardino	—	—	—	—	21%	—	—	<1%	—	79%
City of Needles	San Bernardino	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Colton Electric	San Bernardino	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rancho Cucamonga Municipal Utility	San Bernardino	30%	—	—	—	—	—	—	—	—	70%
Victorville Municipal Utilities Services	San Bernardino	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Southern California Edison	All SCAG counties	1%	9%	1%	1%	10%	6%	4%	28%	6%	34%

NOTE:
a. Unspecified = electricity from transactions that are not traceable to specific generation sources.
b. Southern California Edison supplies energy to the City of Cerritos.
SOURCE:
California Energy Commission. 2013. *Utility Annual Power Content Labels for 2013*. Available at: http://www.energy.ca.gov/sb1305/labels/index.html

Alternative Energy Sources

Alternative fuels, as defined by the Energy Policy Act of 1992, include ethanol, natural gas, propane, hydrogen, biodiesel, electricity, methanol, and p-series fuels. These fuels are being used worldwide in a variety of vehicle applications. Use of these fuels for transportation can generally reduce air pollutant emissions and can be domestically produced and derived from renewable sources. The Energy Policy Act of 2005 further directed the Department of Energy to carry out a study to plan for the transition from petroleum to hydrogen in a significant percentage of vehicles sold by 2020. AB 118 (2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (2008), and AB 8 (2013), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The CEC has an annual program budget of approximately $100 million to support projects that develop and improve alternative and renewable low-carbon fuels; optimize alternative and renewable fuels for existing and developing engine technologies; produce alternative and renewable low-carbon fuels in California; decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability; expand fuel infrastructure, fueling stations, and equipment; improve light-, medium-, and heavy-duty vehicle technologies; retrofit medium- and heavy-duty on-road and non-road vehicle fleets; expand infrastructure connected with existing fleets, public transit, and transportation corridors; establish workforce training programs; conduct public education and promotion; and create technology centers.[37]

There are over 1,500 alternative fueling stations within the SCAG region (**Table 3.6.2-2, *Alternative Fueling Stations in the SCAG Region***; **Figure 3.6.2-5, *Alternative Fueling Facilities***). The following descriptions of alternative fuels are from the U.S. Department of Energy's Alternative Fuels Data Center website.[38]

[37] California Energy Commission. Accessed 12 July 2015. *Alternative and Renewable Fuel and Vehicle Technology Program Proceedings*. Available at: http://www.energy.ca.gov/altfuels/

[38] U.S. Department of Energy, Alternative Fuels Data Center. Accessed 12 July 2015. Website. Available at: http://www.eere.energy.gov/afdc/fuels/index.html

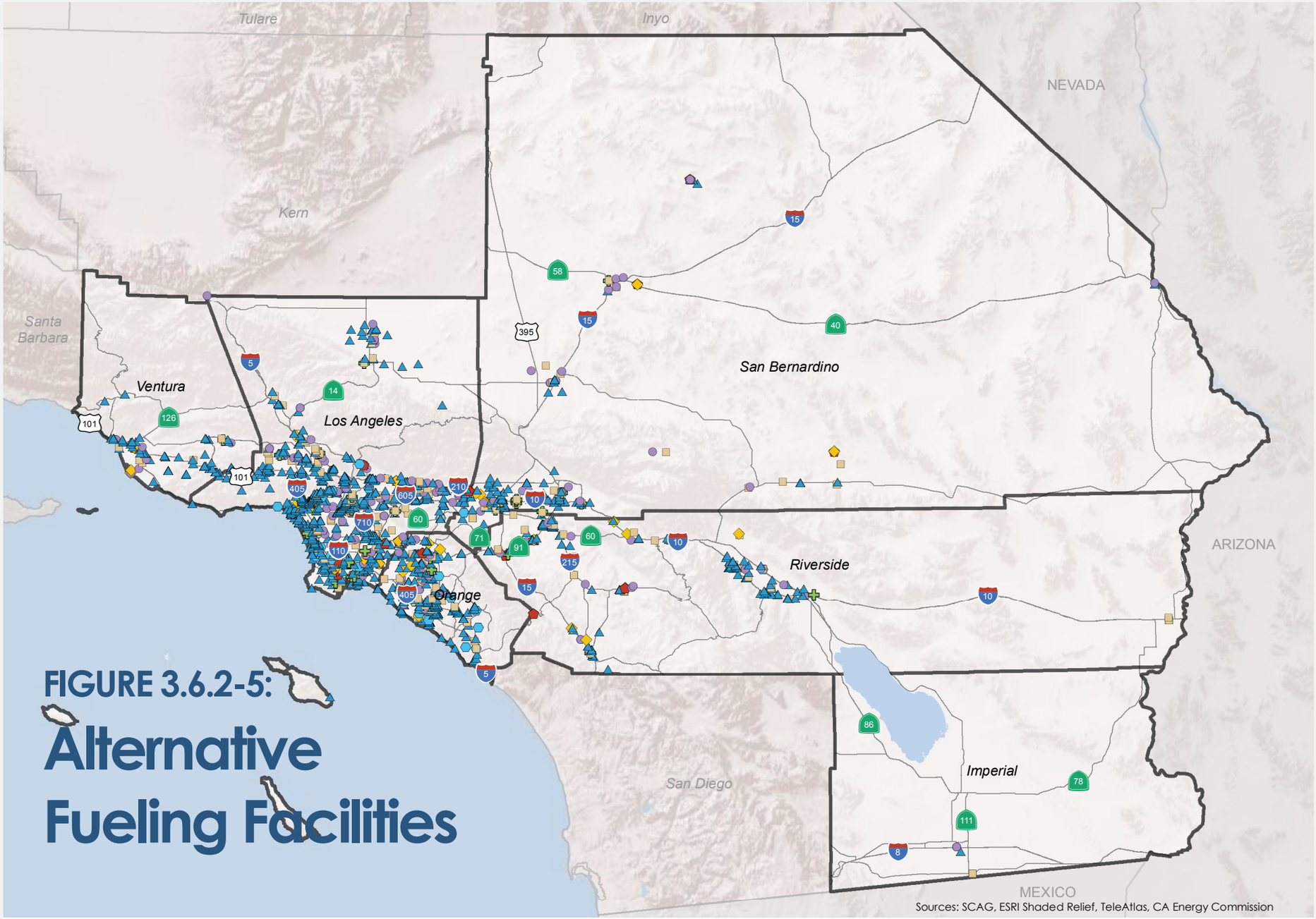

FIGURE 3.6.2-5: Alternative Fueling Facilities

Q:\1315\SCAG\ArcProjects\FuelStations.mxd | Date: 10/14/2015

TABLE 3.6.2-2
ALTERNATIVE FUELING STATIONS IN THE SCAG REGION

County	Fuel Type	Count
Imperial	CNG	2
	ELEC	1
	LPG	2
Los Angeles	BD	9
	CNG	93
	E85	13
	ELEC	658
	HY	19
	LNG	18
	LPG	90
Orange	BD	1
	CNG	30
	E85	9
	ELEC	191
	HY	11
	LNG	2
	LPG	26
Riverside	BD	4
	CNG	34
	E85	8
	ELEC	111
	HY	2
	LNG	5
	LPG	17
San Bernardino	BD	4
	CNG	24
	E85	6
	ELEC	79
	HY	2
	LNG	8
	LPG	24
Ventura	BD	1
	CNG	6
	E85	3
	ELEC	63
	LNG	1
	LPG	9
Total		**1,586**

NOTE:
BD = Biodiesel; CNG = Compressed Natural Gas**;** ELEC = Electric**;** E85 = Ethanol**;** HY = Hydrogen**;** LNG = Liquefied Natural Gas**;** LPG = Propane.
SOURCE:
U.S. Department of Energy, Alternative Fuels Data Center. Accessed 12 July 2015. Website. Available at: http://www.eere.energy.gov/afdc/fuels/index.html

Ethanol. Ethanol is a clear, colorless liquid made from various plant materials collectively known as biomass. Blends of at least 85 percent ethanol are considered alternative fuels under the Energy Policy Act E85. A blend of 85 percent ethanol and 15 percent gasoline is used in flexible fuel vehicles (FFVs) that are currently offered by most major auto manufacturers. FFVs can run on gasoline, E85, or any combination of the two and qualify as alternative fuel vehicles under Energy Policy Act regulations.

Natural Gas. Natural gas is an odorless, gaseous mixture of hydrocarbons—mainly methane (CH4)—and accounts for about a quarter of the energy used in the United States. The vast majority of natural gas in the United States is considered a fossil fuel because it is made from sources formed over millions of years by the action of heat and pressure on organic materials. Alternatively, renewable natural gas (RNG), also known as biomethane, is produced from organic materials—such as waste from landfills and livestock—through anaerobic digestion. RNG qualifies as an advanced biofuel under the Renewable Fuel Standard. Two forms of natural gas are currently used in vehicles: compressed natural gas (CNG) and liquefied natural gas (LNG). Both are domestically produced, relatively low priced, and commercially available.

Propane. Propane is produced as a by-product of natural gas processing and crude oil refining. It accounts for about 2 percent of the energy used in the United States. Of that, less than 2 percent is used for transportation fuel. Its main uses include home and water heating, cooking and refrigerating food, clothes drying, powering farm and industrial equipment. Interest in propane as an alternative transportation fuel stems mainly from its domestic availability, high-energy density, clean-burning qualities, and its relatively low cost. It is the world's third most common transportation fuel and is considered an alternative fuel under the Energy Policy Act of 1992.

Hydrogen. Hydrogen gas is the simplest and lightest fuel (H2). Hydrogen is in a gaseous state at atmospheric pressure and ambient temperatures. Hydrogen is being explored for use in combustion engines and fuel cell electric vehicles. The ability to create hydrogen from a variety of sources (water, hydrocarbons, and other organic matter) and its clean-burning properties make it a desirable alternative fuel. One of the challenges of using hydrogen as fuel comes from being able to efficiently extract hydrogen from these compounds. Although there is no significant transportation distribution system currently for hydrogen transportation use, hydrogen could be transported and delivered using the established hydrogen infrastructure; for significant market penetration, the infrastructure will need further development.

California is leading the nation in hydrogen fueling stations for fuel cell vehicles. By the end of 2015, there should be more than 50 public stations available fuel cell vehicles. Vehicle manufacturers are beginning to offer fuel cell vehicles to consumers who live in regions where these hydrogen stations exist.

Biodiesel. Biodiesel is a domestically produced, renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant greases. Biodiesel is safe, biodegradable, and reduces serious air pollutants such as particulates, carbon monoxide, hydrocarbons, and air toxics. According to the U.S. Department of Energy, pure biodiesel (B100) is considered an alternative fuel under Energy Policy Act. Like petroleum diesel, biodiesel is used to fuel compression-ignition engines, which run on petroleum diesel. Lower-level biodiesel blends are not considered alternative fuels, but covered fleets can earn one Energy Policy Act credit for every 450 gallons of B100 purchased for use in blends of 20 percent or higher.

Electricity. Electricity can be used as a transportation fuel to power plug-in and fuel cell vehicles. When used to power plug-in electric vehicles or EVs, electricity is stored in an energy storage device such as a battery. Fuel cell vehicles use electricity produced from an electrochemical reaction that takes place when hydrogen and oxygen are combined in the fuel cell "stack." The production of electricity using fuel cells takes place without combustion or pollution and leaves only two byproducts, heat and water.

Electric vehicles have several different charging systems: 120-volt, 240-volt, and direct-current. An electric vehicle that accepts 120-volt power can do so from any standard electrical outlet with a 12- or 16-amp dedicated branch circuit (with no other receptacles or loads on the circuit). A 240-volt system (Level 2 charging station) requires the installation of a home charging station and is available at most public charging stations. Direct-current fast charging equipment (480 volt) provides 50 kW to the battery. Many plug-in vehicle owners will do the majority of their charging at home (or at fleet facilities, in the case of fleets). Some employers offer access to charging at the workplace. In many states, plug-in vehicle drivers also have access to public charging stations at libraries, shopping centers, hospitals, and businesses. Charging infrastructure is rapidly expanding, providing drivers with the convenience, range, and confidence to meet more of their transportation needs with plug-in vehicles.

Methanol. Methanol, also known as wood alcohol, can be used as an alternative fuel in flexible fuel vehicles that run on M85 (a blend of 85 percent methanol and 15 percent gasoline). However, it is not commonly used because automakers are no longer manufacturing methanol-powered vehicles. Today most of the world's methanol is produced by a process using natural gas as a feedstock. However, the ability to produce methanol from non-petroleum feedstocks such as coal or biomass is of interest for reducing petroleum imports. The Massachusetts Institute of Technology is researching the future of natural gas as a feedstock to enable more widespread adoption of methanol as a transportation fuel. The National Renewable Energy Laboratory has researched ways to use methanol fuel in fuel cell vehicles.

P-Series fuel. P-Series fuel is a unique blend of natural gas liquids (pentanes plus), ethanol, and the biomass-derived co-solvent methyltetrahydrofuran (MeTHF). P-Series fuels are clear, colorless, 89-93 octane, liquid blends that are formulated to be used in FFVs. P-Series are designed to be used alone or freely mixed with gasoline in any proportion inside the FFV's gas tank. These fuels are not currently being produced in large quantities and are not widely used.

Renewable Electricity. Electricity supply reliability depends, in part, on the diversity of energy sources. PURPA defines facilities that use alternative or renewable energy sources as "qualifying facilities." It provides financial incentives for their installation and requires utilities to sign long-term power purchase contracts with qualifying facilities. The CPUC has adopted contract incentives to assist qualifying facilities.

Qualifying facilities built in the SCAG region include wind and solar installations in Riverside and San Bernardino Counties and a number of cogeneration units around the region. Original provisions of PURPA encouraged the construction of biomass-to-energy facilities, which use materials such as agricultural and wood waste as fuel for energy production.

3.6.3 THRESHOLDS OF SIGNIFICANCE

The potential for the 2016 RTP/SCS to result in impacts related to energy was analyzed considering the potential environmental impacts outlined in Appendix F of the CEQA Guidelines andSCAG has developed the thresholds below. The Plan would result in a potentially significant impact if it would:

- Increase petroleum and non-renewable fuel consumption in the regional transportation system
- Increase residential energy consumption
- Increase building energy consumption in anticipated development
- Increase water consumption and energy use related to water in anticipated development

Methodology

This section summarizes the methodology used to evaluate the expected impacts of implementation of the 2016 RTP/SCS on energy consumption and associated environmental effects. Estimated energy consumption in the Plan horizon year of 2040 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 2040 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 2040 using Urban Footprint Scenario Planning Model (SPM).[39] 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.

The SPM is used for comparing planning scenarios and developing a preferred policy growth scenario for the Plan. It includes a number of planning assumptions. Energy efficiency and conservation measures are accounted for in the energy use with efficiency data, which the SPM assumes a certain percentage of newly constructed buildings to follow stricter energy efficiency standards. The effective average building energy efficiency assumes a decrease in energy consumption of 3 percent by 2020, 9 percent by 2035, and 13 percent by 2040. Similarly, assumed by the SPM, the effective average water efficiency would decrease in water consumption of 3 percent by 2020, 9 percent by 2035, and 14 percent by 2040. The SPM also uses the assumption that the electricity price in the baseline year is $0.15/ kWh. With the 2016 RTP/SCS, the electricity price is predicted to increase to $0.17/kWh in 2020, $0.23/kWh in 2035, and $0.25/kWh in 2040. The SPM assumes that the water price for the Plan baseline year (2012) is estimated at $1,200/acre foot (AF), and that the water price would increase to $1,267/AF in 2020, $1,493/AF in 2035, and $1,577 AF in 2040. These assumptions were used to calculate the total utilities cost per household. Fuel consumption was evaluated in SCAG's Regional Transportation Demand Model.
It is important to note that the analysis of these impacts under this section is programmatic at the

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

regional level. The 2016 RTP/SCS would result in energy impacts as a result of the following: energy demands for construction of transportation projects and development, energy demands for operation of the regional transportation system, and the growing energy demand from anticipated growth and development associated with implementation of the 2016 RTP/SCS. Project-specific impacts vary, and appropriate mitigation measures would need to be developed on the subsequent project-by-project and site-by-site basis by implementation agency, as appropriate.

3.6.4 IMPACT ANALYSIS

IMPACT EN-1: Potential to increase petroleum and non-renewable fuel consumption in the regional transportation system.

Less than Significant Impact

The 2016 RTP/SCS would have a less than significant impact on increasing petroleum and non-renewable fuel usage because fuel consumption is expected to result in a 27.4 percent net reduction in the SCAG region from the 9.3 billion gallons consumed in 2012 to the projected 6.8 billion gallons consumed in 2040 (**Table 3.6.4-1, *SCAG Region Estimated Transportation Fuel Consumption***).

TABLE 3.6.4-1
SCAG REGION ESTIMATED TRANSPORTATION FUEL CONSUMPTION

	Fuel Consumed		
	Billion Gallons per Year	**Thousand Gallons per Day**	**Percentage under Existing**
2012	9.3	25,570	—
2040 Baseline	7.2	19,805	–22.5
2040 Plan	6.8	18,560	–27.4

SOURCE:
SCAG transportation modeling, 2015.

As the SCAG region's economy and population grow, vehicle miles traveled (VMT) from 2012 to 2040 will increase accordingly. Proposed transportation investments and land use strategies that encourage carpooling, increase transit use and active transportation opportunities, and promote more walkable and mixed use communities would potentially help to offset passenger VMT, but not so much as to reduce total VMT by 2040. Despite a net increase in VMT, fuel consumption reductions are still realized through better fuel economy (22 miles per gallon [mpg] to 28 mpg according to corporate average fuel economy [CAFE] standards), the Advanced Clean Cars Program, reduced total daily hours of delays in the SCAG transportation system as a result of the 2016 RTP/SCS, and more alternative fuel and zero emissions vehicle types on the road.[40] In accordance with EO B-16-2012, 1.5 million ZEVs are expected to be on California's roadways by 2025. EO B-16-2012 also sets zero emission vehicles purchasing requirements for State Government fleets to lead this transition to cleaner fuel vehicles. Therefore, it is expected that better fuel economy and use of alternative fuel and zero emissions vehicle types, in addition to potential implementation of the coordinated transportation and land use strategies included in the 2016 RTP/SCS, would result in a less than significant impact with respect to petroleum and non-renewable fuel consumption increase, and the consideration of mitigation measures is not warranted.

[40] U.S. Department of Transportation. Accessed 21 October 2015. *CAFE – Fuel Economy*. Available at: http://www.nhtsa.gov/fuel-economy

IMPACT EN-2: Potential to increase residential energy consumption.

Significant Impact

The 2016 RTP/SCS would result in a potential to increase residential energy consumption because of the increasing number of households. As described in **Section 2.0, *Project Description***, of this PEIR, it is expected that the region would add approximately over 1.5 million households by 2040. However, residential energy consumption per household with efficiency is expected to decline from 70 million Btu in 2012 to 57 million Btu as reflected in the 2016 RTP/SCS (**Table 3.6.4-2, *Residential Energy Use and Cost per Household***). Additionally, the Plan includes land use strategies that are intended to increase more sustainable and energy efficient residential development. As a result, it is projected that the 2016 RTP/SCS would result in an estimated 18 percent reduction in residential energy consumption with efficiency per household and an estimated 19 percent reduction in residential electricity consumption per household (**Table 3.6.4-2**). Despite the reduction in energy and electricity consumption per household, the anticipated growth between 2012 and 2040 will result in an estimated 1.5 million or 26 percent increase in the number of households (**Table 3.6.4-2**). Collectively, the total residential energy use with efficiency will increase by approximately 3 percent to 425 trillion Btu, resulting in a significant impact.

TABLE 3.6.4-2
RESIDENTIAL ENERGY USE AND COST PER HOUSEHOLD

	Base Year (2012)	Plan (2040)	% Difference from Base Year
Residential energy use per household with efficiency (Btu)	70 million	57 million	–18
Residential electricity use per household with efficiency (kWh)	7,756	6,300	–19
Number of households	5,885,000	7,406,000	26
Residential energy use with efficiency (Btu)	414 trillion	425 trillion	3
Residential energy cost	$9.9 billion	$17.8 billion	80

NOTE:
Btu = British thermal unit; kWh = kilowatt-hour.
SOURCE:
SCAG scenario planning modeling, 2015.

Residential energy costs are also expected to increase from $9.9 billion in 2012 to $17.8 billion in 2040 across the SCAG region, as reflected in the 2016 RTP/SCS (**Table 3.6.4-2**). This represents an approximately $722[41] increase in household energy costs from 2012 to 2040 (**Table 3.6.4-3)**. Increased energy costs, despite lower energy use, can be explained by increasing electricity and natural gas per unit costs. **Table 3.6.4-2** shows there would be an estimated 80 percent increase in household cost compared to the 2012 Base Year. The total utility cost per household, including both energy and water cost is also expected to increase by $737[42] from 2012 to 2040 (**Table 3.6.4-3, *Residential Energy and Water Cost per Household***). Water costs do not proportionally increase as much as energy costs and is a much smaller dollar value overall.

[41] $2,401 - $1,679 = $722 increase in household energy costs

[42] $2,925 - $2,188 = $737 increase in household utility costs

TABLE 3.6.4-3
RESIDENTIAL ENERGY AND WATER COST PER HOUSEHOLD

	Base Year (2012)	Plan (2040)	% Difference from Base Year
Residential energy cost per household	$1,679	$2,401	43
Residential water cost per household	$509	$524	3
Total utilities (energy + water) cost per household	**$2,188**	**$2,925**	**34**

SOURCE:
SCAG scenario planning modeling, 2015.

IMPACT EN-3: Potential to increase building energy consumption in anticipated development.

Significant Impact

As described in **Section 2.0, *Project Description***, the SCAG region is expected to add approximately over 1.5 million people by 2040. Because of population growth and anticipated development associated with the growth, building energy consumption is projected to increase, thereby resulting in a potentially significant impact. Implementation of the proposed 2016 RTP/SCS would be expected to result in more compact land use patterns as the proposed Plan's land use strategies focus on urban infill growth and walkable, mixed-use communities in existing urbanized and opportunity areas. More mixed-use, walkable, and urban infill development, plus the proposed transportation investments that increase active transportation opportunities and improved facilities, would be expected to accommodate a higher proportion of growth in more energy-efficient housing types like townhomes, apartments, and smaller single-family homes, as well as more compact commercial building types. Such development would be expected to result in an increase in residential and commercial energy consumption with efficiency in 2040 than in 2012 (**Table 3.6.4-4 *Building Energy Consumption with Efficiency—Residential and Commercial***). Residential and commercial building energy consumption with efficiency is expected to increase by 8 percent from 2012 to 2040 with the proposed 2016 RTP/SCS as a result of the 2016 RTP/SCS (**Table 3.6.4-4**). Most of these increases are seen in the commercial sector (15 percent) compared to the residential sector (3 percent). Despite an increase in energy efficiency in buildings, population growth and more development to accommodate new growth are expected to cause a net increase in energy consumption for both residential and commercial buildings. Therefore, the proposed 2016 RTP/SCS is anticipated to result in a potentially significant impact with respect to increases in building energy consumption, requiring the consideration of mitigation measures.

TABLE 3.6.4-4
BUILDING ENERGY CONSUMPTION WITH EFFICIENCY—RESIDENTIAL AND COMMERCIAL

	Base Year (2012)	Plan (2040)	% Difference from Base Year
Residential electricity consumed with efficiency (GWh)	45,643	46,656	2
Residential natural gas consumed with efficiency (therms)	2.6 billion	2.7 billion	3
Residential energy consumed with efficiency (Btu)	414 trillion	425 trillion	3
Commercial electricity consumed with efficiency (GWh)	55,808	64,859	16
Commercial natural gas consumed with efficiency (therms)	1.1 billion	1.2 billion	12
Commercial energy consumed with efficiency (Btu)	301 trillion	345 trillion	15
Total energy consumed with efficiency (Btu)	**714 trillion**	**770 trillion**	**8**

NOTE:
GWh = gigawatt-hour; Btu = British thermal unit.
SOURCE:
SCAG Scenario planning modeling, 2015.

IMPACT EN-4: Potential to increase water consumption and energy use related to water in anticipated development.

Less than Significant Impact

Due to increasing energy efficiencies, water consumption and water-related energy use would be expected to have a less than significant impact. Residential and commercial water use with efficiency is expected to decline by 19 percent with nearly all of the reductions from the commercial sector (33 percent) versus the residential sector (1 percent) (**Table 3.6.4-5, *Water Use with Efficiency—Residential and Commercial***). As described above, the effective average water efficiency will decrease in water consumption of 3 percent by 2020, 9 percent by 2035, and 14 percent by 2040. These reductions are driven by the drought and EO B-29-15 (2015), which allows the State Resources Water Control Board to impose restrictions to achieve a 25 percent statewide reduction in potable urban water by 2016. 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 3.6.4-5
WATER USE WITH EFFICIENCY—RESIDENTIAL AND COMMERCIAL

	Base Year (2012)	Plan (2040)	% Difference from Base Year
Indoor residential water use with efficiency (AF)	1,092,783	1,140,862	4
Outdoor residential water use with efficiency (AF)	1,403,850	1,318,632	–6
Residential water use with efficiency (AF)	**2,496,633**	**2,459,494**	**–1**
Indoor commercial water use with efficiency (AF)	1,178,150	1,274,841	8
Outdoor commercial water use with efficiency (AF)	2,007,065	873,667	–56
Commercial water use with efficiency (AF)	**3,185,215**	**2,148,508**	**–33**
Total water use with efficiency (AF)	**5,681,848**	**4,608,002**	**–19**

NOTE:
AF = acre-feet.
SOURCE:
SCAG scenario planning modeling, 2015.

Water use is closely tied to the electricity required to transport, distribute, and treat water. Water-related electricity use is expected to decline from 21,984 gigawatt-hours (GWh) in 2012 to 18,186 GWh in 2040 with the proposed 2016 RTP/SCS, which represents a 17 percent reduction in electricity (**Table 3.6.4-6, *Water-Energy***). Therefore, implementation of the 2016 RTP/SCS would be expected to result in a less than significant impact with respect to water consumption and water-related energy use, and the consideration of mitigation measures is not warranted.

TABLE 3.6.4-6
WATER-ENERGY

	Base Year (2012)	Plan (2040)	% Difference from Baseline
Water-related electricity use with water efficiency (GWh)	21,984	18,186	–17

NOTE:
GWh = gigawatt-hour.
SOURCE:
SCAG scenario planning modeling, 2015.

3.6.5 CUMULATIVE IMPACTS

The SCAG region accounts for about half of California's population and about half of its energy demand. As noted above, the state is aggressively pursuing GHG reductions that will also result in a decrease in energy consumption. The 2016 RTP/SCS reflects transportation projects, growth, and land use strategies, including anticipated development patterns at a regional level to accommodate growth projections and plan strategically for the region's future. These growth and land use strategies are coordinated with and supported by transportation investments that are intended to increase mobility, active transportation and transit opportunities. SCAG's Regional Travel Demand Model (RTDM) used for this analysis captures pass-through traffic that does not have an origin or destination in the region, but does impact the region, so that too is included in the project analysis.

IMPACT EN-1: Potential to increase petroleum and non-renewable fuel consumption in the regional transportation system.

Less than Significant Cumulative Impact

The 2016 RTP/SCS includes transportation projects and strategies that would have the potential to increase petroleum and non-renewable fuel consumption in the regional transportation system. With implementation of the Plan, the fuel consumption would be less in 2040 than in 2015 (**Table 3.6.4-1**). Because the Plan would benefit from lower emission factors in the future, cleaner cars, improved fuel and vehicle technology, and increased public transit use and active transportation, the Plan would result in less than significant cumulative impact to increasing petroleum and non-renewable fuel consumption.

IMPACT EN-2: Potential to increase residential energy consumption.

Significant Cumulative Impact

Implementation of the transportation projects included in the 2016 RTP/SCS, when taken into consideration with other development and infrastructure projects within the SCAG region and surrounding areas, would have the potential to increase the consumptive use of energy by residential land uses, constituting a significant cumulative impact. The cumulative residential energy consumption between 2015 and 2040 would be 6 percent less with the Plan than with no Plan. However, there would still be 11,028 trillion Btu commitment to residential energy consumption over the lifespan of the Plan (**Table 3.6.5-1, *Cumulative Building Energy Consumption—Residential and Commercial***), resulting in a significant cumulative impact requiring the consideration of mitigation measures.

IMPACT EN-3: Potential to increase building energy consumption in anticipated development.

Significant Cumulative Impact

Furthermore, implementation of the transportation projects included in the 2016 RTP/SCS, when taken into consideration with other development and infrastructure projects within the SCAG region and surrounding areas, would have the potential to increase building energy consumption, constituting a significant cumulative impact. The total energy consumption between 2015 and 2040 with the proposed 2016 RTP/SCS is 19,559 trillion Btu (**Table 3.6.5-1**). This is 4 percent less than the energy consumption expected in the same time frame without the Plan. Compared to the yearly energy consumption with efficiency in the year 2040, which had a net increase from 2012 as evaluated in Impact EN-3, cumulatively there are reductions in total energy consumption with the proposed 2016 RTP/SCS. Cumulatively, the residential sector has more energy savings (6 percent) than the commercial sector (1 percent). This reduction in cumulative building energy consumption has a corresponding energy cost savings of $27 billion ($735 billion compared to $762 billion) over the lifetime of the proposed Plan (2016–2040). However, there would still be 19,559 trillion Btu commitment to total energy consumption over the lifespan of the Plan, resulting in a significant cumulative impact requiring the consideration of mitigation measures.

TABLE 3.6.5-1
CUMULATIVE BUILDING ENERGY CONSUMPTION—RESIDENTIAL AND COMMERCIAL

	Baseline (2015-2040)	Plan (2015-2040)	% Difference from Baseline
Cumulative residential electricity consumed (GWh)	1,290,874	1,212,916	–6
Cumulative residential natural gas consumed (therms)	72.7 billion	68.9 billion	–5
Cumulative residential energy consumed (Btu)	**11,677 trillion**	**11,028 trillion**	**–6**
Cumulative commercial electricity consumed (GWh)	1,613,499	1,596,322	–1
Cumulative commercial natural gas consumed (therms)	31.2 billion	30.8 billion	–1
Cumulative commercial energy consumed (Btu)	**8,630 trillion**	**8,530 trillion**	**–1**
Cumulative total energy consumed (Btu)	**20,306 trillion**	**19,559 trillion**	**–4**
Cumulative total energy costs ($)	$762 billion	$735 billion	–3

NOTE:
GWh = gigawatt-hour; Btu = British thermal unit.
SOURCE:
SCAG scenario planning modeling, 2015.

IMPACT EN-4: Potential to increase water consumption and energy use related to water in anticipated development.

Less than Significant Cumulative Impact

If considered cumulatively, the total water consumption between 2015 to 2040 with the proposed 2016 RTP/SCS is 133,135,367 AF (**Table 3.6.5-2, *Cumulative Water Use and Costs—Residential and Commercial***). This is 0.6 percent less than the water consumption expected in the same time frame without the RTP. This is similar to the decrease seen in the yearly water consumption with efficiency in Impact EN-4, but to a lesser degree when considered cumulatively. Cumulatively, the residential sector has less water use by 1.3 percent with implementation of the Plan. The commercial sector remains relatively unchanged with implementation of the Plan. This should correlate with a reduction in required water-related energy usage, resulting in a less than significant cumulative impact.

TABLE 3.6.5-2
CUMULATIVE WATER USE AND COSTS—RESIDENTIAL AND COMMERCIAL

	Baseline (2015-2040)	Plan (2015-2040)	% Difference from Baseline
Cumulative indoor residential water use (AF)	29,396,594	29,297,620	–0.3
Cumulative outdoor residential water use (AF)	36,260,835	35,506,097	–2.1
Cumulative residential water use (AF)	**65,657,429**	**64,803,718**	**–1.3**
Cumulative indoor commercial water use (AF)	32,244,468	32,236,722	0.0
Cumulative outdoor commercial water use (AF)	36,094,927	36,094,927	0.0
Cumulative commercial water use (AF)	**68,339,395**	**68,331,650**	**0.0**
Cumulative total water use (AF)	**133,996,824**	**133,135,367**	**–0.6**
Cumulative total water costs ($)	$186 billion	$185 billion	–0.6

NOTE:
AF = acre-feet.
SOURCE:
SCAG scenario planning modeling, 2015.

3.6.6 MITIGATION MEASURES

Mitigation measures as they pertain to each CEQA question related to energy are described below. Mitigation measures are categorized into two categories: SCAG mitigation and project-level mitigation measures. SCAG mitigation measures shall be implemented by SCAG over the lifetime of the proposed 2016 RTP/SCS. Project-level mitigation measures can and should be implemented by Lead Agencies for transportation and development projects, as applicable and feasible.

IMPACT EN-2: Potential to increase residential energy consumption.

SCAG Mitigation Measures

MM-EN-2(a): SCAG shall encourage energy efficient design for buildings, potentially including strengthening local building codes for new construction and renovation to achieve a higher level of energy efficiency.

See also **MM-EN-3(a)(1), MM-EN-3(a)(2), MM-GHG-3(a)(12).**

Project-Level Mitigation Measures

MM-EN-2(b): Consistent with the provisions of Section 15091 of the State CEQA Guidelines, SCAG has identified mitigation measures capable of avoiding or reducing the significant effects of increased residential energy consumption that are in the jurisdiction and responsibility of public agencies and/or Lead Agencies. Where the Lead Agency has identified that a project has the potential for significant effects, the Lead Agency can and should consider mitigation measures to ensure compliance with CALGreen, local building codes, and other applicable laws and regulations governing residential building standards, as applicable and feasible. Such measures may include the following, or other comparable measures identified by the Lead Agency:

- Integrate green building measures consistent with CALGreen (California Building Code Title 24) into project design including:
  - Use energy efficient materials in building design, construction, rehabilitation, and retrofit.
  - Install energy-efficient lighting, heating, and cooling systems (cogeneration); water heaters; appliances; equipment; and control systems.
  - Reduce lighting, heating, and cooling needs by taking advantage of light colored roofs, trees for shade, and sunlight.
  - Incorporate passive environmental control systems that account for the characteristics of the natural environment.
  - Use high-efficiency lighting and cooking devices.
  - Incorporate passive solar design.
  - Use high-reflectivity building materials and multiple glazing.
  - Prohibit gas-powered landscape maintenance equipment.
  - Install electric vehicle charging stations.
  - Reduce wood burning stoves or fireplaces.
  - Provide bike lanes accessibility and parking at residential developments.

IMPACT EN-3: Potential to increase building energy consumption in anticipated development.

SCAG Mitigation Measures

MM-EN-3(a)(1): SCAG shall continue to work with local jurisdictions and energy providers, through its Energy and Environment Committee, and administration of the Clean Cities program, Sustainability Planning grants program, and other SCAG energy-related planning activities, to encourage energy efficient building development. SCAG's Sustainability Program works actively with Southern California communities and stakeholders to create a dynamic regional growth vision based on the principles of mobility, livability, prosperity and sustainability.

MM-EN-3(a)(2): SCAG shall continue to pursue partnerships with SCE, municipal utilities, and the CPUC to promote energy efficient development in the SCAG region, through coordinated planning and data and information sharing activities.

Project-Level Mitigation Measures

MM-EN-2(b).

3.6.7 LEVEL OF SIGNIFICANCE AFTER MITIGATION

IMPACT EN-2: Potential to increase residential energy consumption use.

Implementation of Mitigation Measures **MM-EN-2(a), MM-EN-3(a)(1), MM-EN-3(a)(2), MM-GHG-3(a)(12)** and **MM-EN-2(b)** would reduce residential energy consumption; however direct, indirect, and cumulative impacts would remain significant and unavoidable.

IMPACT EN-3: Potential to increase building energy consumption in anticipated development.

Implementation of Mitigation Measures **MM-EN-3(a)(1)**, **MM-EN-3(a)(2)** and **MM-EN-2(b)** would reduce impacts to increasing building energy consumption in anticipated development; however, direct, indirect, and cumulative impacts would remain significant and unavoidable.