

Chapter 8—Energy and Global Climate Change

8.1 Introduction

This chapter evaluates the potential impacts on energy consumption and global climate change from greenhouse gas (GHG) emissions related to the implementation of the 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy (proposed MTP/SCS). The section describes the existing environmental conditions and regulatory structure at the federal, state, and local level as it relates to energy consumption and GHG emissions. The analysis provides existing and forecasted energy consumption and GHG emission inventories from all sources, and describes the methodology used to make those estimates.

The consumption of nonrenewable energy (primarily gasoline and diesel fuel) results in GHG emissions that ultimately result in global climate change. Alternative fuels such as natural gas, ethanol, and electricity (unless derived from solar, wind, nuclear, or other energy sources that do not produce carbon emissions) also result in GHG emissions and contribute to global climate change. An overview of global climate change, the anticipated impacts of climate change to California, and the climate change impacts of the proposed MTP/SCS are provided in the following sections.

The following sections address GHG emissions, their sources, and impacts on climate change. Particular measures from statewide policies that address vehicle fuel efficiency are included in the analysis.

The information presented in this EIR chapter is based on review of existing and available information and is regional in scope. Data, analysis and findings provided in this chapter are programmatic rather than project-specific. This document is appropriate for general policy planning and to use for tiering in preparation of subsequent environmental documents; however, site-specific, project-level evaluations may be necessary to determine future project-level environmental effects and appropriate mitigation measures. Once certified, this EIR may be used to streamline CEQA compliance for those projects listed in the Preferred Scenario Project List as well as the anticipated community development shown on the 2016 Draft MTP/SCS Preferred Scenario map to the extent those projects are consistent with requirements set forth in the Public Resources Code for streamlined environmental review.

No comments were received on the Energy and Global Climate Change Chapter in response to the Notice of Preparation.

8.2 Environmental Setting

8.2.1 An Overview of Energy Consumption

ELECTRICITY CONSUMPTION

California relies on a regional power system composed of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. Approximately 71 percent of the electrical power needed to meet California's demand is produced in the state. Approximately 29 percent of its electricity demand is imported from the Pacific Northwest and the Southwest (California Energy Commission, 2014). In 2013, California's electricity was derived from natural gas (44.31 percent), large hydroelectric resources (7.76 percent), coal (7.82 percent), nuclear sources (8.84 percent), and renewable resources that include geothermal, biomass, small hydroelectric resources, wind, and solar (18.77 percent) (California Energy Commission, 2014).

According to the California Energy Commission (CEC), total statewide electricity consumption increased from 166,979 gigawatt-hours (GWh) in 1980 to 228,038 GWh in 1990, which is an estimated annual growth rate of 3.66 percent. The statewide electricity consumption in 1997 was 246,225 GWh, reflecting an annual growth rate of 1.14 percent between 1990 and 1997 (California Energy Commission Energy Almanac, 2011). Statewide consumption was 274,450 GWh in 2012, an annual growth rate of 0.7 percent between 1997 and 2012. The SACOG region consumed 17,787 GWh in 2012 (ECDMS, 2014), roughly 6.5 percent of the state total.

Peak electricity demand, expressed in megawatts (MWh), measures the largest electric power requirement during a specified period, usually integrated over one hour. A single MWh is enough power to meet the expected electricity needs of 1,000 typical California homes. Peak demand is important in evaluating system reliability, determining congestion points on the electrical grid, and identifying potential areas where additional transmission, distribution, and generation facilities may be needed. California's peak demand typically occurs in August between 3:00 p.m. and 5:00 p.m. High temperatures lead to increased use of air conditioning, which in combination with industrial loads, commercial lighting, and office equipment comprise the major demand for electricity consumption in the peak demand period in the state. In 2014, peak electricity demand for California is predicted to be 64,191 MWh (California Energy Commission, 2012).

Pacific Gas and Electric (PG&E), Roseville Electric and the Sacramento Municipal Utility District (SMUD) provide electricity in the plan area. Each of these electricity providers buys power from a diverse mix of generating sources, including fossil-fueled plants, hydroelectric powerhouses, wind farms, and nuclear power plants.

OIL

The primary energy source for the United States is oil, which is refined to produce fuels like gasoline, diesel, and jet fuel. Oil is a finite, nonrenewable energy source. World consumption of petroleum products has grown steadily in the last several decades. As of 2011, world consumption of oil had reached 100 million barrels per day. The United States, with less than five percent of the world's population, accounts for approximately 19 percent of world oil consumption, or approximately 18.8 million barrels per day (The World Factbook 2011, Washington, DC: Central Intelligence Agency, 2011). The transportation sector relies heavily on oil. In California, petroleum

based fuels currently provide approximately 96 percent of the state's transportation energy needs (California Energy Commission, 2011).

California is currently ranked third in the nation among oil producing states. Crude oil production in California averaged roughly 545,000 barrels per day in 2013, a decline of 1.8 percent from 2009. In 2013, the total oil supplied to refineries in California came from in-state oil production (37.0 percent), combined with oil from Alaska (11.8 percent), and foreign sources (51.2 percent) (ECDMS, 2014).

California's refineries, located in the San Francisco Bay Area, the Los Angeles area, and the Central Valley, produce approximately two million barrels of petroleum per day. (US Energy Information Agency, 2014). Imported crude oil is received by tanker, barge, pipeline, rail, or truck at nearly 100 terminals. Most of those are marine terminals. The crude oil is then sent to refineries by pipeline for refining (California Energy Commission, 2007).

NATURAL GAS

In 2012, the SACOG region consumed 529.5 million therms of natural gas. Natural gas supplies are derived from underground sources and brought to the surface at gas wells. Once it is extracted, gas is purified and the odorant that allows gas leaks to be detected is added to the normally odorless gas. Natural gas suppliers, such as PG&E, then send the gas into transmission pipelines, which are usually buried underground. Compressors propel the gas through the pipeline system, which delivers it to homes and businesses.

The state produces approximately 9 percent of its natural gas, while obtaining 16 percent from Canada and 75 percent from the Rockies and the Southwest (California Energy Commission, 2014). In 2012, California produced 637 million cubic feet of natural gas per day (California Energy Commission, 2014).

PG&E is the largest publicly-owned utility in California and provides natural gas for residential, industrial, and agency consumers within the MTP/SCS plan area.

8.2.2 An Overview of Global Climate Change

Atmospheric GHGs and clouds within the Earth's atmosphere influence the temperature by absorbing most of the infrared radiation rising from the Earth's sun-warmed surface that would otherwise escape into space. This process is commonly known as the Greenhouse Effect. GHGs and clouds, in turn, radiate some heat back to the Earth's surface and some out to space. The resulting balance between incoming solar radiation and outgoing radiation from both the Earth's surface and atmosphere keeps the planet habitable.

However, anthropogenic GHG emissions, or those caused by human activities, enhance the Greenhouse Effect by absorbing additional radiation that would otherwise escape to space, thereby trapping more radiation in the atmosphere and causing temperatures to increase. The anthropogenic GHG emissions responsible for increasing the Greenhouse Effect and their relative contribution to global climate change (based on their relative ability to trap heat in the atmosphere) are carbon dioxide (CO₂) (53 percent); methane (CH₄) (17 percent); near-surface ozone (O₃) (13 percent); nitrous oxide (N₂O) (12 percent); and chlorofluorocarbons (CFCs) (5 percent).

The increasing emissions of these GHGs—primarily associated with the burning of fossil fuels (during motorized transport, electricity generation, consumption of natural gas, industrial activity, manufacturing, etc.) and deforestation, as well as agricultural activity and the decomposition of solid waste—have led to a trend of anthropogenic warming of the Earth’s average temperature, which is causing changes in the Earth’s climate. This increasing temperature phenomenon is known as global warming and the climatic effect is known as climate change or global climate change.

The California State Legislature adopted the public policy position that global climate change is “a serious threat to the economic well-being, public health, natural resources, and the environment of California” (Health & Saf. Code, § 38501). Further, the State Legislature has determined that “the potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious disease, asthma, and other human health-related problems,” and that “(g)lobal warming will have detrimental effects on some of California’s largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry (and)...will also increase the strain on electricity supplies necessary to meet the demand for summer air-conditioning in the hottest parts of the State” (Health & Saf. Code, § 38501).

8.2.3 Effects of Energy Consumption

Depending on the source and use of the fuel, the impacts of energy consumption can be far reaching. Electricity generation, and the extraction and consumption of fossil fuels affect air emissions, water quality, solid waste, and land resources. Each of these is described in more detail below.

AIR EMISSIONS

Fossil fuel related energy production can lead to sulfur dioxide, nitrogen oxide, and CO₂ emissions. These emissions can be responsible for smog, acid rain, and haze. These emissions can also increase the risk of climate change (EPA, 2009).

WATER QUALITY

The production of energy can have an impact on water resources by the use of water for cooling and the creation of steam, the discharge of water after use, and the discharge of pollutants into natural water sources. The impact varies by the source of energy used, and technologies used in energy creation (EPA, 2009).

SOLID WASTE

Certain technologies used in the generation of energy create solid waste. While some of this can be disposed of in landfills, others like nuclear energy rods, oil sludge, and ash from coal and solid waste management require special handling as they may contain toxic materials (EPA, 2009).

LAND RESOURCES

Energy production usually requires the use of certain resources. While this varies by source and purpose, it usually entails the extraction of materials, like natural gas, coal, and oil, and/or the siting of large facilities, like nuclear and hydro-electric. The impacts vary from the erosion of land from mining, to the destruction of natural habitat, to contamination and disruption of water systems (EPA, 2009).

8.2.4 Effects of Climate Change

In 1991, the United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several GHG emission outcomes of varying demographic, social, economic, technological, environmental, and policy futures. There have been five subsequent assessments of the initial scenarios, with the fifth assessment released in 2014. The Fifth Assessment Report (AR5) builds upon prior IPCC work, adding new research findings from the prior years of research. AR5 concludes that continued emissions of greenhouse gases will cause further warming and changes in “all components of the climate system”, and that “limiting climate change will require substantial and sustained reductions of greenhouse gas emissions”. (IPCC, 2014).

The California Environmental Protection Agency (CalEPA), as directed by California Governor Arnold Schwarzenegger through Executive Order #S-3-05, is to prepare biennial science reports on the potential impact of continued global climate change on certain sectors of the California economy. The fourth of these reports, *Scenarios of Climate Change in California: An Overview* (Climate Scenarios report), was published in February 2006.

The Climate Scenarios report uses the IPCC work to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century: lower warming range (3.0-5.5°F); medium warming range (5.5-8.0°F); and higher warming range (8.0-10.5°F). The Climate Scenarios report then presents an analysis of future climate conditions in California under each warming range, for impacts on public health, water resources, agriculture, forests and landscapes, and rising sea levels. Each area is described in detail below.

PUBLIC HEALTH

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation are projected to increase from 25 to 35 percent under the lower warming range, to 75 to 85 percent under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from

dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat. It will also result in more GHG emissions from increased energy consumed from the use of air conditioners (EPA, 2011).

WATER RESOURCES

A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snow pack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snow pack, increasing the risk of summer water shortages.

The state's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta, a major state fresh water supply.

Global climate change is projected to seriously affect agricultural areas, with California farmers projected to lose as much as 25 percent of the water supply they need. Reductions or changes in seasonal flows associated with changing precipitation patterns could also decrease the potential for hydropower production within the state (although the effects on hydropower are uncertain). Global climate change could also seriously harm winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as one month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

If GHG emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snow pack by as much as 70 to 90 percent. Under the lower warming scenario, snow pack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range. The actual amount of lost snow pack will depend in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snow pack would pose challenges to water managers, hamper hydropower generation, and nearly eliminate all skiing and other snow-related recreational activities.

AGRICULTURE

Increased GHG emissions are expected to cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. Although higher CO₂ levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development will change, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's

agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk.

In addition, continued global climate change will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps. Continued global climate change is also likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

FORESTS AND LANDSCAPES

Global climate change is expected to intensify the threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. For example, if precipitation increases as temperatures rise, the risk of wildfires in southern California is expected to increase by approximately 30 percent toward the end of the century. In contrast, precipitation decreases could increase the risk of wildfires in northern California by up to 90 percent.

Moreover, continued global climate change will alter natural ecosystems and biological diversity within the state. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60 to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests is also expected to decrease as a result of global climate change.

RISING SEA LEVELS

Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the state's coastal regions. Under the higher warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

REGIONAL CLIMATE RISKS

Climate risks have their own characteristics, like geographic extent, impacts and severity, and seasonality. A climate related event also has the potential to create multiple hazards: heat is a factor in increased wildfires and wildfires can lead to landslides. Therefore, it is necessary to identify the potential primary and secondary hazards from climate risks. For a report released by SACOG in the summer of 2015, international climate change scenarios were disaggregated into regional climate risks in order to identify particular climate trends and the likelihood of their occurrence in the Sacramento region. This effort identified the following major climate related risks to our region: extreme heat; precipitation, runoff and flooding; increased wildfires; and landslides. Each of these climate risks poses potential impacts to land use and transportation infrastructure.

8.3 Regulatory Setting

8.3.1 International Regulations, Plans and Policies

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

The United States aligned with other countries around the world in 1994 by signing the UNFCCC. Under the convention, governments collaborate and share information on national based policies and best practices related to curbing GHG emissions and adapting to the impacts of climate change.

8.3.2 Federal Regulations, Plans and Policies

CLEAN AIR ACT (CAA) OF 1970

Endangerment and Cause or Contribute Findings for Greenhouse Gases

On December 7, 2009, the U.S. Environmental Protection Agency (EPA) made two findings regarding GHGs under section 202(a) of the CAA (42 U.S. Code, § 7401 et seq.). While the findings did not create requirements for any industry, they were a means to finalize the GHG emission standards for light-duty vehicles the EPA and USDOT proposed in September of 2009.

The first finding states that the current and projected concentrations of GHGs in the atmosphere pose a risk to public health for current and future populations.

The second finding states that the combined GHG emissions from new motor vehicles contribute to the GHG concentrations that threaten public health and welfare.

California Greenhouse Gas Waiver

In December of 2005, the California Air Resources Board (ARB) requested, and on June 14, 2011, the EPA granted, an amendment to California's motor vehicle GHG emission standards beginning with model year 2009. EPA CAA standards require a waiver for states to enact emission standards for new cars. On June 14, 2011, the EPA confirmed that ARB's amendments to its motor vehicle GHG emission standards are within the scope of the existing waiver of preemption issued.

ENERGY POLICY AND CONSERVATION ACT OF 1975

The Energy Policy and Conservation Act of 1975 (42 U.S. Code, § 6421) sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon (mpg). Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate

Average Fuel Economy (CAFE) program, which is administered by the EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

Additions to CAFE have been made in recent years. In 2010, President Obama signed a memorandum directing the EPA and the USDOT to create a policy to increase fuel efficiency and decrease GHG pollution from medium- and heavy-duty trucks for Model Years 2014-2018. Then, in 2011, President Obama reached an agreement with 13 auto manufacturers to increase fuel efficiency to 54.5 miles per gallon for cars and light-duty trucks by Model Year 2025.

ENERGY POLICY ACT OF 1992 (EPACT)

EPACT (42 U.S. Code, § 13201 note) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPACT includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPACT requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPACT. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

ENERGY POLICY ACT OF 2005 (EPACT 2005)

EPACT 2005 (42 U.S. Code, § 15942) was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY (MAP-21)

The bill makes significant changes to the framework that directs federal transportation funding, giving more flexibility to recipients, while MPOs to establish performance measures and targets to evaluate these investments. This flexibility changes requirements and incentives for spending on sustainable transportation initiatives. The bill is the first significant change to transportation funding since the passage of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005.

Specifically, the bill requires MPOs to address performance measures in planning and project selection. Long-range plans are required to include performance targets, and transportation improvement programs must discuss the anticipated effects of selected projects toward achieving the performance targets. In addition, electric vehicle charging and natural gas fueling stations are expressly authorized uses of funding under CMAQ, surface transportation, and highway safety programs.

8.3.3 State Regulations, Plans and Policies

CALIFORNIA STRATEGY TO REDUCE PETROLEUM DEPENDENCE, ASSEMBLY BILL 2076 (AB 2076)2000

AB 2076 (Stats. 2000, ch. 936) requires the CEC and the ARB to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles.

The strategy, Reducing California's Petroleum Dependence, was adopted by the CEC and ARB in 2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles (SUVs); and California increases the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

CALIFORNIA RENEWABLES PORTFOLIO STANDARD (RPS), SENATE BILL 1078 (SB 1078)2002

SB 1078 (Stats. 2002, ch. 516) established the RPS for electricity supply. The RPS requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. This target date was moved forward by SB 1078 to require compliance by 2010. In addition, electricity providers subject to the RPS must increase their renewable share by at least one percent each year. In 2011, Governor Brown signed the California Renewable Energy Resources Act of 2011, also known as Senate Bill 2 (Stats. 2011, 1st Ex. Sess., ch. 1; SB X1-2) that applies renewable energy standards to all energy providers, and requires a 33 percent renewable mix by 2020.

CLEAN CAR STANDARDS, ASSEMBLY BILL 1493 (AB 1493)2002

AB 1493 (Stats. 2002, ch. 200; Pavley I) required ARB to develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state." To meet the requirements of AB 1493, ARB approved amendments to the California Code of Regulations adding GHG emission standards to California's existing motor vehicle emission standards in 2004. Amendments to Title 13 of the California Code of Regulations, sections 1900 and 1961, and adoption of section 1961.1, require automobile manufacturers to meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. Emission limits are further reduced each model year through 2016. For passenger cars and light-duty trucks 3,750 pounds or less loaded vehicle weight (LVW), the 2016 GHG emission limits are approximately 37 percent lower than the during the first year of the regulations in 2009. For medium-duty passenger vehicles and light-duty trucks 3,751 LVW to 8,500 pounds gross vehicle weight (GVW), GHG emissions are reduced approximately 24 percent between 2009 and 2016.

In 2012, ARB approved an update to AB 1493, creating new vehicle emission controls standards for model years 2017 to 2025. The update takes a series of measures and combines them into one policy called Advanced Clean Cars (Pavley II). By 2025, the new standards call for new automobiles to emit 34 percent fewer GHG emissions and 75 percent fewer smog-forming emissions, compared to projected vehicle emission levels in 2016 under the previous rule.

ENERGY: PLANNING AND FORECASTING, SENATE BILL 1389 (SB 1389) 2002

SB 1389 requires the CEC to adopt and transmit to the Governor and Legislature a report of findings every two years. The report is called the Integrated Energy Policy Report and CEC has adopted one every other year since 2003. The reports make recommendations to increase California's energy supplies, reduce energy demand, broaden the range of alternatives to conventional energy sources, and improve the State's energy delivery infrastructure.

In January 2007, the CEC published the 2006 Integrated Energy Policy Report Update, which was completed after inviting input from stakeholders and federal, state, and local agencies. The report contained a review of two areas: "Renewable Portfolio Standard activities and the potential relationship between sustainable land use planning, also called 'smart growth,' and energy saving opportunities." The report also discusses California's "minimal progress to date in meeting Renewable Portfolio Standard goals, identifies challenges the state faces in achieving those goals, and offers recommendations." Further, the report "details the lack of relationship between land use planning activities and energy concerns and offer recommendations for taking advantage of potential energy efficiencies that smart growth would offer" (California Energy Commission, 2007).

In the report, the CEC notes that California's population is expected to grow by 20 million people between 2000 and 2050 and that this growth will strain California's energy and infrastructure system. The CEC concludes that land use decisions have a profound effect on every aspect of energy, which necessitates a shift in approaches to land use and development in light of the coming growth in California. The recommendations in the report are based on the conclusion that California "needs to investigate approaches that go beyond decreasing transportation fuel use and relieving congestion to approaches that can serve as a nexus for developing distributed renewable generation and efficient transportation in communities to help California meet its statewide energy and climate change goals." The report notes that the best opportunity for meeting this goal is to emphasize the principles of "smart growth", which uses resources prudently and creates low-impact communities.

The report was updated in 2008, 2010, 2012, and again in 2014. The 2014 update focused on a variety of energy issues, including:

- the role of transportation in meeting state climate, air quality, and energy goals
- the Alternative and Renewable Fuel and Vehicle Technology Program
- current and potential funding mechanisms to advance transportation policy
- the status of statewide plug-in electric vehicle infrastructure
- challenges and opportunities for electric vehicle infrastructure deployment
- measuring success and defining metrics within the Alternative and Renewable Fuel and Vehicle Technology Program

- market transformation benefits resulting from Alternative and Renewable Fuel and Vehicle Technology Program investments
- the state of hydrogen, zero-emission vehicle, biofuels, and natural gas technologies over the next 10 years
- transportation linkages with natural gas infrastructure
- evaluation of methane emissions from the natural gas system and implications for the transportation system
- changing trends in California’s sources of crude oil
- the increasing use of crude-by-rail in California
- the integration of environmental information in renewable energy planning processes
- an update on electricity reliability planning for Southern California energy infrastructure
- an update to the electricity demand forecast.

ALTERNATIVE FUELS PLAN, ASSEMBLY BILL 1007 (AB 1007) 2005

AB 1007 (Stats. 2005, ch. 371) requires the CEC to prepare a plan to increase the use of alternative fuels in the State. The California Alternative Fuel Plan, prepared in partnership with ARB, is presented as an alternative fuels goal coupled with a series of implementing requirements. It contains the following goals for renewable fuel uses: nine percent by 2012, 11 percent by 2017, and 26 percent by 2022. This comes from an increase in alternative fuel vehicles, made possible by public sector investment as a catalyst for private sector involvement. The plan was published in 2007.

EXECUTIVE ORDER #S-3-05

On June 1, 2005 California Governor Arnold Schwarzenegger signed Executive Order #S-3-05, which called for a reduction in total GHG emissions within California to 1990 levels by 2020 and for an 80 percent reduction below 1990 levels by 2050. The Executive Order also directed the Secretary of CalEPA to coordinate with a number of other state agencies to meet these targets. AB 32 was adopted in part to respond to the aspirations of Executive Order #S-3-05 by establishing a statewide GHG emissions limit for 2020 and beyond. Specifically, the legislature responded to Executive Order #S-3-05’s goal of promoting longer-term emissions reductions by mandating that the 2020 emissions limit established by AB 32 “continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020,” but the state legislature did not include the Executive Order’s aspirational 2050 goal in AB 32 (Health & Saf. Code, § 38551(b)).

In 2008, the ARB adopted the Scoping Plan for AB 32—the main strategies California will use to reduce the GHGs that cause climate change. The Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation regulation to fund the program. The Scoping Plan recognizes that the Senate Bill 375 (Stats. 2008, ch. 728; SB 375) regional GHG emissions reduction targets is the main action required to obtain the necessary reductions from the land use and transportation sectors in order to achieve the 2020 emissions reduction goals of AB 32.

As discussed below, SB 375 requires the MTP to include an SCS (or Alternative Planning Strategy) to meet the regional emissions reduction target for passenger vehicles. In adopting SB 375, the state legislature expressly found that improved land use and transportation systems are needed to achieve AB 32's 2020 GHG emissions reduction target. Thus the legislature drew a direct link between the SB 375 GHG emissions reduction targets and AB 32.

EXECUTIVE ORDER #B-30-15

In April 2015, California Governor Jerry Brown signed Executive Order #B-30-15, which called for a reduction in total GHG emissions within California to 40 percent below 1990 levels by 2030. The Executive Order aligns the state's GHG reduction targets with many countries around the world, and put's the state on track to meet the long-term GHG reduction target of 80 percent below 1990 levels by 2050 as set by Executive Order #S-3-05.

The Executive Order also directs state agencies to address climate adaptation in their work. This includes climate adaptation considerations in the state's 5-year Infrastructure Plan, planning and budget setting, and all financial decisions.

CALIFORNIA GLOBAL WARMING SOLUTIONS ACT, ASSEMBLY BILL 32 (AB 32) 2006

In September 2006, Governor Arnold Schwarzenegger signed into law AB 32 (Stats. 2005, ch. 488). AB 32 set a statewide goal of reducing GHG emissions to 1990 levels by 2020. AB 32 was intended to effectively end the scientific debate in California over the existence and consequences of global climate change. In order to be effective, measures to reduce GHG will have to occur in connection with similar reductions by other states and countries. Through AB 32, California is attempting to assume a leadership role in the abatement of climate change and to offer a model for other states and countries to reduce GHG emissions.

AB 32 also takes into account the relative contribution of each source, or source category, to prevent undue burden on small businesses and others by requiring the ARB to recommend a minimum threshold of GHG emissions below which emissions reduction requirements would not apply. AB 32 also allows the Governor to adjust the deadlines mentioned above for individual regulations or the entire state to the earliest feasible date in the event of extraordinary circumstances, catastrophic events, or threat of significant economic harm.

Pursuant to AB 32, in 2008 ARB adopted the Climate Change Scoping Plan, which contains strategies to reduce GHG emissions. The Scoping Plan uses various actions including regulations, incentives, and market mechanisms to achieve reduction targets. In 2011, ARB approved an update of the expected GHG emissions reductions from each of the measures outlined in the Scoping Plan document. Table 8.1 shows the expected measures and statewide reductions for the Transportation and Electricity and Natural Gas sectors. These measures are included in the Methods and Assumptions section of this chapter.

In 2014, ARB adopted the first update to the Scoping Plan, which outlines additional statewide strategies over the next 5 years, which will keep the state on track to meet the 2020 GHG emission reduction targets required by AB 32. The update focuses on a policy framework that outlines steps necessary for further GHG emission reductions, including: creating and consuming cleaner and more efficient forms of energy, cleaner modes of transportation, and utilizing the State's Cap-and-

Trade program to help achieve statewide goals. The update suggests actions over the next 5 years, including development of interim year targets between 2020 and 2050 and related measures to achieve those new targets.

Table 8.1
GHG Reductions from Scoping Plan (million tons of Co2 equivalents)

Measures in Capped Sectors	49.0
Transportation	24.4
T-1 Advanced Clean Cars	3.8
T-2 Low Carbon Fuel Standards	15.0
T-3 Regional Targets (SB 375)	3.0
T-4 Tire Pressure Program	0.2
T-5 Ship Electrification	0.6
T-7 Heavy Duty Aerodynamics	0.9
T-8 Medium/Heavy Hybridization	0.0
T-9 High Speed Rail	1.0
Electricity and Natural Gas	24.6
E-1 Energy Efficiency and Conservation	7.8
CR-1 Energy Efficiency and Conservation	4.1
CR-2 Solar Hot Water	0.1
E-3 Renewable Energy Standards	11.4
E-4 Million Solar Roofs	1.1

Source: ARB, 2011

EMISSION PERFORMANCE STANDARDS, SENATE BILL 1368 (SB 1368) 2006

SB 1368 (Stats. 2006, ch. 598) is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a GHG emissions performance standard for baseload generation from investor-owned utilities by February 1, 2007. The CEC was also tasked with establishing a similar standard for local publicly-owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The bill further requires that all electricity provided to California, including imported electricity, be generated from plants that meet the standards set by the CPUC and the CEC. In January 2007, the CPUC adopted an interim GHG Emissions Performance Standard, which requires that all new long-term commitments for baseload generation entered into by investor-owned utilities have emissions no greater than a combined cycle gas turbine plant (i.e., 1,100 pounds of CO₂ per megawatt-hour). A “new long-term commitment” refers to new plant investments (new construction), new or renewal contracts with a term of five years or more, or major investments by the utility in its existing baseload power plants. In May 2007, the CEC approved regulations that prohibit the state’s publicly-owned utilities from entering into long-term financial commitments with plants that exceed the standard adopted by the CPUC of 1,100 pounds of CO₂ per megawatt hour.

BIOENERGY ACTION PLAN, EXECUTIVE ORDER #S-06-06

Executive Order #S-06-06, April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs state agencies to work together to advance biomass programs in

California while providing environmental protection and mitigation. The Executive Order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the state to meet a target for use of biomass electricity.

LOW CARBON FUEL STANDARD AND ALTERNATIVE DIESEL FUEL REGULATIONS,

Executive Order #S-01-07, January 18, 2007, establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through the establishment of a Low Carbon Fuel Standard (LCFS). The EO states that the LCFS shall be incorporated into the State's Alternative Fuels Plan required by AB 1007 and was one of the proposed discrete early action GHG reduction measures identified by the ARB pursuant to AB 32. In 2009, ARB adopted formal regulations establishing the LCFS, which became effective in 2010. Subsequent amendments to the LCFS were approved by ARB in 2011 and 2012.

In 2014, in response to litigation and court orders, ARB initiated a process to re-adopt the LCFS, along with proposed amendments to the existing LCFS regulation that, if approved, would become effective in 2015. In 2014, ARB also initiated a regulatory proceeding to adopt an Alternative Diesel Fuel (ADF) regulation that would both establish a process by which alternative diesel fuels could be commercialized in California and create a regulatory process in which potential nitrous oxide (NO_x) emissions impacts from biodiesel could be mitigated. Both the proposed re-adoption of LCFS and the proposed ADF regulation are scheduled for hearings and adoption by ARB in 2015.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) GHG EMISSIONS, SENATE BILL 97 (SB 97) 2007

In 2007, CEQA (Pub. Resources Code, § 21000 et seq.) was amended by SB 97 (Stats. 2007, ch. 185). SB 97 provides that documents required by CEQA for transportation projects must analyze GHG impacts. The amendments to CEQA became effective on March 18, 2010.

SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT, SENATE BILL 375 (SB 375) 2008

SB 75 (Stats. 2008, ch. 728) was built on AB 32 (California's 2006 climate change law) and requires regional transportation agencies to develop an SCS in order to reduce GHG emissions from passenger vehicles. The SCS is one component of the existing Regional Transportation Plan (RTP). Pursuant to SB 375, ARB adopted GHG emissions reduction targets in 2010 applicable to each of the State's 18 Metropolitan Planning Organizations (MPOs). The targets were developed through a collaborative process that involved input from the Regional Targets Advisory Committee (RTAC), the MPOs, and numerous other stakeholders. Following input from the RTAC and in consultation with the MPOs, ARB provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks for 2020 and 2035. For SACOG, these targets are seven percent below 2005 emissions levels by 2020 and 16 percent below 2005 levels by 2035.

The SCS outlines the region's plan for combining transportation resources, such as roads and mass transit, with a realistic land use pattern, in order to meet a state target for reducing GHG emissions. The strategy must take into account the region's housing needs, transportation demands, and protection of resource and farmlands.

Additionally, SB 375 modified the state's Housing Element Law to achieve consistency between the land use pattern outlined in the SCS and the Regional Housing Needs Assessment allocation required under State Planning and Zoning law. The legislation also substantially improved cities' and counties' accountability for carrying out their housing element plans.

Finally, SB 375 amended the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) to ease the environmental review requirements for consistent developments that help reduce the growth of GHG emissions.

CLIMATE ACTION PROGRAM AT CALTRANS

In December 2006, the California Department of Transportation (Caltrans), Business, Transportation, and Housing Agency, issued a Climate Action Program. The goal of the Climate Action Program is to promote clean and energy efficient transportation, and provide guidance for mainstreaming energy and climate change issues into business operations. The overall approach to lower fuel consumption and CO₂ from transportation is twofold: (1) reduce congestion and improve efficiency of transportation systems through smart land use, operational improvements, and Intelligent Transportation Systems; and (2) institutionalize energy efficiency and GHG emissions reduction measures and technology into planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment.

The Climate Action Program is based on the assumption that “the most effective approach to addressing GHG reduction, in the short-to-medium term, is strong technology policy and market mechanisms to encourage innovations. Rapid development and availability of alternative fuels and vehicles, increased efficiency in new cars and trucks (light and heavy duty), and super clean fuels are the most direct approach to reducing GHG emissions from motor vehicles (emission performance standards and fuel or carbon performance standards).” Caltrans asserts that the state must maintain a consistent GHG reduction policy across all agencies to create a coordinated climate change program.

In the Climate Change Action Program, Caltrans recognizes the importance of regional planning in GHG emissions and notes that SACOG's Blueprint plan “would result in lowering 246,000 gallons of fuel each day. (Caltrans, 2006)”

2013 ZERO EMISSION VEHICLE ACTION PLAN

In 2012, California Governor Brown issued Executive Order B-16-2012 calling for the rapid commercialization of zero emission vehicles (ZEV). The order set a benchmark to have 1.5 million ZEVs on California's roads by 2025, and called for state agencies to take action to facilitate public and private investment into vehicle technology and fueling infrastructure. In addition, it specifically called for the transportation sector to reduce GHG emissions to 80 percent below 1990 levels by 2050, following an earlier executive order setting the same target for overall GHG reductions.

ENVIRONMENTAL QUALITY: TRANSIT ORIENTED INFILL PROJECTS, JUDICIAL REVIEW STREAMLINING FOR ENVIRONMENTAL LEADERSHIP DEVELOPMENT PROJECTS, AND ENTERTAINMENT AND SPORTS CENTER IN THE CITY OF SACRAMENTO, SENATE BILL 743 (SB 743) 2013

SB 743, which creates a process to change the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 requires the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to automobile level of service (LOS) for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must consider the reduction of GHG emissions. Draft guidelines were released by OPR in August 2014, comments were received and a final recommendation is due in 2015.

SAFEGUARDING CALIFORNIA

In July of 2014, the California Natural Resources Agency released *Safeguarding California, Reducing Climate Risks*. This document was an update to earlier work on climate adaptation strategies for the State prepared pursuant to Executive Order S-13-08. The report analyzes the various climate related risks the state is faced with now and forecasted into the future, and outlines measures and policies that can be implemented to reduce the impact these risks may cause (California Resources Agency, 2014).

8.3.4 Local Regulations, Plans and Policies

GENERAL PLANS

Several of SACOG's member agencies have general plan elements and policies that specifically address energy use and conservation, as well as the reduction of GHG emissions and strategies to prepare for the effects of climate change. Such general plans contain goals, objectives, and policies aimed at reducing energy consumption and GHG emissions. These include policies on energy retrofits to existing residential and commercial land uses, zoning and building ordinances for energy efficiency of new construction, and ways to reduce vehicle miles traveled (VMT) through land use and transportation priorities.

LOCAL AND REGIONAL GREENHOUSE GAS REDUCTION PLANS, CLIMATE ACTION PLANS, AND RELATED INITIATIVES

Many of SACOG's member jurisdictions and partner agencies have climate action plans that set goals and targets on the reduction of GHG emissions, and outline policies to help achieve those goals. Examples include Citrus Heights, Davis, Elk Grove, Roseville, and Sacramento; along with Yolo County and Sacramento County. In addition, many of the member jurisdictions within the plan area have begun the Climate Action Plan process by conducting baseline emissions inventories, which establish a reference point for GHG emissions reduction.

Many of the completed climate actions plans in the area address similar issues related to emissions produced by transportation, energy usage, and operational emissions. The types and quantity of emissions produced in the SACOG region vary among county boundaries. For instance, Yolo and Sutter Counties have a higher proportion of emissions produced by agricultural activities that are not observed in more urban or less cultivated counties. Considering this, Yolo and Sutter Counties have established more policies for reducing emissions due to these activities.

For most jurisdictions, transportation and energy usage produce a majority of GHG emissions. Policies observed among climate action plans in the region establish a needed framework for improved circulation networks and energy conservation. Transportation policies aim to reduce VMT by offering more opportunities for alternative transportation modes, such as bicycling and transit use. In addition, many of the climate action plans frame policies to promote transit-oriented development. Future residents in these developments will have close access to frequent local transit. In order to reduce emissions caused from energy usage, jurisdictions are committed to establishing policies that will provide energy efficiency for both residential and commercial land uses. Cities and counties include programs to improve energy efficiencies in old and new buildings and decrease the use of fossil fuels by providing incentives for renewable energy sources.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT GREENHOUSE GAS EMISSION THRESHOLDS

The Sacramento Metropolitan Air Quality Management District (SMAQMD) adopted recommended GHG thresholds of significance for projects within their air quality attainment area. The thresholds of significance are as follows:

- 1,100 metric tons of carbon dioxide equivalent (CO₂e) for the construction phase of projects,
- 1,100 metric tons of CO₂e per year for operational phases of projects, and
- 10,000 direct metric tons of CO₂e per year from stationary source projects.

In addition, the SMAQMD set a level of mitigation for any project that found CEQA thresholds significant to be consistent with AB 32 and CARB's current Scoping Plan. At the time of adoption of the threshold, the reduction was 21.7 percent below a "no action taken" scenario for the operational phase of the project in the year 2020. SMAQMD, with direction from its Board, will update the percent as changes are made to the Scoping Plan¹.

8.4 Impacts and Mitigation Measures

8.4.1 Methods and Assumptions

For each of the three levels of analysis (regional, Community Type, and Transit Priority Areas), impacts are assessed in terms of both the proposed land use pattern and transportation network. By 2036, implementation of the proposed MTP/SCS will result in a land use pattern and transportation network that is different from existing conditions. Unless otherwise stated, "existing conditions" in the proposed MTP/SCS refers to conditions in the baseline of 2012. The proposed MTP/SCS uses 2012 as the baseline because it is the most recent year for which comprehensive land use, demographic, traffic count and VMT data are available for the SACOG region. Chapter 1 – Introduction includes a more detailed discussion of the baseline for the proposed MTP/SCS.

¹ <http://www.airquality.org/ceqa/cequguideupdate/Ch6ghgFINAL.pdf>

ENERGY

Total energy use from the residential and commercial sectors, measured in GWh of electricity, therms of natural gas, and gallons of gasoline, were estimated for the baseline (2012), the project year (2036), and an interim year (2020). 2012 was used for the baseline due to the availability of data for this single year from state and local sources. This includes data on energy consumption from CEC; emission inventories from ARB; electricity profiles from SMUD, PG&E, and Roseville Electric; and, land use and demographic estimates from the California Department of Housing and Community Development (HCD) and SACOG. In addition, the lack of regional land use data for more recent years makes forecasting energy consumption difficult as estimates not based on accurate small scale geographic land uses, like parcels, are less accurate. Table 8.2 shows the energy consumption for each year by source in the plan area.

Table 8.2
Electricity, Natural Gas, and Gasoline Consumption Estimates for 2012, 2020, and 2036 in the proposed MTP/SCS Plan Area

Energy Source	2012	2020	2036
Electricity (GWh)	17,787	18,182	22,166
Natural Gas (therms)	520,261,612	531,809,161	648,347,000
Gasoline (gallons)	731,137,537	797,035,518	957,177,000

Sources: California Energy Commission, ECDMS, 2014; SACOG, 2014

Electricity and natural gas usage data for 2012 were obtained for the plan area from the California Energy Consumption Database (ECDMS, 2011). For 2020 and 2036, business-as-usual (BAU) energy consumption was estimated by calculating the rate of consumption by single-family residential, multi-family residential, and employment in 2012. These rates were then applied to the growth in each category for each of the horizon years in the proposed MTP/SCS, 2020 and 2036. This method was used to align with 2005 data from the U.S. Energy Information Administration (EIA) showing that multi-family residential units, on average, are 44 percent more efficient on a per unit basis in terms of electricity consumption and 35 percent more efficient in terms of natural gas consumption (EIA, 2005). In the proposed MTP/SCS, residential land uses are split into the following categories: single family, multi-family with between two and four units and multi-family with more than five units. For this analysis, the two multi-family residential categories were combined to better align with the EIA data.

Gasoline consumption from passenger vehicles was estimated using outputs from EMFAC, developed by ARB to estimate emissions from on-road sources. Specifically, the analysis used the EMFAC Pavley I + LCFS postprocessor, also developed by ARB to adjust the CO₂ emissions from EMFAC outputs to account for the reductions from fuel efficiency improvements as directed by AB 1493 (Stats. 2002, ch. 200). From this output, total gallons of gasoline consumption were estimated.

CLIMATE CHANGE

Total GHG emissions, measured in million metric tons of CO₂ equivalent (MMtCO₂e), were estimated for the baseline, the project year (2036), and the interim year (2020) from the following sources: transportation operations, electricity generation, residential and commercial uses, industrial operations, and agricultural and forestry lands. The 2012 baseline and sectors were used as they are consistent with the ARB GHG inventory from May of 2014, as described below. This inventory was

the base for much of the regional inventory used in this analysis. Table 8.3 below shows the total GHG emissions for the plan area. The method and calculations are described in subsequent paragraphs.

**Table 8.3
Proposed MTP/SCS Plan Area GHG Emissions in 2012, 2020, and 2036 (MMtCO₂e) By Sector**

Sector	2012	2020	2036
Transportation	10.33	8.13	4.63
Electricity Generation	5.51	3.14	1.48
Residential/Commercial	2.76	2.20	1.67
Industrial	0.89	0.60	0.60
Agriculture & Forestry	1.28	0.93	0.88
TOTAL	20.78	15.00	9.27

Source: SACOG, 2014.

In 2014, ARB updated its statewide GHG emissions inventory for 2012 (ARB, 2014). The inventory for CO₂, CH₄, and N₂O included emissions from the following sectors: Transportation, Industrial, Electricity Generation within the State, Electricity Generation Imported, Residential, Commercial, Recycling and Solid Waste, and Agriculture and Forestry. For this analysis, the Residential and Commercial sectors were combined into one sector, as were the two Electricity Generation sources. Similarly, Recycling and Solid Waste was combined within the Industrial sector. These data were used because no additional statewide or region-wide inventory data exists at the writing of this report.

AB 32 required ARB to estimate 2020 BAU GHG emissions (ARB, 2010). The BAU scenario assumed no additional measures to curb emissions would be taken by the forecast year. The forecast was used to estimate potential GHG emissions reductions from the Scoping Plan measures—the main strategies the state will use to implement for GHG emissions reductions under AB 32².

For 2020, BAU emissions were estimated by applying the formula set forth in the ARB 2020 forecast methodology. That forecast states, “In all cases, the forecasting calculations reflect economic data or some other activity patterns to estimate future emissions. The 2020 forecasts use the following general equations to estimate emissions by sector: 2020 Emissions = Base Year Emissions x 2020 Multiplier. 2020 Multiplier = 2020 Activity Data / Base Year Activity Data” (ARB, 2014). Base year is different from the baseline. Base year is used in the foregoing formula to calculate estimated emissions for a particular year in the future. Baseline, which for the purposes of this EIR is 2012 unless otherwise noted in a particular impact area analysis, is the year against which the potential impacts of the proposed project are measured. Activity and emission data from 2012 were used in the formula above to estimate 2020 emissions. This method forecasts emissions without employing any measures set forth in the Scoping Plan. To account for Scoping Plan measures, SACOG’s share of statewide reductions was derived by calculating the plan area’s share of forecasted statewide dwelling units in 2020. The statewide forecast of dwelling units was obtained

² Additional information on the 2020 forecast can be found at <http://www.arb.ca.gov/cc/inventory/data/bau.htm>

from the California Department of Housing and Community Development (HCD), and equaled 16,174,519 (HCD, 2011). SACOG’s 2020 forecast was estimated to be 6.2 percent of the statewide number.

The same formula described above, with 2020 emissions and activity estimates as the baseline, was used to estimate 2036 GHG emissions. The year 2020 was used because it accounts for the Scoping Plan reductions. The Scoping Plan reductions for SB 375 regional targets were updated to reflect the modeled reductions from the proposed MTP/SCS, and not an estimate of the plan area’s share of reductions.

Table 8.4 below shows the areas in which reductions were taken from the Scoping Plan in 2020, and SACOG’s share of those reductions. Table 8.5 shows the estimates for 2020 and 2036 using the above stated formula. It shows what activity is being measured and final MMtCO_{2e}.

Table 8.4
Proposed MTP/SCS Plan Area Share of Scoping Plan Measures in 2020 (MMtCO_{2e})

Scoping Plan Measures	Region Share
Transportation – Includes Fuel Efficiency, Low Carbon Fuels, etc.	1.10
Electricity Efficiency – Includes Million Solar Roofs, and Building and Appliance Efficiency	0.48
Natural Gas Efficiency – Includes Solar Hot Water, and Building and Appliance Efficiency	0.27

Sources: ARB, 2010, and SACOG, 2015

Table 8.5
Proposed MTP/SCS Plan Area GHG Calculations for 2020 and 2036 (MMtCO_{2e})

2020 Estimates	Activity	2020 Emissions
Transportation	VMT/capita	8.13
Electricity Generation	Relative percent of base emissions	3.14
Residential /Commercial	Relative percent of base emissions	2.20
Industrial	Square feet per employee	0.60
Agriculture & Forestry	Millions of acres of Ag production	0.93
2036 Estimates	Activity	2036 Emissions
Transportation	VMT/capita	4.63
Electricity Generation	Relative percent of base emissions	1.48
Residential /Commercial	Relative percent of base emissions	1.67
Industrial	New industrial employees	0.6
Agriculture & Forestry	Millions of acres of Ag Production	0.88

Source: SACOG, 2015

TRANSPORTATION OPERATIONS

Transportation operational impacts for the year 2012 were assessed by calculating the SACOG region’s portion of statewide emissions for all forms of travel, including: aviation, on road, rail, and waterborne. For all years, on-road emissions from passenger cars, SUVs, and motorcycles were projected from the SACSIM travel model, replacing those obtained from the statewide data. The transportation impacts for years 2020 and 2036 were assessed using SACSIM and the land uses and

transportation projects reflected in the proposed MTP/SCS. The activity used in forecasting future on-road impacts outside of passenger cars, SUVs, and motorcycles was total VMT per capita for 2012 and forecast years. All other forms of transportation emissions were estimated assuming their 2012 relative proportion of emissions as compared to on-road sources. Emissions were estimated using ARB's vehicle emissions model, EMFAC.

ENERGY PRODUCTION AND CONSUMPTION

Energy production and consumption impacts were assessed for all years as residential and non-residential electricity production, and natural gas consumption. Emission factors for electricity and natural gas were obtained from the EPA, and applied to the regional energy consumption estimates. For forecast years, using the calculation described above, the activity used to estimate emissions for all residential products was the percent of single-family residential units as compared to all residential units. This activity was used based on EIA findings that multi-family units consume less energy when compared to single-family units (EIA, 2005). Because the proposed MTP/SCS forecasts more single-family residential growth than multi-family residential by 2036, this method best captures the changes in energy usage and the related GHG emissions from this shift in residential land use. For non-residential land uses, the proportion of consumption as compared to residential uses in 2012 was applied to the forecasted residential consumptions.

INDUSTRIAL OPERATIONS

The impacts for the industrial sector were assessed for the baseline by calculating the SACOG region's share of industrial emissions from the statewide inventory. For the baseline, the share was based on the amount of economic activity from the Bureau of Economic Analysis (BEA) as measured by Gross Domestic Product (GDP) for industrial processing in the SACOG region as compared to the state of California (BEA, 2014). This share was then multiplied by the statewide emissions.

AGRICULTURAL AND FORESTRY LANDS

The impacts for agricultural and forestry operations were assessed for the baseline by calculating the SACOG region's share of agricultural and forestry land emissions from the statewide inventory. For the baseline, the share was based on the amount of economic activity from the BEA as measured by GDP for agriculture, forestry, fishing, and hunting in the SACOG region as compared to the state of California (BEA, 2014). This share was then multiplied by the statewide emissions. Future year activity was the acres of land in agricultural production or forests. The reduction of acres represents the loss of production land and emissions from processing activities.

8.4.2 Criteria for Determining Significance

For the purposes of this EIR, SACOG has determined that adoption and/or implementation of the proposed MTP/SCS (including adoption of the MTP policies, adoption of the SCS, and adoption of the transportation project list and financing plan) would result in significant impacts under CEQA, if any of the following would occur:

1. Conflict with the goal of decreasing overall per capita energy consumption.
2. Conflict with the goal of decreasing reliance on natural gas and oil.

3. Conflict with the goal of increasing reliance on renewable electricity sources.
4. Increase energy consumption from project construction activities resulting from the projects included in the proposed MTP/SCS in a manner inconsistent with AB 32.
5. Substantially interfere with achievement of AB 32 goals.
6. Conflict with the SACOG region's achievement of SB 375 GHG emissions reduction targets.
7. Conflict with applicable local GHG reduction plans.
8. Increase GHG emissions from project construction activities resulting from the proposed MTP/SCS in a manner inconsistent with AB 32.

8.4.3 Impacts and Mitigation Measures

IMPACT ENE-1: CONFLICT WITH THE GOAL OF DECREASING OVERALL PER CAPITA ENERGY CONSUMPTION.

Regional Impacts

Implementation of the proposed MTP/SCS would not conflict with the goal of decreasing overall per capita energy consumption. For this analysis, energy consumption in the plan area was measured from three sources: kilowatt hours of electricity, therms of natural gas, and gallons of gasoline. This analysis does not include an analysis of impacts in the interim 2020 horizon year, which is addressed in total greenhouse gas emissions.

A summary of land use and transportation changes for the Region/Plan Area is provided in Chapter 2 – Project Description. Per capita annual energy consumption in the SACOG region is shown in Table 8.6. In 2012, annual per capita consumption was approximately 7,842 kilowatt hours of electricity, 229 therms of natural gas, and 322,351 gallons of gasoline. Assuming the growth in the proposed MTP/SCS, annual per capita energy consumption is expected to decrease to 7,200 kilowatt hours of electricity, 211 therms of natural gas, and 270,775 gallons of gasoline by 2036.

As discussed in the plan and in subsequent sections, this decrease in gallons of gasoline comes from many variables, including speed, fuel efficiency and a reduction in household-generated and total per capita VMT.

The electricity and natural gas estimates include lower energy consumption for smaller-footprint residential products (EIA, 2012). Attached residential products increase to 33 percent in 2036 as a proportion of overall residential products in the region under the proposed MTP/SCS as compared to 22 percent in 2012. This type of housing is more energy efficient per household and is the type of growth that helps decrease per capita VMT in the plan area because the vast majority of it also located near transit and employment opportunities.

Using the foregoing data, a BAU total per capita energy output from electricity, natural gas, and gasoline, expressed in millions of joules (mJ), was estimated for 2012 and 2036. This analysis shows approximately 94,900 mJ in 2012, and 83,809 mJ in 2036, an 11 percent difference from 2012 because of the implementation of the proposed MTP/SCS.

Therefore, implementation of the proposed MTP/SCS does not conflict with the goal of decreasing overall per capita energy consumption. In addition, at least three Scoping Plan measures achieve

additional reductions through a decrease in energy consumption. Specifically, the following measures from the Scoping Plan would further reduce energy consumption per capita through 2036:

- **E-1 Energy Efficiency and Conservation:** More stringent building & appliance standards help reduce electricity consumption. Projected reductions: 7.8 MMtCO₂e statewide; 0.48 MMtCO₂e plan area.
- **CR-1 Energy Efficiency and Conservation:** More stringent building & appliance standards help reduce natural gas consumption. Projected reductions: 4.4 MMtCO₂e statewide; 0.27 MMtCO₂e plan area.
- **T-1 Advanced Clean Cars, T-2 Low Carbon Fuel Standards:** 18.3 MMtCO₂e statewide; 1.1 MMtCO₂e plan area.

Combined, these measures equal a reduction of approximately 30.5 MMtCO₂e, nearly half of the reductions for natural gas, electricity, and transportation emissions in the Scoping Plan (ARB, 2014). Factored into the energy consumption for the MTP/SCS plan area, these measures result in a further per capita decrease in energy consumption. Assuming 6.2 percent share of the Scoping Plan for the plan area, based on the region’s share of statewide dwelling units and using the 2012 emission factors for natural gas and electricity, an estimate of energy savings is calculated below.

The emission rates for 2012 are 5.313E-09 MMtCO₂e per therm, 3.1E-10 MMtCO₂e per kWh, and 8.89E-03 MMtCO₂e per gallon of gasoline. This equals a total decline of roughly 51 million therms of natural gas, 1,560 kWh of electricity and 127 million gallons of gasoline in the plan area as a result of these Scoping Plan measures and a per capita decline of 16.7 therms, 507 kilowatt hours, 229 gallons of gasoline. The result brings the proposed MTP/SCS per capita consumption of natural gas to 193.9, 15 percent below 2012, per capita consumption of electricity to 6,693 kilowatt hours, 14 percent below 2012, and per capita gasoline consumption to 270,545 gallons, 26 percent below 2012 by 2036.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS at the regional level are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Table 8.6
Per Capita Energy Consumption in the proposed MTP/SCS Plan Area

Source	2012	2036 BAU	2036 Adjusted	Percent Reduction
Electricity (million kwh)	7,842	7,200	6,693	7%
Natural Gas	229	211	194	8%
Gasoline	322,351	270,775	270,545	<1%

Source: SACOG, 2015

Localized Impacts

Although all communities, with the exception of Lands Not Identified for Development, receive growth, there is no increase in relative per capita energy consumption as compared to the region. As described in Chapter 2 – Project Description, the proposed MTP/SCS accommodates the population and employment growth in the region through a mix of housing options, proximity of housing to jobs and transit, utilization of existing infrastructure and building assets, and development in a compact form. One goal of the proposed MTP/SCS is to decrease overall and per capita energy consumption. A regional evaluation of energy consumption was performed using the methodology described in the Methods and Assumptions section of this chapter, and is shown in table 8.5 above. Additional measures from the Scoping Plan aimed at reducing GHG emissions from electricity and natural gas consumption, as described in the regional impacts section above, were also considered. Impacts are described in more detail below.

Center and Corridor Communities

The Center and Corridor Communities contain a significant amount of attached, multi-family residential products. EIA data shows multi-family residential units, when compared to single-family residential units, are 49 percent more efficient on a per unit basis in terms of consumption of electricity and 45 percent more efficient with natural gas consumption (EIA, 2012). Center and Corridor Communities are typically higher density and contain more mixing of uses as compared to surrounding areas. This type of growth is more conducive to additional multi-family residential development, and helps reduce energy from travel by giving more opportunities for shorter trip lengths. In addition, Center and Corridor Communities will include a variety of new transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects, thereby reducing energy consumption.

Therefore, the land use changes and transportation improvements from implementation of the proposed MTP/SCS in Center and Corridor Communities do not conflict with the goal of decreasing overall per capita energy consumption are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Established Communities

Established Communities are mostly medium-density residential, office parks, and strip retail. They are considered to be mostly built-out, with little or no vacant land to develop. Any development that occurs is to build out existing areas or infill on vacant parcels. This type of growth takes advantage of existing transportation infrastructure and surrounding land uses. Established Communities are typically adjacent to, and surrounding, Center and Corridor Communities, and show many of the characteristics described above. Established Communities attempt to better balance the housing and job development. Established Communities will include a variety of new transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. This helps reduce trip length and offers more opportunities for non-vehicular forms of travel. Therefore, per capita energy consumption is expected to decline in these areas.

In summary, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in Established Communities are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Developing Communities

While Developing Communities would serve a substantial portion of the growth in residential units and employment, housing types are projected to significantly shift during the planning period from large lot detached to small lot detached and attached housing. This new housing stock, therefore, will not only be in a form which is shown to be more energy efficient (EIA, 2012), but as it develops will present opportunities to implement the energy efficiency measures in the Scoping Plan.

Developing Communities will not necessarily have the same mix of transportation projects as Center and Corridor Communities and Established Communities. Developing Communities include more road widening projects and newly constructed road projects to serve the new residential and employment developments that would be built by 2036. Developing Communities have little or no transit service presently, but at build-out some areas may include bus service every 30 minutes or less. These areas also often include trails for walking and bicycling. This will help reduce energy consumption from travel.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in Developing Communities are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Rural Residential Communities

Rural Residential communities receive little residential and employment growth in the proposed MTP/SCS, and the growth that does occur in these areas does not change in density or building type from 2012 to 2036. The limited amount and types of growth in Rural Residential Communities maintains the rural nature of the area over time and has the effect of also maintaining per capita energy consumption. Rural Residential Communities receive a small proportion of growth, and new development would have the ability to reduce building energy consumption by implementing measures outlined in the Scoping Plan.

Existing transportation infrastructure in Rural Residential Communities consists primarily of roads serving automobile traffic, with some very limited transit service in a few places in the region. Implementation of the proposed MTP/SCS will result in the construction of roadway improvements, including road maintenance and rehabilitation, roadway widenings, newly constructed roadways, and freeway improvements. There may also be limited improvements to transit service.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements in the Rural Residential Communities of the proposed MTP/SCS are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Lands Not Identified for Development in the proposed MTP/SCS

Although some housing and employment growth, consistent with historical trends, may occur in this Community Type within the MTP/SCS planning period, the proposed MTP/SCS does not forecast any development in these areas by 2036. The proposed MTP/SCS will make a very limited number of transportation investments in this Community Type by 2036, including road maintenance, road

widenings and safety enhancements, and other roadway improvements. With no population growth, and therefore no increase in energy consumption, per capita energy consumption is unchanged by the proposed MTP/SCS.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in Lands Not Identified for Development are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Transit Priority Area Impacts

Transit Priority Areas (TPAs) are areas of the region within one-half mile of a major transit stop (existing or planned light rail, street car, or train station) or an existing or planned high-quality transit corridor included in the proposed MTP/SCS (see Chapter 2 – Project Description for more details on TPAs). These areas contain higher densities, more mixing of land uses, and existing or planned transit infrastructure, making them more efficient from a land use and transportation standpoint. A regional evaluation of energy consumption was prepared using the methodology described in the Methods and Assumptions section of this chapter. Additional measures from the Scoping Plan aimed at reducing GHG emissions from electricity, natural gas, and gasoline consumption, as described in the regional impacts section above, were factored into the analysis. Impacts are described in more detail below.

Placer County Transit Priority Areas

The growth in these TPAs is consistent with the regional goal of reducing energy consumption. Most of the growth in the areas is employment to match the existing jobs centers. The residential growth is largely attached products between 2012 and 2036. As noted, EIA data shows multi-family residential units are 44 percent more efficient on a per unit basis in terms of consumption of electricity, and 35 percent more efficient with natural gas consumption (EIA, 2012), than single family units.

Placer County TPAs will receive a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, but the majority of transit service increases will be commuter service to downtown Sacramento. Placer TPAs are served by the Capital Corridor train, as well as high-quality transit service in Roseville. These systems are connected to the larger regional transit network, making Placer TPAs very accessible regional destinations. This creates more opportunities for non-auto modes of travel, reducing energy consumption per capita for travel.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in the Placer County TPAs are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Sacramento County Transit Priority Areas

Sacramento County TPAs receive a large amount of residential and employment growth in the proposed MTP/SCS. The types and densities of residential growth in the area are consistent with the goal of reducing energy consumption. Most new residential products are attached, as noted

above, EIA data shows multi-family residential units, compared to single family units, are 49 percent more efficient on a per unit basis in terms of consumption of electricity and 45 percent more efficient with natural gas consumption (EIA, 2012).

Sacramento County TPAs will receive a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, major increases in light rail service, new streetcar service, and more express bus service. In addition, Sacramento TPAs are served by light rail, Capital Corridor, and numerous bus routes. In 2036, Sacramento TPAs have a streetcar corridor in downtown, and bus rapid transit service. Transit in Sacramento TPAs is connected to the larger regional transit network, giving more opportunities for shorter trips and non-auto forms of travel, thus reducing travel related energy consumption.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in the Sacramento County TPAs are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

Yolo County Transit Priority Areas

In Yolo County TPAs, most residential growth is projected to be attached which, as noted, is shown to be more energy efficient (EIA, 2012). The area has relatively balanced residential and employment growth, bolstering the existing jobs centers in West Sacramento and UC Davis.

Yolo County TPAs will receive a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, a major light rail extension to Sacramento International Airport, new streetcar service in West Sacramento, and increased express service to downtown Sacramento. In addition, Yolo County TPAs are served by Capital Corridor as well as numerous bus routes. In 2036, the areas will include bus rapid transit and a streetcar in West Sacramento. These new transit services will be connected to new and existing regional transit service. This will reduce travel related energy consumption by offering non-auto modes of travel.

Therefore, per capita energy consumption impacts related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS in the Yolo County TPAs are considered less than significant (LS) for Impact ENE-1. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-2: CONFLICT WITH THE GOAL OF DECREASING RELIANCE ON NATURAL GAS AND OIL.

Regional Impacts

Implementation of the proposed MTP/SCS would not conflict with the goal of decreasing reliance on natural gas and oil. As described in Chapter 2 – Project Description, and as discussed above, the

proposed MTP/SCS accommodates the population and employment growth in the region through a mix of housing options, proximity of housing to jobs and transit, utilization of existing infrastructure and building assets, and development in a compact form. The proposed MTP/SCS is built with the goal of decreasing overall and per capita energy consumption. The proposed growth also includes a large proportion of attached and multi-family residential growth. This type of residential product has been shown to be more energy efficient (EIA, 2012).

As demonstrated above, per capita energy consumption in the plan area decreases by 2036. While these data do not represent a decline in total natural gas and oil consumption as compared to 2012, they represent a declining trend in reliance on these sources of energy.

The overall increase in total natural gas and oil consumption is driven by a forecasted 39 percent growth in population in the region, along with the housing, employment, and transportation needed to serve that population. The proposed MTP/SCS neither generates nor induces that growth—it provides a plan to serve that forecasted growth in an energy efficient manner which helps achieve the goal of decreasing reliance on natural gas and oil.

Therefore, implementation of the proposed MTP/SCS does not conflict with the goal of reducing reliance on natural gas and oil. In addition, at least five Scoping Plan measures achieve additional reductions through a decrease in energy consumption. Specifically, the following measures from the Scoping Plan would further reduce energy consumption per capita through 2036:

- **E-1 Energy Efficiency and Conservation:** More stringent building & appliance standards help reduce electricity consumption. Projected reductions: 7.8 MMtCO₂e statewide; 0.48 MMtCO₂e plan area.
- **CR-1 Energy Efficiency and Conservation:** More stringent building & appliance standards help reduce natural gas consumption. Projected reductions: 4.1 MMtCO₂e statewide; 0.25 MMtCO₂e plan area.
- **CR-2 Solar Hot Water:** Goals of AB 1470 (Stats. 2007, ch. 536) to move from natural gas to solar for heating water. Projected reductions: 0.1MMtCO₂e statewide; 0.006 MMtCO₂e plan area.
- **E-3 Renewable Electricity Standard (33 percent):** Achieve 33 percent renewables by 2020. Projected reductions: 21.3 MMtCO₂e statewide; 1.32 MMtCO₂e plan area.
- **E-4 Million Solar Roofs:** Conversion of natural gas sources of energy to solar. Projected reductions: 1.32 MMtCO₂e statewide; 0.13 MMtCO₂e plan area.

Assuming 6.2 percent share of the Scoping Plan for the plan area, and using the 2012 emission factors for natural gas and electricity, an estimate of energy savings is calculated below.

The emission rates for 2012 are 5.313E-09 MMtCO₂e per therm, 3.1E-10 MMtCO₂e per kWh, and 8.89E-03 MMtCO₂e per gallon of gasoline. This equals a total decline of roughly 51 million therms of natural gas, 1,560 kWh of electricity and 127 million gallons of gasoline in the plan area as a result of these Scoping Plan measures and a per capita decline of 16.7 therms, 507 kilowatt hours, 229 gallons of gasoline. The result brings the proposed MTP/SCS per capita consumption of natural gas to 193.9 therms, or 15 percent below 2012; per capita consumption of electricity to 6,693 kilowatt hours, or 14 percent below 2012; and per capita gasoline consumption to 270,545 gallons, or 26 percent below 2012 by 2036. However, the mix of energy sources for the three electricity providers

in the region contains a large share of natural gas. The power content labels for SMUD, PG&E and Roseville Electric in 2012 show a range of natural gas as a percentage of all sources between 27 percent and 42 percent. While it is unknown what the percentages will be in 2036, the Scoping Plan measures will further decrease the reliance on natural gas in the plan area.

Therefore, implementation of the land use changes in the proposed MTP/SCS are not expected to conflict with the goal of decreasing reliance on natural gas and oil at the regional level. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

The proposed MTP/SCS is based on a regional employment and population forecast, and accommodates this growth through land use and transportation projects. It does not create the growth, but develops a plan to accommodate it in a manner that helps achieve the goal of decreasing reliance on natural gas and oil. As shown in Impact ENE-1, total energy consumption per capita decreases from 2012 to 2036 with the implementation of the proposed MTP/SCS. The proposed MTP/SCS includes transportation projects that, in conjunction with the surrounding land use, would decrease VMT per day per capita by 14 percent by 2036 as compared to 2012 (SACOG, 2015).

In addition, Impact ENE-5 concludes that the implementation of the proposed MTP/SCS would not conflict with the goals of AB 32, which is implemented by the Scoping Plan. Although the Scoping Plan focuses on GHG emission reductions, many of the measures achieve reductions through a decrease in energy consumption. The following measures from the Scoping Plan are expected to further reduce natural gas and oil consumption from transportation through 2036:

- **T-1 Pavley I and Pavley II– Light-Duty Vehicle GHG Standards:** More fuel efficient vehicles reduce gasoline consumption.

Given these reductions, the consumption of gasoline from transportation would decline 128 million gallons as compared to the 2036 BAU scenario (SACOG, 2015).

Therefore, implementation of the transportation projects in the proposed MTP/SCS are not expected to conflict with the goal of decreasing reliance on natural gas and oil at the regional level. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Localized Impacts

The growth in the proposed MTP/SCS, as described in Chapter 2 – Project Description, provides a mix of housing options, located closer to jobs and transit. The proposed growth is more compact in form and more effectively utilizes existing infrastructure. A regional evaluation of energy consumption was completed using the formula described in the Methods and Assumptions section of this chapter. Additional measures from the Scoping Plan aimed at reducing GHG emissions from electricity and natural gas consumption, as described in the regional impacts section above, were considered. Impacts at a localized level are described in more detail below.

Center and Corridor Communities

The Center and Corridor Communities contain a significant amount of attached, multi-family residential products, EIA data show multi-family residential units, when compared to single family residential units, are 49 percent more efficient on a per unit basis in terms of consumption of electricity and 45 percent more efficient with natural gas consumption (EIA, 2012). Center and

Corridor Communities are typically higher density and contain more mixing of uses as compared to surrounding areas. This type of growth is more conducive to additional multi-family residential development, and helps reduce energy from travel by giving more opportunities for shorter trip lengths. In addition, Center and Corridor Communities will include a variety of new transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects, thereby reducing energy consumption.

Therefore, implementation of the land use changes in the proposed MTP/SCS are not expected to conflict with the goal of decreasing reliance on natural gas and oil in Center and Corridor Communities are considered less than significant (LS) for Impact ENE-2. No mitigation is required.

The higher density and mixed uses in centers and corridors helps reduce energy consumption from travel by giving more opportunities for shorter trip lengths. In addition, Center and Corridor Communities will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects, thereby reducing natural gas and oil consumption.

Therefore, the transportation projects in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in Center and Corridor Communities. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Established Communities

Established Communities are mostly medium-density residential, office parks, and strip retail. They are considered to be mostly built-out, with little or no vacant land to develop. Any development that occurs is to build out existing areas or infill on vacant parcels. This type of growth takes advantage of existing transportation infrastructure and surrounding land uses. Established Communities are typically adjacent to, and surrounding, Center and Corridor Communities, and show many of the characteristics described above. Established Communities attempt to better balance the housing and job development. Established Communities will include a variety of new transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. This helps reduce trip length and offers more opportunities for non-vehicular forms of travel. Therefore, per capita energy consumption is expected to decline in these areas.

Therefore, the land use changes in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in Established Communities. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

The transportation network in Established Communities is characterized by reduced trip lengths and more opportunities for non-vehicular forms of travel. The transportation improvements by 2036 include new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects.

Therefore, the transportation projects in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in Established Communities. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Developing Communities

While Developing Communities would serve a substantial portion of the growth in residential units and employment, housing types are projected to significantly shift during the planning period from large lot detached to small lot detached and attached housing. This new housing stock, therefore, will not only be in a form which is shown to be more energy efficient (EIA, 2012), but as it develops will present opportunities to implement the energy efficiency measures in the Scoping Plan.

Therefore, the land use changes in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in Developing Communities. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Developing Communities will not necessarily include the same mix of transportation projects as Center and Corridor Communities and Established Communities. Developing Communities typically will receive more road widening projects and newly constructed road projects than other Community Types to serve the new residential and employment developments to be built by 2036. Developing Communities have little or no transit service today, but at build-out some areas will include bus service every 30 minutes or less. These areas also often include walk and bike facilities via trails. With little existing transit service, however, growth in these areas will increase reliance on automobile use and, therefore, increase reliance on natural gas and oil for travel.

Therefore, the transportation projects in the proposed MTP/SCS may conflict with the goal of decreasing reliance on natural gas and oil related in Developing Communities. This impact is considered potentially significant (PS) for Impact ENE-2. Mitigation Measure ENE-1 is described below.

Rural Residential Communities

Rural Residential communities receive little residential and employment growth in the proposed MTP/SCS, and the growth that does occur in these areas does not change in density or building type from 2012 to 2036. The limited amount and types of growth in Rural Residential Communities maintains the rural nature of the area over time and has the effect of also maintaining per capita energy consumption. Rural Residential Communities receive a small proportion of growth, and new development would have the ability to reduce building energy consumption by implementing measures outlined in the Scoping Plan.

Although any development that occurs in this Community Type generally could increase the use of energy, the slight shift in the type of residential products, the opportunities for more efficient buildings, and generally modest growth in these areas result in little or no impact on the goal of decreasing reliance on natural gas and oil.

Therefore, the land use projects in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in Rural Residential Communities. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Existing transportation infrastructure in Rural Residential Communities consists primarily of roads serving automobile traffic with some very limited transit service in a few places in the region. Implementation of the proposed MTP/SCS will result in the construction of roadway improvements, including road maintenance and rehabilitation, roadway widenings, newly constructed roadways, and freeway improvements. Limited improvements to transit service are projected in these areas, which are mostly auto-oriented. Although these areas receive few transportation improvements in the proposed MTP/SCS, it is likely that much of the new development could increase reliance on the use of natural gas and oil as it relates to travel.

Therefore, the impacts from increasing reliance on natural gas and oil related to transportation improvements from implementation of the proposed MTP/SCS in Rural Residential Communities are considered potentially significant (PS) for Impact ENE-2. Mitigation Measure ENE-1 is described below.

Lands Not Identified for Development in the proposed MTP/SCS

Although some housing and employment growth, consistent with historical trends, may occur in this Community Type within the MTP/SCS planning period, the proposed MTP/SCS does not forecast any development in these areas by 2036. Additionally, the proposed MTP/SCS will make a limited number of transportation investments in this Community Type by 2036, including road maintenance, road widenings and safety enhancements, and other roadway improvements. With no population growth and limited transportation improvements, no increase in the reliance of natural gas and oil consumption is expected as a result of the proposed MTP/SCS.

Therefore, the land use changes and transportation improvements in the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil related in Lands Not Identified for Development. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Transit Priority Area Impacts

Transit Priority Areas (TPAs) are areas of the region within one-half mile of a major transit stop (existing or planned light rail, street car, or train station) or an existing or planned high-quality transit corridor included in the proposed MTP/SCS. (See Chapter 2 – Project Description for more details on TPAs.) As noted, these areas contain higher densities, more mixing of uses, and existing or planned transit infrastructure, making them more efficient from a land use and transportation standpoint. A regional evaluation of energy consumption was prepared using the formula described in the Methods and Assumptions section of this chapter, and additional measures from the Scoping Plan were considered. Impacts are described in more detail below.

Placer County Transit Priority Areas

The growth in Placer County TPAs is consistent with the regional goal of reducing energy consumption and the reliance on natural gas and oil. Most growth in these areas is employment to match the existing jobs centers. The residential growth is largely attached product between 2012 and 2036, which is more energy efficient than single family (EIA, 2012).

Therefore, the land use changes of the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in the Placer County TPAs. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Placer County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, but the majority of transit service increases will be commuter service to downtown Sacramento. Placer County TPAs are served by the Capital Corridor train, as well as high-quality transit service in Roseville. These systems are connected to the larger regional transit network, making Placer County TPAs very accessible regional destinations. This creates more efficient travel, as well as opportunities for non-auto modes of travel.

Therefore, the transportation improvements from implementation of the proposed MTP/SCS do not conflict with the goal of decreasing reliance on natural gas and oil in the Placer County TPAs. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Sacramento County Transit Priority Areas

The growth in Sacramento County TPAs is consistent with the regional goal of reducing energy consumption and the reliance on natural gas and oil. Most growth in these areas is employment to match the existing jobs centers. The residential growth is largely attached product between 2012 and 2036, which is more energy efficient than single family (EIA 2012).

Therefore, the land use changes of the proposed MTP/SCS in the Sacramento County TPAs do not conflict with the goal of decreasing reliance on natural gas and oil. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Sacramento County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, major increases in light rail service, new streetcar service, and more express bus service. Sacramento County TPAs are served by light rail, Capital Corridor, and numerous bus routes. In 2035, Sacramento County TPAs have a streetcar corridor in downtown, and bus rapid transit service. Transit in Sacramento County TPAs is connected to the larger regional transit network, giving more opportunities for shorter trips and non-auto forms of travel.

Therefore, transportation improvements in the proposed MTP/SCS in the Sacramento County TPAs do not conflict with the goal of decreasing reliance on natural gas and oil. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Yolo County Transit Priority Areas

Yolo County TPAs is consistent with the regional goal of reducing energy consumption and the reliance on natural gas and oil. Most growth in these areas is employment to match the existing jobs centers. The residential growth is largely attached product between 2012 and 2036, which is more energy efficient than single family (EIA, 2012). The area has relatively balanced growth in residential and employment, bolstering the existing jobs centers in downtown West Sacramento and UC Davis.

Therefore, the land use changes in the proposed MTP/SCS in the Yolo County TPAs do not conflict with the goal of decreasing reliance on natural gas and oil. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

Yolo County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, a major light rail extension to Sacramento International Airport, new streetcar service in West Sacramento, and increased express service to downtown Sacramento. In addition, the Yolo County TPAs are served by Capital Corridor as well as numerous bus routes. In 2036, the TPAs will include bus rapid transit and a streetcar in West Sacramento. These new transit services will be connected to new and existing regional transit service.

Therefore, the transportation improvements in the proposed MTP/SCS in the Yolo County TPAs do not conflict with the goal of decreasing reliance on natural gas and oil. This impact is considered less than significant (LS) for Impact ENE-2. No mitigation is required.

MITIGATION MEASURES

As part of planning, design, and engineering for projects that result from the proposed MTP/SCS, the lead agency shall ensure that climate and energy related resources are treated in accordance with applicable federal, state, and local laws and regulations. SACOG does not have authority to require the implementing agencies to adopt the identified mitigation measures; the mitigation measures are within the responsibility and jurisdiction of another public agency. However, implementation of the following mitigation measures at a project-level would reduce the impacts to climate and energy related, and agencies with jurisdiction to adopt these measures should do so (Pub. Resources Code, § 21081).

Mitigation Measure ENE-1: Require new development to provide necessary infrastructure to charge electric vehicles.

To address this impact, where feasible and necessary to address site-specific impacts, the lead agency shall (1.) require all new single-family residential developments to install conduit necessary for the installation of charging infrastructure for electric vehicles for the use and charging of electric vehicles at the place of residence; and, (2.) require all new multi-family residential developments to install both necessary conduit and charging equipment for electric vehicles. All charging infrastructure and equipment shall be sufficient to meet or exceed electric vehicle supply equipment (EVSE) installation requirements of CALGreen Tier 1.

Mitigation Measure ENE-2: Require new development to comply with local GHG reduction plans that contain measures identified in the Scoping Plan.

The implementing agency should require development and transportation projects to comply with locally-adopted GHG reduction plans that, at a minimum, specifically address measures in the Scoping Plan aimed at reducing GHG emissions. Local plans should include local targets to help the state achieve the AB 32 goal of reducing 5 MMtCO₂e from cities and counties, which also will result in reduced reliance on oil and natural gas from residential, commercial, industrial, and public land uses, as well as transportation.

If a local GHG reduction plan does not exist, the jurisdiction should adopt a plan with the foregoing features and apply such plan to new development projects.

SIGNIFICANCE AFTER MITIGATION

Implementation of these mitigation measures as a part of the proposed MTP/SCS will reduce reliance on natural gas and oil from transportation projects in the Developing and Rural Residential Communities. If an implementing agency adopts this mitigation measure, Impact ENE-2 would be reduced to less than significant (LS). Projects taking advantage of CEQA Streamlining provisions of SB 375 (Pub. Resources Code § 21155.1, 21155.2, and 21159.28) must apply the mitigation measure described above to address site-specific conditions, resulting in impacts that are less than significant (LS). However, because SACOG cannot require the implementing agency to adopt this mitigation measure, and it is ultimately the responsibility of a lead agency to determine and adopt project-specific mitigation, this impact remains significant and unavoidable (SU).

IMPACT ENE-3: CONFLICT WITH THE GOAL OF INCREASING RELIANCE ON RENEWABLE ELECTRICITY SOURCES.

Regional Impacts

The land uses in the proposed MTP/SCS do not conflict with the goal of increasing the implementation of renewable electricity sources. Most of the impacts of renewable electricity will be from the energy providers, who set the mix of energy sources, including renewable sources. In 2012, PG&E had a portfolio that included 19 percent renewables, Roseville Electric was at 12 percent, and SMUD at 20 percent. All of these providers are expected to utilize 33 percent renewable by 2020, as outlined in SB X1-2. In addition, the AB 32 Scoping Plan identifies several renewable energy measures. Although these measures are intended to reduce GHG emissions, they will also impact the use of renewable energy sources. Below are the Scoping Plan measures aimed at the use of renewable energy sources. These measures are expected to be implemented through 2036.

CR-2 Solar Hot Water: Goals of AB 1470, use of renewable energies for water heaters.

E-3 Renewable Electricity Standard: Reach 33 percent renewables by 2020; PG&E, SMUD, and Roseville Electric have all adopted these standards.

E-4 Million Solar Roofs: Move away from natural gas and electricity to on-site renewables.

Therefore, the land uses in the proposed MTP/SCS do not conflict with the goal of increasing reliance on renewable electricity sources at the regional level. This impact is considered less than significant (LS) for Impact ENE-3. No mitigation is required.

Localized Impacts

Center and Corridor Communities, Established Communities, Developing Communities, Rural Residential Communities, and Lands Not Identified for Development in the MTP/SCS

Implementation of Scoping Plan measures aimed at renewable energy, as described in the regional impacts section above, will not be impacted by the proposed MTP/SCS either at a regional scale or at a localized scale, irrespective of Community Type. Electricity providers are required to have 33 percent renewable energy sources by 2020, pursuant to Scoping Plan measure E-3, without regard for land use or transportation projects. Scoping Plan measures CR-2 and E-4 can be adopted in any Community Type.

Therefore, the land uses in the proposed MTP/SCS do not conflict with the goal of increasing reliance on renewable electricity sources at the local level. This impact is considered less than significant (LS) for Impact ENE-3. No mitigation is required.

Transit Priority Area Impacts

Placer County, Sacramento County, and Yolo County TPAs

Identical to the localized impacts on the goal of increasing reliance on renewable energy sources, implementation of Scoping Plan measures aimed at renewable energy will not be impacted by the proposed MTP/SCS either regionally, locally, or at the TPA scale. The Scoping Plan measures are unaffected by the implementation of the land uses or transportation projects in these areas.

Therefore, the land uses in the proposed MTP/SCS do not conflict with the goal of increasing reliance on renewable electricity sources at the transit priority area level. This impact is considered less than significant (LS) for Impact ENE-3. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-4: INCREASE ENERGY CONSUMPTION FROM THE CONSTRUCTION OF THE PROJECTS INCLUDED IN THE PROPOSED MTP/SCS IN A MANNER INCONSISTENT WITH AB 32.

Regional Impacts

The impact construction projects have on energy consumption is considered significant if the projects in the proposed MTP/SCS are implemented in a manner that is not consistent with the GHG emissions reduction goals set forth in AB 32. Construction energy consumption includes operation of equipment, and travel to and from the worksite.

The population and employment growth in the proposed MTP/SCS by 2036 is accommodated by the development of new housing, commercial, industrial, and public uses; as well as the construction of new, and the expansion of existing, roads, rail, and other related transportation projects. In addition, new infrastructure such as water, wastewater treatment, and storm water management will need to be constructed to accommodate this growth. A 2005 study by SACOG found that the more compact development found in the 2050 Blueprint has less infrastructure need, as compared to the more sprawled pattern of growth previously projected for the region (SACOG, 2005). Because the proposed MTP/SCS generally is consistent with the Blueprint preferred scenario, while construction of the land uses in the plan area should increase energy consumption, by limiting the need for additional infrastructure, construction related energy consumption should decrease overall.

Travel energy consumption from construction is captured as part of the regional travel model. The benefits of the land use and transportation projects in the proposed MTP/SCS—higher densities, mixed uses, and transit options—are captured as well. The reduced per capita VMT by 2036, as discussed in Chapter 16 –Transportation, results in less construction-related on-road vehicle travel as compared to 2012.

In addition, as discussed above, per capita energy consumption from the implementation of the proposed MTP/SCS from both land use and transportation-related projects decreases between 2012 and 2036. The reduction of energy use per capita is part of the reason overall GHG emissions decrease with the implementation of the proposed MTP/SCS, and the proposed MTP/SCS does not conflict with the achievement of the goals of AB 32.

Therefore, the construction of the land use changes in the proposed MTP/SCS do not increase energy consumption in a way inconsistent with the goals of AB32 at the regional level. This impact is considered less than significant (LS) for Impact ENE-4. No mitigation is required.

Localized Impacts

Center and Corridor Communities, Established Communities, Developing Communities, Rural Residential Communities, and Lands Not Identified for Development in the MTP/SCS

The localized impact of the energy consumption related to the land use changes and transportation improvements from construction of the proposed MTP/SCS is the same as the regional impact and is considered less than significant (LS) for Impact ENE-4. No mitigation is required.

Transit Priority Area Impacts

Placer County, Sacramento County, and Yolo County TPAs

The TPAs impact of the energy consumption related to the land use changes and transportation improvements from construction of the proposed MTP/SCS is the same as the regional impact and is considered less than significant (LS) for Impact ENE-4. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-5: SUBSTANTIALLY CONFLICT WITH ACHIEVEMENT OF AB 32 GOALS.

Regional Impacts

Implementation of the proposed MTP/SCS will not interfere with achievement of AB 32 goals. In fact, the plan is an integral part of achieving those goals within the SACOG region. AB 32 calls for the State of California to reach 1990 levels of GHG emissions from all sources by the year 2020. For purposes of this analysis, 1990 levels were estimated to be 15 percent below the 2008 levels. The 2008 baseline was used as it matches the Third Edition ARB GHG inventory from May 2010. A 15 percent reduction below 2008 was used as a proxy for 1990 because there is no 1990 GHG emissions data for the plan area, and the Scoping Plan states that 15 percent reduction in emissions from 2008 is an approximate estimate of 1990 levels (ARB, 2010).

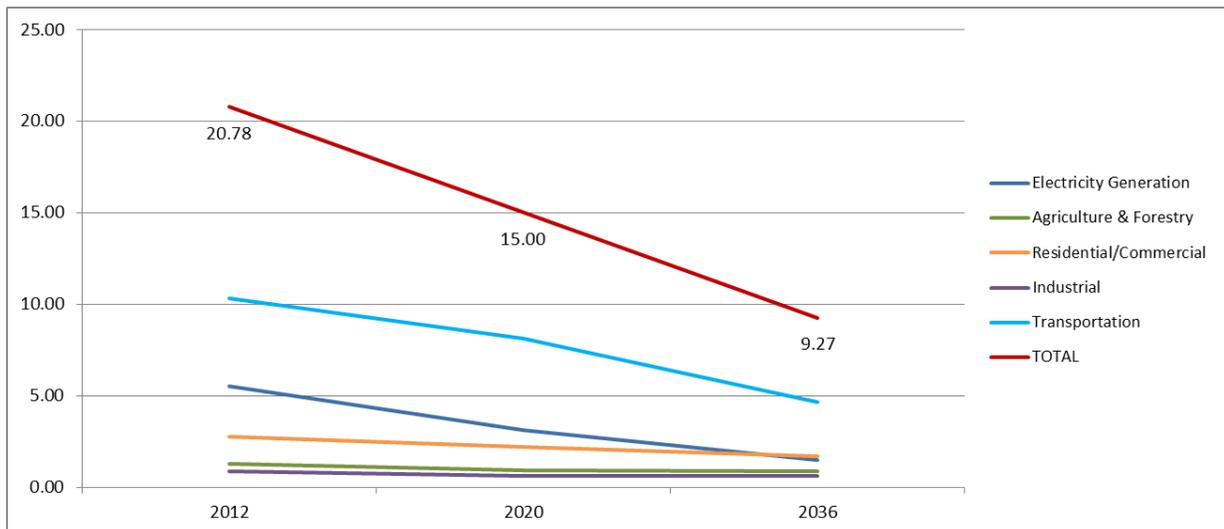
As described in the Methods and Assumptions section of this chapter, GHG emissions were measured in MMtCO₂e from transportation, electricity generation, residential and commercial uses, industrial operations, and agricultural and forestry lands. These sectors match the Level 1 Sectors of the Third Edition ARB GHG inventory.

For the region, 2012 GHG emissions totaled 20.78 MMtCO₂e (Figure 8.1.) Therefore, to achieve AB 32's goals, the plan area emissions must reach 19.35 MMtCO₂e by 2020. With implementation

of the proposed MTP/SCS and the Scoping Plan measures, 2020 emissions are forecasted to be 15.00 MMtCO₂e, 22 percent below that target, or a total of 28 percent below 2012 (See Figure 8.1). Measures from the Scoping Plan, as described in the Methods and Assumptions section of this chapter, include: low carbon fuels, fuel efficiency, building efficiency, appliance efficiency, million solar roofs, and renewable electricity standards.

Although no numeric goal for the year 2036 is included as part of AB 32, it was the forecast year of the proposed MTP/SCS and was also analyzed in terms of total GHG emission and therefore included in the analysis. With the implementation of the proposed MTP/SCS and continuation of the benefits from the 2020 Scoping Plan measures, 2036 emissions are forecasted to be 9.27 MMtCO₂e. This downward trajectory beyond the timeframe set in AB 32 is illustrated in Figure 8.1 which shows emissions for 2012, 2020, and 2036 by the sectors described in the Methods and Assumptions section of this chapter.

Figure 8.1
Plan Area MMtCO₂e Emission by Sector in 2012, 2020, and 2036



Source: SACOG, 2015

Therefore, the land use and transportation changes in proposed MTP/SCS at the regional level do not conflict with the achievement of AB 32 goals. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

EXECUTIVE ORDER S-3-05 AND EXECUTIVE ORDER B-30-15

While not part of AB 32, Executive Orders S-3-05 and B-30-15, as described in the Settings section of this chapter, call for additional statewide GHG emissions reductions beyond 2020. B-30-15 calls for reductions of 40 percent below 1990 levels by 2030, and S-3-05 calls for reductions of 80 percent below 1990 levels by the year 2050. For the SACOG region, this would constitute achieving an emissions limit of 11.6 MMtCO₂e by 2030, and 3.87 MMtCO₂e by 2050. However, the Executive Orders do not include any specific measures to achieve these reductions, and instead merely places oversight for reporting from all state agencies with CalEPA.

As noted above, AB 32 and the Scoping Plan—as informed but not mandated by Executive Order #S-3-05—establish the statewide standards and implementation measures for emissions reductions applicable to regional planning agencies such as SACOG. The 2014 Scoping Plan update stated that mid-term targets for emission reductions, and related measures to ensure continued progress toward those mid-term targets would be developed past 2020. Executive Order B-30-15 informs, but does not mandate such targets past 2020.

While AB 32 and the Scoping Plan Update establish the statewide standards and implementation measures (including SB 375) for GHG emissions reductions for 2020 and beyond, there is no statewide guidance on assumptions, strategies, or measures to calculate achievement of the Executive Orders’ aspirational goals for 2030 and 2050. Nevertheless, SACOG conducted a preliminary analysis estimate of GHG emissions for 2030 and 2050 for the plan area.

First, a BAU GHG scenario was estimated for 2030 and 2050 by deriving an average annual reduction in GHGs from the proposed MTP/SCS between 2008 and 2036, and applying it for each year out to 2050. The result is a BAU GHG estimate for 2030 of 14.47 MMtCO_{2e}, and a 2050 estimate of 6.50 MMtCO_{2e}.

In order to complete the 2030 and 2050 estimates, and in the absence of any guidance, some assumptions must be made regarding the GHG reduction measures that will be implemented for the period after 2020. Appendix C to the 2014 Scoping Plan Update is a starting point. If new GHG reduction measures, as described above, were implemented for the Executive Order, additional reductions could be realized. The Scoping Plan suggests that strategies for achieving the Executive Order’s goal likely come from the decarbonization of electricity supplies and fuels, and major improvements in energy efficiency.

The 2030 and 2050 scenarios with additional emissions reduction measures could be as low as 11.42 MMtCO_{2e} for 2030 and 3.66 MMtCO_{2e} for 2050 for the plan area. This includes the following reductions, most of which already are included in the 2014 Scoping Plan Update, Appendix C, and which are just examples of reductions that could be implemented by the state:

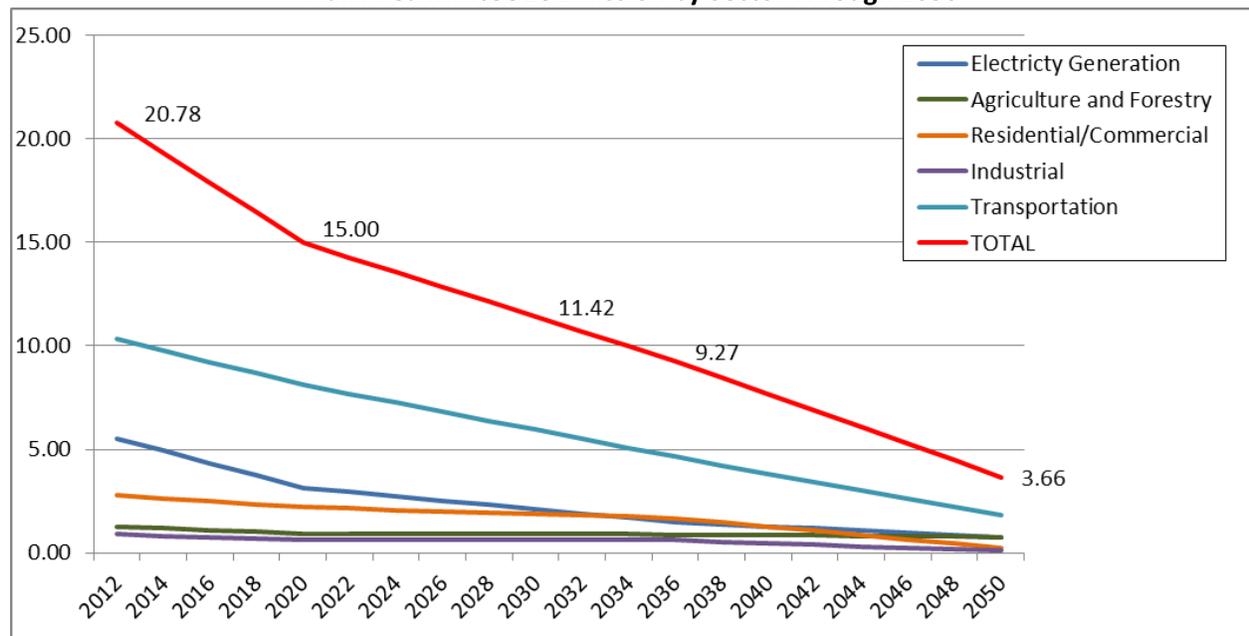
- **Electricity Generation:** Increase renewable energy standards to 66 percent. Estimated reduction of 0.71 MMtCO_{2e} based on SACOG’s share of 11.4 MMtCO_{2e} from Scoping Plan reduction to 33 percent renewable energy standard.
- **Agriculture & Forestry:** 20 percent further market penetration of hybrid heavy-duty and above trucks. Estimated reduction of 0.06 MMtCO_{2e} based on SACOG’s share of 1.0 MMtCO_{2e} from Scoping Plan reduction for heavy-duty hybrids.
- **Residential/Commercial:** Additional 50 percent increase in building and energy efficiency from Scoping Plan. Estimated reduction of 0.41 MMtCO_{2e} based on one half of SACOG’s share of Scoping Plan reductions.
- **Industrial:** Additional 50 percent increase in industrial process efficiency from non-capped portions of the Scoping Plan. Estimated reduction of 0.2 MMtCO_{2e} based on one half of SACOG’s share of Scoping Plan reductions. This can include carbon capture and storage.
- **Transportation:** Improved CAFE standards to a fleet average of 54.5 MPG from federal estimates of 250 MMtCO_{2e} reductions nationally (EPA, 2011), of which the plan area is 0.41 percent. Estimated reduction of 1.04 MMtCO_{2e} for the plan area in 2050.

Additional rounds of regional targets results in a 0.31 MMtCO₂e reduction based on region's share of reductions from the Scoping Plan.

A 3.5 MMtCO₂e reduction from implementation of additional transportation-related technologies. This includes, but is not limited to: high speed rail in the plan area, truck stop electrification, catalytic improvements for gasoline and diesel engines, reduction of cold starts, and enhanced fuel combustion through improved engine design.

As noted, it is currently unknown whether these, or other, measures will be implemented by the state to achieve the goals of the two Executive Orders, or some other state mandate, beyond 2020. These measures are merely illustrative of how the region could meet, and exceed, the Executive Orders' goals for 2030 and 2050 with the support of other statewide emissions reduction measures. The downward projection in GHG emissions in the plan area between 2012 and 2050 is shown in Figure 8.2 below.

Figure 8.2
Plan Area MMtCO₂e Emission by Sector Through 2050



Source: SACOG, 2015

In any event, even if no additional reduction measures beyond 2036 come from the Executive Orders or other state mandates, total GHG emissions for the plan area would decrease from 20.78 in 2012 to 14.15 MMtCO₂e in 2036, and would be on a declining trajectory beyond, with the implementation of the proposed MTP/SCS.

Localized Impacts

For all Community Types in the proposed MTP/SCS, an aggregated evaluation of emissions from all sectors was prepared using the formula described in the Methods and Assumptions section of this chapter. The measures from the Scoping Plan aimed at reducing emissions, as described in the regional impacts section above, were used in the analysis, impacts are described below.

Center and Corridor Communities

The Center and Corridor Communities are projected to contain a significant amount of more energy efficient attached, multi-family residential products, which are shown to have lower emissions as compared to other land uses.

In addition, Center and Corridor Communities will include a variety of transportation improvements by 2036 including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects, that are expected to reduce GHG emissions.

Therefore, the land use and transportation changes in the proposed MTP/SCS in Center and Corridor Communities do not conflict with the achievement of AB32 goals. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Established Communities

The growth pattern in Established Communities indicates that while these areas are proposed to have population, housing, and employment growth, the growth rate will be relatively modest when compared to Center and Corridor Communities and Developing Communities, which will have a much higher rate of growth.

Established Communities are mostly lower density residential, office parks, and strip retail. They are considered to be mostly built-out, with little or no vacant land to develop. With little or no growth occurring, GHG emissions will remain constant, or even decrease slightly with the implementation of the Scoping Plan measures outlined in the regional impacts section above. Established Communities will include a variety of transportation improvements by 2036 including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects.

Therefore, the land use and transportation changes in proposed MTP/SCS in Established Communities do not conflict with the achievement of AB32 goals. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Developing Communities

Developing Communities are expected to have a high rate of growth during the MTP/SCS plan period. Although Developing Communities will serve a substantial portion of the growth in residential units and employment, the housing type will experience a significant shift from large lot detached to small lot detached and attached housing, increasing energy efficient and, therefore, emissions reductions. However, because Developing Communities contain little or no development in 2012, projected growth of lower density residential with supporting retail and public uses, will likely result in some increased GHG emissions.

Developing Communities will not necessarily include the same mix of transportation projects as Center and Corridor Communities and Established Communities. Developing Communities will include more road widening projects and newly constructed road projects to serve the new residential and employment developments that will be built by 2036. In addition, while Developing Communities have little or no transit service today, at build-out they may include bus service every 30 minutes or less. These areas also often include walk and bike facilities via trails. This will reduce

emissions from travel. In addition, the transportation related emission reductions from the Scoping Plan can be implemented in these areas.

The measures from the Scoping Plan, as described above in the regional impacts section, are assumed to be largely implemented in Developing Communities. These areas have more opportunities to implement measures like on-site renewable energy sources, building efficiency, and appliance efficiency as they are being built within the timeframe of AB 32. This will help to reduce the emissions from the growth that occurs in the Developing Communities.

Therefore, the land use and transportation changes in proposed MTP/SCS in Developing Communities do not conflict with the achievement of AB32 goals. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Rural Residential Communities

These communities are expected to receive very limited growth by 2036. This is the lowest growth rate of any Community Type, resulting in a decreasing share of regional population, housing units, and employment. Rural Residential Communities are dominated by single family houses sitting on one to 20 acre parcels which, according to EIA data, are less efficient in terms of electricity and natural gas consumption when compared to multi-family products (EIA, 2012). However, they are just as likely to receive the benefits from the Scoping Plan aimed at GHG reductions as any other community type.

These areas are mostly auto-oriented, with little or no transit service. Existing transportation infrastructure in Rural Residential Communities consists primarily of roads serving automobile traffic with some very limited transit service in a few places in the region. Implementation of the proposed MTP/SCS will result in the construction of roadway improvements, including road maintenance and rehabilitation, roadway widenings, newly constructed roadways, and freeway improvements. There may also be limited improvements to transit service, thus maintaining the auto-dependent nature of these areas. However, they are just as likely to receive the benefits from the Scoping Plan aimed at GHG reductions as any other community type.

Therefore, the land use and transportation projects in the proposed MTP/SCS in Rural Residential Communities will not conflict with achieving the goals in AB32. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Lands Not Identified for Development in the proposed MTP/SCS

Although some housing and employment growth, consistent with historical trends, may occur in this Community Type within the MTP/SCS planning period, the proposed MTP/SCS does not forecast any development in these areas by 2036. The proposed MTP/SCS will make a limited number of transportation investments in this Community Type by 2036, including road maintenance, road widenings and safety enhancements, and other roadway improvements. With no population growth and limited transportation improvements, no conflict with the achievement of AB 32 goals is expected as a result of the proposed MTP/SCS.

Therefore, the land use and transportation projects in the proposed MTP/SCS in Lands Not Identified for Development will not conflict with achieving the goals in AB32. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Transit Priority Area Impacts

For all TPAs in the proposed MTP/SCS, an aggregated evaluation of GHG emissions was done using the formula described in the Methods and Assumptions section of this chapter. Additional measures from the Scoping Plan aimed at reducing emissions from electricity and natural gas consumption, as described in the regional impacts section above, were considered. Impacts are described below.

Placer County Transit Priority Areas

A large portion of housing growth in Placer County TPAs between 2012 and 2036 are assumed to be attached (see the Product Description chapter). As discussed, EIA data shows this housing type to be more efficient than its single family counterpart on a per unit basis in terms of consumption of electricity and natural gas (EIA, 2012). This will support the plan's GHG emissions reduction goals.

Placer County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, but the majority of transit service increases will be commuter service to downtown Sacramento. In addition, Placer County TPAs are served by the Capital Corridor train, as well as high-quality transit service in Roseville. This creates more non-auto modes of travel, reducing emissions from travel.

Therefore, the land use and transportation projects in the proposed MTP/SCS in Placer County TPAs will not conflict with achieving the goals in AB32. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Sacramento County Transit Priority Areas

Sacramento County TPAs include the majority of the City of Sacramento and portions of Rancho Cordova, Folsom, and Citrus Heights. Between 2012 and 2036, a large percentage of all new residential products are assumed to be attached (see the Product Description chapter), and residential densities are generally high, which will support a more energy efficient housing supply and will help reduce GHG emissions.

Sacramento County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, major increases in light rail service, new streetcar service, and more express bus service. In addition, the Sacramento TPA is served by light rail, Capital Corridor, and numerous bus routes. In 2036, the Sacramento TPA is assumed to have a streetcar corridor in downtown, and bus rapid transit service. This offers more non-auto modes of travel, reducing travel related emissions.

Therefore, the land use and transportation projects in the proposed MTP/SCS in Sacramento County TPAs will not conflict with achieving the goals in AB32. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

Yolo County Transit Priority Areas

Yolo County TPAs include the majority of West Sacramento and Davis, and some portions of Yolo County near the Sacramento International Airport where Sacramento Regional Transit District will run light rail service. As noted, residential growth in Yolo County TPAs is dominated by attached housing at generally high densities (see the Product Description chapter). These housing types support the plan's goals of reducing energy consumption and GHG emissions.

Yolo County TPAs will include a variety of transportation improvements by 2036, including new HOV lanes, auxiliary lanes, roadway widenings, bicycle and pedestrian infrastructure improvements, transit facilities, increased transit service, and roadway maintenance and rehabilitation projects. Transit service will include increased frequency on local fixed route buses, a major light rail extension to Sacramento International Airport, new streetcar service in West Sacramento, and increased express service to downtown Sacramento. In addition, the Yolo County TPAs are served by Capital Corridor as well as numerous bus routes. In 2036, the area will include bus rapid transit and a streetcar in West Sacramento. This will reduce travel related emissions by offering non-auto modes of travel.

Therefore, the land use and transportation projects in the proposed MTP/SCS in Yolo County TPAs will not conflict with achieving the goals in AB32. This impact is considered less than significant (LS) for Impact ENE-5. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-6: CONFLICT WITH THE SACOG REGION'S ACHIEVEMENT OF SB 375 GHG EMISSIONS REDUCTION TARGETS.

Regional Impacts

Pursuant to SB 375, ARB has established regional on-road GHG per capita emissions reduction targets from light-duty trucks and passenger vehicles. This section describes the regional impact from the land use and transportation projects in the proposed MTP/SCS as they relate to SB 375 and the regional targets. Since this impact relates to a regional target, smaller area impacts are only considered in aggregation. Therefore, no separate analyses of local Community Types or TPAs are conducted.

SACOG used a regional travel demand model to estimate travel for the proposed MTP/SCS for the 2012 baseline year and, for the purpose of the analysis of achieving the targets set by SB 375, the year 2005. SACOG's primary model is the "Sacramento Regional Activity-Based Simulation Model" or "SACSIM." SACSIM analyzes travel for weekday conditions during a non-summer month. There are four demand periods within the typical weekday: AM peak period (7:00AM to 10:00AM); midday period (10:00AM to 3:00PM); PM peak period (3:00PM to 6:00PM); and the late evening/overnight period (6:00PM to 7:00AM). See Chapter 16 - Transportation for more details of the modeling used to create the final estimated VMT and associated GHG emissions reductions.

One of the goals of SB 375 is to reach the GHG emissions reduction targets set by ARB through an integrated land use, transportation, and housing plan. Achievement of this goal is an objective of the

proposed MTP/SCS. The growth in the proposed MTP/SCS, as described in Chapter 2 – Project Description, provides a mix of housing options, located closer to jobs and transit. The proposed growth is more compact in form and more effectively utilizes existing infrastructure. In addition, the proposed transportation projects include expansion of existing rail and bus service, increased headways to reduce wait time between transit service, increased bicycle and pedestrian improvements, and targeted roadway and highway improvement and expansion.

Chapter 16 – Transportation, includes an analysis of the relationship between land use and travel behavior, often referred to as the “D’s”, which describe the land use through a set of measures that impact the amount and type of travel in a region. These measures include regional accessibility, street pattern, mix of use, distance to nearest transit, and residential density. Through the development of the proposed MTP/SCS, SACOG has applied the “D’s” in the development of the land use growth allocations, and the transportation projects and improvements in the plan area. The benefits measured by the D’s not only impact VMT, but also increase walk and bike trips, as well as transit ridership. (See Chapter 16 – Transportation for more information on travel improvements in the proposed MTP/SCS.)

For the SACOG region, the targets set by ARB are seven percent below 2005 emissions levels by 2020 and 16 percent below 2005 levels by 2035. The 2005 GHG per capita emissions were modeled for the plan area to be 22.69 pounds per day. With the proposed MTP/SCS, the 2020 GHG per capita emissions were modeled for the plan area to be 20.9 pounds per day, a reduction of eight percent from 2005, and the 2035 emissions levels were modeled to be 19.2 pounds per day, a 16 percent reduction from 2005. Table 8.7 below outlines these reductions.

**Table 8.7
Plan Area SB375 Related GHG Emissions**

Year	GHG Lbs Per Day Per Capita	Percent Reduction from 2005
2005	22.69	--
2020	20.9	8%
2035	19.2	16%

Source: SACOG, 2015

These projections do not include any additional measures from the Scoping Plan to further reduce GHG emissions and is, therefore, conservative. Application of Pavley fuel efficiency standards and low carbon fuel standards, both AB 32 Scoping Plan measures, are anticipated to reduce levels even further.

Therefore, the impact on achieving the SB 375 GHG emissions reduction targets related to the land use changes and transportation improvements from implementation of the proposed MTP/SCS at the regional level is considered less than significant (LS) for Impact ENE-6. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-7: CONFLICT WITH APPLICABLE LOCAL GHG REDUCTION PLANS.

Regional Impacts

In the development of the proposed MTP/SCS, SACOG analyzed local climate action plans, specific plans, and general plans that included targets for GHG reductions and made efforts to address policies within the plans. The local GHG reduction plans are adopted in an effort to comply with the goals set for local governments in the AB 32 Scoping Plan. While the land use and transportation projects of the proposed MTP/SCS are consistent with the goals of AB 32 (see ENE-5) and SB 375 (see ENE-6), ultimately it is the local jurisdictions that have authority to determine if projects are consistent with local plans. SACOG, and the proposed MTP/SCS, have no jurisdiction in approval of development within the plan area.

In addition, the proposed MTP/SCS does not address all of the potential reduction measures, goals, and GHG targets from various local agencies. Climate action plans, general plans, and other plans that address climate change and reduce GHG emissions will set targets based on state, regional, or local conditions. Not all plans will have identical GHG reduction goals and implementation measures. Entities in the SACOG region are in different stages of the climate action plan or GHG reduction planning process. As emissions inventories and climate action or GHG reduction plans are prepared and near completion or adoption, jurisdictions will set benchmarks to evaluate the implementation of their plan.

The proposed MTP/SCS relies on the benefits of dense, compact development coupled with an efficient and diversified transportation network. It seeks to reduce overall and per capita energy consumption and related GHG emissions from all sources. These actions would help to reduce GHG emissions associated with changes in land use and transportation systems at both the local and regional level, and thus could result in beneficial contributions to localized GHG emissions reductions identified in local plans.

Therefore, the land use and transportation projects in the proposed MTP/SCS at the regional level do not conflict with the applicable local GHG reduction plans. This impact is considered less than significant (LS) for Impact ENE-7. No mitigation is required.

MITIGATION MEASURES

None required.

IMPACT ENE-8: INCREASE GHG EMISSIONS FROM THE CONSTRUCTION OF THE PROPOSED MTP/SCS IN A MANNER INCONSISTENT WITH AB 32.

Regional Impacts

The impact construction projects have on energy consumption is considered significant if the projects in the proposed MTP/SCS are implemented in a manner that is not consistent with the GHG emissions reduction goals set forth in AB 32. Construction energy consumption includes operation of equipment, and travel to and from the worksite.

The population and employment growth in the proposed MTP/SCS by 2036 requires the development of new housing, commercial, industrial, and public uses, as well as the construction of new, and the expansion of existing, roads, rail, and other related transportation projects. In addition, new infrastructure such as water, wastewater treatment, and storm water management will need to be constructed to accommodate this growth. A 2005 study by SACOG found that the more compact development found in the 2050 Blueprint has less infrastructure need, as compared to the more sprawled pattern of growth previously projected for the region (SACOG, 2005). Because the proposed MTP/SCS generally is consistent with the Blueprint preferred scenario, construction of the land uses in the plan area would increase energy consumption but should reduce energy needs by limiting the need for additional infrastructure.

Travel energy consumption from construction is captured as part of the regional travel model. The benefits of the land use and transportation projects in the proposed MTP/SCS – higher densities, mixed uses, and transit options – are captured as well. The reduced per capita VMT by 2036, as discussed in Chapter 16 – Transportation reflects construction-related travel as compared to 2012.

In addition, as discussed above, per capita energy consumption from the implementation of the proposed MTP/SCS from both land use and transportation-related projects decreases between 2012 and 2036. The reduction of energy use per capita is part of the reason overall GHG emissions decrease with the implementation of the proposed MTP/SCS, and the proposed MTP/SCS does not conflict with the achievement of the goals of AB 32.

Therefore, the land use and transportation projects in the proposed MTP/SCS at the regional level do not conflict increase GHG emissions in a manner inconsistent with AB 32. This impact is considered less than significant (LS) for Impact ENE-8. No mitigation is required.

Localized Impacts

Center and Corridor Communities, Established Communities, Developing Communities, Rural Residential Communities, and Lands Not Identified for Development in the MTP/SCS

The localized impact of the energy consumption of the construction of the proposed MTP/SCS is the same as the regional impact and is considered less than significant (LS) for Impact ENE-8. No mitigation is required.

Transit Priority Area Impacts

Placer County, Sacramento County, and Yolo County TPAs

The TPAs impact of the energy consumption of the construction of the proposed MTP/SCS is the same as the regional impact and is considered less than significant (LS) for Impact ENE-8. No mitigation is required.

MITIGATION MEASURES

None required.