3.6 GREENHOUSE GAS EMISSIONS

This section describes the current greenhouse gas (GHG) emissions, discusses the construction and operational impacts of the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS or Plan), identifies mitigation measures for the impacts, and evaluates the residual impacts.

GHG emissions refer to a group of emissions that are generally believed to affect global climate conditions. The greenhouse effect compares the Earth and the atmosphere surrounding it to a greenhouse with glass panes. The glass panes in a greenhouse let heat from sunlight in and reduce the amount of heat that escapes. GHGs, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), keep the average surface temperature of the Earth close to 60 degrees Fahrenheit (°F).

In addition to CO_2, CH_4, and N_2O, GHGs include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and water vapor. Of all the GHGs, CO_2 is the most abundant pollutant that contributes to climate change through fossil fuel combustion. CO_2 comprised 83.3 percent of the total GHG emissions in California in 2002.[1] The other GHGs are less abundant but have higher global warming potential than CO_2. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. The CO_2e of CH_4 and N_2O represented 6.4 and 6.8 percent, respectively, of the 2002 California GHG emissions. Other high global warming potential gases represented 3.5 percent of these emissions.[2] In addition, there are a number of human-made pollutants, such as CO, NO_X, non-methane VOC, and SO_2, that have indirect effects on terrestrial or solar radiation absorption by influencing the formation or destruction of other climate change emissions.

REGULATORY FRAMEWORK

Federal

Supreme Court Ruling. The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency, 127 S.Ct. 1438 (2007)*, that carbon dioxide and other greenhouse gases are pollutants under the Federal Clean Air Act (CCA), which the U.S. Environmental Protection Agency (USEPA) must regulate if it determines they pose an endangerment to public health or welfare. On December 7, 2009 the USEPA Administrator made two distinct findings: 1) that the current and projected concentrations of the six key GHG [carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)] in the atmosphere threatens the public health and welfare of current and future generations; and 2) that the combined emissions of these greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 includes several key provisions that will increase energy efficiency and the availability of renewable energy, which will reduce greenhouse gas emissions as a result. First, the Act sets a Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022. Second, it increased Corporate Average Fuel Economy (CAFE) Standards to require a minimum average fuel economy of 35 miles per gallon for the combined fleet of cars and light trucks by 2020. Third, the adopted bill includes a variety of new standards for lighting and for residential and commercial appliance equipment. The equipment includes residential

[1] Cal/EPA, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March 2006, p. 11.
[2] *Ibid*.

refrigerators, freezers, refrigerator-freezers, metal halide lamps, and commercial walk-in coolers and freezers.

National Fuel Efficiency Policy. In addition, on May 19, 2009, President Barack Obama announced a new National Fuel Efficiency Policy aimed at increasing fuel economy and reducing greenhouse gas pollution.[3] The new National Fuel Efficiency Policy is expected to increase fuel economy by more than 5 percent by requiring a fleet-wide average of 35.5 miles per gallon by 2016 starting with model years 2012. However, federal fuel economy standards have not yet been promulgated to establish specific benchmarks.

The Heavy-Duty National Program was adopted on August 9, 21011 to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with the model year 2014.

State

In response to growing scientific and political concern with global climate change, California adopted a series of laws to reduce emissions of GHGs into the atmosphere.

Assembly Bill 1493 (AB 1493). In September 2002, AB 1493 was enacted, requiring the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State.

Executive Order (E.O.) S-3-05. On June 1, 2005, E.O. S-3-05 set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

The Executive Order establishes State GHG emission targets of 1990 levels by 2020 (the same as AB 32) and 80 percent below 1990 levels by 2050. It calls for the Secretary of California Environmental Protection Agency (Cal/EPA) to be responsible for coordination of State agencies and progress reporting. A recent California Energy Commission report concludes, however, that the primary strategies to achieve this target should be major "decarbonization" of electricity supplies and fuels, and major improvements in energy efficiency.[4]

In response to the Executive Order, the Secretary of the Cal/EPA created the Climate Action Team (CAT). California's CAT originated as a coordinating council organized by the Secretary for Environmental Protection. It included the Secretaries of the Natural Resources Agency, and the Department of Food and Agriculture, and the Chairs of the Air Resources Board, Energy Commission, and Public Utilities Commission. The original council was an informal collaboration between the agencies to develop potential mechanisms for reductions in GHG emissions in the State. The council was given formal recognition in Executive Order S-3-05 and became the CAT.

The original mandate for the CAT was to develop proposed measures to meet the emission reduction targets set forth in the executive order. The CAT has since expanded and currently has members from 18 State agencies and departments. The CAT also has ten working groups which coordinate policies among their members. The working groups and their major areas of focus are:

- Agriculture: Focusing on opportunities for agriculture to reduce GHG emissions through efficiency improvements and alternative energy projects, while adapting agricultural systems to climate change;

[3]The White House, Office of the Press Secretary, May 19, 2009, *http://www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/*.

[4]California Energy Commission, *California's Energy Future – The View to 2050*, May 2011.

- Biodiversity: Designing policies to protect species and natural habitats from the effects of climate change;
- Energy: Reducing GHG emissions through extensive energy efficiency policies and renewable energy generation;
- Forestry: Coupling GHG mitigation efforts with climate change adaptation related to forest preservation and resilience, waste to energy programs and forest offset protocols;
- Land Use and Infrastructure: Linking land use and infrastructure planning to efforts to reduce GHG from vehicles and adaptation to changing climatic conditions;
- Oceans and Coastal: Evaluating the effects sea level rise and changes in coastal storm patterns on human and natural systems in California;
- Public Health: Evaluating the effects of GHG mitigation policies on public health and adapting public health systems to cope with changing climatic conditions;
- Research: Coordinating research concerning impacts of and responses to climate change in California;
- State Government: Evaluating and implementing strategies to reduce GHG emissions resulting from State government operations; and
- Water: Reducing GHG impacts associated with the State's water systems and exploring strategies to protect water distribution and flood protection infrastructure.

The CAT is responsible for preparing reports that summarize the State's progress in reducing GHG emissions. The most recent CAT Report was published in December 2010. The CAT Report discusses mitigation and adaptation strategies, State research programs, policy development, and future efforts.

Assembly Bill 32 (AB 32). In September 2006, Governor Arnold Schwarzenegger signed the California Global Warming Solutions Act of 2006, also known as AB 32, into law. AB 32 focuses on reducing GHG emissions in California, and requires the ARB to adopt rules and regulations that would achieve greenhouse gas emissions equivalent to Statewide levels in 1990 by 2020. To achieve this goal, AB 32 mandates that the ARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce Statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved. Because the intent of AB 32 is to limit 2020 emissions to the equivalent of 1990, it is expected that the regulations would affect many existing sources of GHG emissions and not just new general development projects. Senate Bill (SB) 1368, a companion bill to AB 32, requires the California Public Utilities Commission and the California Energy Commission to establish GHG emission performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the State.

AB 32 charges ARB with the responsibility to monitor and regulate sources of GHG emissions in order to reduce those emissions. On June 1, 2007, ARB adopted three discrete early action measures to reduce GHG emissions. These measures involved complying with a low carbon fuel standard, reducing refrigerant loss from motor vehicle air conditioning maintenance, and increasing methane capture from landfills.[5] On October 25, 2007, ARB tripled the set of previously approved early action measures. The approved measures include improving truck efficiency (i.e., reducing aerodynamic drag), electrifying port equipment, reducing perfluorocarbons from the semiconductor industry, reducing propellants in consumer products, promoting proper tire inflation in vehicles, and reducing sulfur hexaflouride emission from the non-electricity sector. The ARB has determined that the total Statewide aggregated GHG 1990 emissions level and 2020 emissions limit is 427 million metric tons of CO_2e. The 2020 target reductions are currently estimated to be 174 million metric tons of CO_2e.

The ARB AB 32 Scoping Plan contains the main strategies to achieve the 2020 emissions cap. The Scoping Plan was developed by the ARB with input from the CAT and proposes a comprehensive set of actions designed to reduce overall carbon emissions in California, improve the environment, reduce oil dependency,

[5]California Air Resources Board, *Proposed Early Action Measures to Mitigate Climate Change in California*, April 20, 2007.

diversify energy sources, and enhance public health while creating new jobs and improving the State economy. The GHG reduction strategies contained in the Scoping Plan include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. Key approaches for reducing greenhouse gas emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a Statewide renewable electricity standard of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets; and
- Adopting and implementing measures to reduce transportation sector emissions, including California's.

ARB has also developed the GHG mandatory reporting regulation, which required reporting beginning on January 1, 2008 pursuant to requirements of AB 32. The regulations require reporting for certain types of facilities that make up the bulk of the stationary source emissions in California. The regulation language identifies major facilities as those that generate more than 25,000 metric tons of CO_2 per year. Cement plants, oil refineries, electric generating facilities/providers, co-generation facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons of CO_2 per year, make up 94 percent of the point source CO_2 emissions in California.

CEQA Guidelines Amendments. California Senate Bill (SB) 97 required the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." The CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. Noteworthy revisions to the CEQA Guidelines include:

- Lead agencies should quantify all relevant GHG emissions and consider the full range of project features that may increase or decrease GHG emissions as compared to the existing setting;
- Consistency with the ARB Scoping Plan is not a sufficient basis to determine that a project's GHG emissions would not be cumulatively considerable;
- A lead agency may appropriately look to thresholds developed by other public agencies, including the ARB's recommended CEQA thresholds;
- To qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project. General compliance with a plan, by itself, is not mitigation;
- The effects of GHG emissions are cumulative and should be analyzed in the context of CEQA's requirements for cumulative impact analysis; and
- Given that impacts resulting from GHG emissions are cumulative, significant advantages may result from analyzing such impacts on a programmatic level. If analyzed properly, later projects may tier, incorporate by reference, or otherwise rely on the programmatic analysis.

Senate Bill 375 (SB 375). SB 375, adopted in September 30, 2008, provides a means for achieving AB 32 goals through the reduction in emissions of cars and light trucks. SB 375 requires new RTPs to include Sustainable Communities Strategies (SCSs). This legislation also allows the development of an Alternative Planning Strategy (APS) if the targets cannot be feasibly met through an SCS. The APS is not included as part of the RTP. In adopting SB 375, the Legislature expressly found that improved land use and

transportation systems are needed in order to achieve the GHG emissions reduction target of AB 32. Further, the staff analysis for the bill prepared for the Senate Transportation and Housing Committee's August 29, 2008 hearing on SB 375 (hereby incorporated by reference) began with the following statement: "According to the author, this bill will help implement AB 32 by aligning planning for housing, land use, transportation and greenhouse gas emissions for the 17 MPOs in the state."

Senate Bill 1078, Senate Bill 107, and Executive Order S-14-08 (Renewables Portfolio Standard). On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107, signed by the Governor on September 26, 2006 changed the due date for this goal from 2017 to 2010. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewables Portfolio Standard target for California requiring that all retail sellers of electricity serve 33% of their load with renewable energy by 2020. Increased use of renewable energy sources will decrease California's reliance on fossil fuels, reducing emissions of greenhouse gases from the energy sector.

Assembly Bill 1493 (Pavley Regulations). AB 1493 (referred to as Pavley I) required CARB to develop and adopt standards for vehicle manufacturers to reduce greenhouse gas emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22% reduction by 2012 and 30% by 2016.

Executive Order (E.O.) S-1-07, the Low Carbon Fuel Standard. On January 18, 2007 E.O. S-1-07 was issued requiring a reduction of at least ten percent in the carbon intensity of California's transportation fuels by 2020. Regulatory proceedings and implementation of the Low Carbon Fuel Standard have been directed to the California Air Resources Board (ARB). The Low Carbon Fuel Standard has been identified by ARB as a discrete early action item in the Adopted *Climate Change Scoping Plan*. ARB expects the Low Carbon Fuel Standard to achieve the minimum 10 percent reduction goal; however, many of the early action items outlined in the *Climate Change Scoping Plan* work in tandem with one another. To avoid the potential for double-counting emission reductions associated with AB 1493 (see previous discussion), the *Climate Change Scoping Plan* has modified the aggregate reduction expected from the Low Carbon Fuel Standard to 9.1 percent.

Executive Order S-13-08. Executive Order S-13-08, signed on November 14, 2008, directs California to develop methods for adapting to climate change impacts through preparation of a statewide plan. In response to this order, the California Natural Resources Agency coordinated with ten State agencies, multiple scientists, a consulting team, and stakeholders to develop the first Statewide, multi-sector adaptation strategy in the country. The resulting report, *2009 California Climate Adaptation Strategy*, summarizes the best-known science to assess the vulnerability of the State to climate change impacts, and outlines possible solutions that can be implemented within and across State agencies to promote resiliency. This strategy is the first step in an evolving process to reduce California's vulnerability to climate change impacts.

Adaptation refers to efforts that prepare the State to respond to the impacts of climate change – adjustments in natural or human systems to actual or expected climate changes to minimize harm or take advantage of beneficial opportunities. California's ability to manage its climate risks through adaptation depends on a number of critical factors. These include its baseline and projected economic resources, technology, infrastructure, institutional support and effective governance, public awareness, access to the best available scientific information, sustainably-managed natural resources, and equity in access to these resources.

California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," these energy efficiency standards were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible

incorporation of new energy efficiency technologies and methods.[6] The most recent update to Title 24 was adopted by the California Energy Commission on April 23, 2008. The requirement for when the 2008 standards must be followed is dependent on when the application for the building permit is submitted. If an application for a building permit is submitted on or after January 1, 2010, the 2008 standards must be met. The California Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards to respond to the mandates of AB 32 and to pursue California energy policy that energy efficiency is the resource of first choice for meeting California's energy needs.

Senate Bill 1368. SB 1368 (2006) directs the California Energy Commission and the California Public Utilities Commission to adopt a performance standard for greenhouse gas emissions for the future electricity used in California, regardless of whether it is generated in-state or purchased from other states.

California Green Building Code. The California Green Building Code (2008) referred to as "CalGreen," is the first statewide green building code. It was developed to provide a consistent, approach for green building within California. Taking effect January 2011, it lays out minimum requirements for newly constructed buildings in California, which will reduce greenhouse gas emissions through improved efficiency and process improvements. It requires builders to install plumbing that cuts indoor water use by as much as 20 percent, to divert 50 percent of construction waste from landfills to recycling, and to use low-pollutant paints, carpets, and floors.

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

Assembly Bill 811 (AB 811). AB 811 (2008) authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are permanently fixed to the property. These financing arrangements would allow property owners

Regional

South Coast Air Quality Management District (SCAQMD). SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy.

SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, the SCAQMD proposed the use of a percent emission reduction target (e.g., 30 percent) to determine significance for commercial/residential projects that emit greater than 3,000 metric tons per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is lead agency. However, SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial projects) and has formed a GHG Significance Threshold Working Group to further evaluate potential GHG significance thresholds.[7]

SCAQMD has convened a GHG CEQA Significance Threshold Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. Members of the

[6]The California Energy Commission, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, *Title 24, Part 6, of the California Code of Regulations*, http://www.energy.ca.gov/title24, accessed August, 2011.

[7]South Coast Air Quality Management District, *Greenhouse Gases (GHG) CEQA Significance* Thresholds, http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html, accessed August, 2011.

working group include government agencies implementing CEQA and representatives from various stakeholder groups that will provide input to the SCAQMD staff on developing CEQA GHG significance thresholds. The working group is currently discussing multiple methodologies for determining project significance. These methodologies include categorical exemptions, consistency with regional GHG budgets in approved plans, a numerical threshold, performance standards, and emissions offsets.

Counties

Los Angeles County. The Los Angeles County Office of Sustainability (COS) was created within the Internal Services Department by the Board of Supervisors in October 2009 to respond to legislation, regulation and policy related to Climate Change and serve as a central hub to coordinate Energy Efficiency, Conservation and Sustainability Programs within the County, its facilities, and the region. The COS develops and implements programs that impact and benefit the constituents of Los Angeles County, such as the Energy Upgrade California in Los Angeles County energy efficiency home improvement and rebate program, countywide Environmental Service Centers, the SolarMap LACounty.gov and Green.LACounty.gov websites, and the Los Angeles Regional Collaborative for Climate Action and Sustainability. In addition, COS is the lead in coordinating and implementing Energy and Environmental policy programs and activities by all County departments.

Orange County. In early 2010, a joint committee with equal representation from the Orange County Council of Governments (COG) and the Orange County Transportation Authority (OCTA) was formed to develop the Orange County Sustainable Communities Strategy (SCS). The Orange County COG/OCTA SCS Joint Working Committee led overall efforts to develop a subregional Orange County SCS to meet the requirements of SB 375 and the mutual agreements with SCAG with a plan that all local jurisdictions in Orange County could support. As a result of this collaborative effort, the Orange County SCS was adopted unanimously by the OCTA and Orange County COG Boards of Directors in June of 2011. Orange County SCS utilizes the transportation system along with land use and Best Management Practices strategies to help the County to achieve the State-mandated emissions reduction targets.

Riverside County. Riverside County has created a Green Action Plan to establish a clear path to sustainability and GHG reduction. The Green Action Plan focuses on seven key areas: Energy, Greenhouse Gas Emissions, Waste, Urban Design, Urban Nature, Transportation and Water. The Energy section of the guidebook includes goal to increase the use of non-greenhouse gas emitting energy to 70 percent with at least 50 percent coming from renewable sources by 2020. The Plan has established a target to reduce GHG emissions by 7 percent below 1990 baseline and 15 percent below the baseline by 2020. The County aims to reduce waste by 75 percent by 2020 based on the 2007 per capita baseline. The Plan also provides incentives to increase green development and encourage the planting of at least 3,000 shade trees on private property and 1,000 trees in parks annually. For Transportation, the Plan envisions a 15 percent decrease in vehicle miles traveled by 2015 based on the 2009 baseline. The waters section specifies a 20 percent water usage reduction by 2020 while increasing the use of recycled water by 30 percent by 2020 based on the 2008 baseline.[8]

San Bernardino County. Santa Bernardino County launched *Green County San Bernardino* in August 2007 to promote the use of environmentally friendly technologies and practices among business owners, developers, and residents in the County. All San Bernardino County cities are encouraged to join the Green Valley Initiatives to pledge to address five or more policy areas that aim to reduce greenhouse gas emissions. The policy areas to select from are Green Building Program, Buy Green/Buy Local, Green Business Programs, Conservation and Recycling, Solar and Alternative Energy, Encourage Green Economic Development, Green Valley Land Use, and Green Valley Coordinators. The Green Building Program promotes the development and support for policies such as US Green Building Council's Leadership in

[8]Green Riverside, *Green Action Plan*, http://www.greenriverside.com/About-Green-Riverside-4/Green-Action-Plan-190, accessed August 2011.

Energy and Environmental Design (LEED)-certifiable commercial buildings and remodels and incorporates the California Green Builder program for residences. Buy green/buy local support Energy Star, California Friendly and other locally grown and manufactured products. Green Business Programs promote businesses that create green products and to support businesses that help employee live close to work or encourage telecommuting. The Conservation and Recycling area aims to reduce waste generation, increase reuse or recycling programs, and expand recycled and gray water systems for landscape irrigation. Cities who pledged to address Solar and Alternative Energy policy will provide motivation to manufacture, deploy, and locally use solar and other alternative energies for peak needs. The Green Economic Development and Green Valley Land Use within the Green Valley Initiatives will focus on increasing the number of green technology jobs in the region, as well as government infrastructure investments on areas where housing and jobs are coordinated to reduce vehicle emissions.[9]

Ventura County. The County of Ventura is in the process of developing a Climate Action Plan. The Plan will focus on compliance with AB 32 and reduce GHG emissions by aligning transportation needs with housing needs.

Cities

Many cities in the SCAG region have incorporated climate change and GHG policies into their planning and permitting programs. A complete list of cities that have incorporated climate change and GHG policies is found in the SCS.

The City of Los Angeles has issued guidance promoting green building to reduce GHG emissions. The goal of the Green LA Action Plan (Green LA Plan) is to reduce greenhouse gas emissions 35 percent below 1990 levels by 2030.[10] The Green LA Plan identifies objectives and actions designed to make the City of Los Angeles a leader in confronting global climate change. The measures would reduce emissions directly from municipal facilities and operations, and create a framework to address City-wide GHG emissions. The Green LA Plan lists various focus areas in which to implement GHG reduction strategies. Focus areas listed in the Green LA Plan include energy, water, transportation, land use, waste, port, airport, and ensuring that changes to the local climate are incorporated into planning and building decisions.

In furtherance of the Green LA Plan, the City of Los Angeles adopted an ordinance to establish a green building program in April 2008. The ordinance establishes green building requirements for projects involving 50 or more dwelling units. The Green Building Program was established to reduce the use of natural resources, create healthier living environments and minimize the negative impacts of development on local, regional, and global ecosystems. The program addresses location, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.

The City of Santa Monica released the Santa Monica Sustainable City Plan in September 1994, with updates and revisions to the Santa Monica Sustainable City Plan adopted in February 2003, and October 2006. The Santa Monica Sustainable City Plan was initiated with the goals and strategies for City government and all sectors of the community to conserve and enhance local resources, safeguard human health and the environment, maintain a healthy and diverse economy, and improve the livability and quality of life in the City of Santa Monica. To that end, the Santa Monica Sustainable City Plan has set GHG emissions reduction targets for the City in order to address climate change impacts; these targets, if achieved, would result in greater GHG emissions reductions than those set by the State, at least in the short term. The Sustainable City Plan includes targets of reducing GHG emissions at least 30 percent below 1990 levels by 2015 for City government operations and 15 percent below 1990 levels by 2015 Citywide.

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[9]San Bernardino County, *Green Valley Initiative Cities*, http://www.sbcounty.gov/greencountysb/green_valley_initiative_cities.aspx, accessed August 2011.

[10]City of Los Angeles, *Green LA: An Action Plan to Lead the Nation in Fighting Global Warming*, May 2007.

To help meet the goals of the Santa Monica Sustainable City Plan, in 2000, the Santa Monica City Council adopted a set of green building requirements for public and private sector buildings. These requirements addressed energy efficiency and construction and demolition waste recycling. They were later expanded to include green construction materials and landscape water conservation requirements. Since 2000, the City has required that new buildings be approximately 15 percent more efficient than State law requires, on average. The City has also adopted a policy for new municipal buildings to achieve at least a Silver rating by the LEED rating system.

EXISTING SETTING

GHGs are the result of both natural and human-influenced activities. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooling are the primary sources of greenhouse gas emissions. Without human intervention, the Earth maintains an approximate balance between the emission of GHGs into the atmosphere and the storage of greenhouse gases in oceans and terrestrial ecosystems. Increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.), have contributed to the rapid increase in atmospheric levels of GHGs over the last 150 years.

The primary effect of rising global concentrations of atmospheric GHG levels has been a rise in the average global tropospheric temperature of approximately 0.2 degrees Celsius per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur given the expected rise in global atmospheric GHG concentrations from innumerable sources of GHG emissions worldwide,[11] which would induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California may include but may not be limited to:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;[12]
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets;[13]
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;[14]
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;[15]
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st Century;[16] and

[11] See, e.g., Environmental Protection Agency, Draft Endangerment Finding, 74 Fed. Reg. 18886, 18904 (April 24, 2009) ("cumulative emissions are responsible for the cumulative change in the stock of concentrations in the atmosphere"); see also 74 Fed. Reg. 66496, 66538 (same in Final Endangerment Finding).

[12] *Ibid*.

[13] Intergovernmental Panel on Climate Change, "Climate Change 2007."

[14] *Ibid*.

[15] California Environmental Protection Agency, Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature. 2006.

[16] *Ibid*.

- Increasing the potential for erosion of California's coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level.[17]

Scientific understanding of the fundamental processes responsible for global climate change has improved over the past decade, and predictive capabilities are advancing. However, there remain significant scientific uncertainties, for example, in predictions of local effects of climate change, occurrence of extreme weather events, and effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of the Earth's climate system, the uncertainty surrounding climate change may never be completely eliminated. Because of these uncertainties, there continues to be significant debate as to the extent to which increased concentrations of GHGs have caused or will cause climate change, and with respect to the appropriate actions to limit and/or respond to climate change. In addition, it may not be possible to link specific development projects to future specific climate change impacts., though estimating project-specific impacts is possible.

State of California

California is the fifteenth largest emitter of GHG on the planet, representing about two percent of the worldwide emissions.[18] **Table 3.6-1** shows the California GHG emissions inventory for years 2000 to 2008. 2008 saw a small decrease in Statewide GHG emissions, driven by a noticeable drop in on-road transportation emissions. 2008 also reflects the beginning of the economic recession and fuel price spikes. According to the ARB, as the economy recovers, GHG emissions are likely to rise again without other mitigation actions.

TABLE 3.6-1: CALIFORNIA GREENHOUSE GAS EMISSIONS INVENTORY

	CO_2e Emissions (Million Metric Tons)								
Sector	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Transportation	171	174	180	178	182	184	184	184	175
Electric Power	104	121	106	110	120	111	108	111	116
Commercial and Residential	44	41	44	41	43	41	41	42	43
Industrial	97	95	97	96	91	91	90	94	93
Recycling and Waste	6.2	6.3	6.2	6.3	6.2	6.5	6.6	6.5	6.7
High Global Warming Potential	11	11	12	13	14	14	15	15	16
Agriculture	25	25	28	28	29	29	30	28	28
Forest Net Emissions	(4.7)	(4.5)	(4.4)	(4.3)	(4.3)	(4.2)	(4.0)	(4.1)	(4.0)
Emissions Total	**453**	**469**	**470**	**469**	**480**	**473**	**471**	**477**	**474**

SOURCE: ARB, *California Greenhouse Gas Inventory*, 2011.

The Transportation sector – largely the cars and trucks that move people and goods – is the largest contributor with 36.5 percent of the State's total GHG emissions in 2008. On road emissions (from passenger vehicles and heavy duty trucks) constitute 93 percent of the transportation sector total. On road emissions grew to a maximum of 170.8 million metric tons of CO_2e in 2005, plateaued until 2007, and decreased in 2008 to 163.3 million. The amount of gasoline and diesel fuel consumed by on road vehicles followed a similar trend.

The Electricity and Commercial/Residential Energy sector is the next largest contributor with more than 30 percent of the Statewide GHG emissions. Although electricity imported into California accounts for only about a quarter of our electricity, imports contribute more than half of the GHG emissions from electricity because much of the imported electricity is generated at coal-fired power plants. AB 32 specifically requires ARB to address emissions from electricity sources both inside and outside of the State.

[17]California Environmental Protection Agency, Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature. 2006.

[18]ARB, *Climate Change Scoping Plan*, December 2008.

California's industrial sector includes refineries, cement plants, oil and gas production, food processors, and other large industrial sources. This sector contributes almost 20 percent of California's GHG emissions, but the sector's emissions are not projected to grow significantly in the future. The sector termed recycling and waste management is a unique system, encompassing not just emissions from waste facilities but also the emissions associated with the production, distribution and disposal of products throughout the economy.

Although high global warming potential gases are a small contributor to historic GHG emissions, levels of these gases are projected to increase sharply over the next several decades, making them a significant source by 2020.

The Forest sector is unique in that forests both emit GHG and absorb CO_2. While the current inventory shows forests as a sink of 4.7 million metric tons of CO_2e, carbon sequestration has declined since 1990. For this reason, the 2020 projection assumes no net emissions from forests.

The agricultural GHG emissions shown are largely methane emissions from livestock, both from the animals and their waste. Emissions of GHG from fertilizer application are also important contributors from the Agricultural sector. ARB has begun a research program to better understand the variables affecting these emissions. Opportunities to sequester CO_2 in the Agricultural sector may also exist; however, additional research is needed to identify and quantify potential sequestration benefits.

In December 2007, ARB approved a GHG emissions target for 2020 equivalent to the State's calculated GHG emissions level in 1990. ARB developed the 2020 target after extensive technical work and a series of stakeholder meetings. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the State's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual) and the reduction of 42 million metric tons of CO_2e, or almost ten percent, from 2002 to 2004 average emissions.

SCAG Region

SCAG is in the process of developing GHG emissions inventories for various emissions sources. These inventories have not been completed at the time of this analysis. The most recent emissions inventory for the SCAG region was estimated in the 2008 RTP EIR. It was estimated that in 2008, construction activities, mobile sources, electricity generation, and natural gas consumption generated 177 million metric tons of GHG emissions. Regional emissions vary by climate. Similar climates have been aggregated into climate zones. Climate zones in the SCAG region are shown in **Map 3.6-1** in Chapter 8 (Maps).

THRESHOLDS OF SIGNIFICANCE

The 2012-2035 RTP/SCS would have a significant impact related to greenhouse gas emissions if it would

- Increase GHG emissions compared to existing conditions (2011);
- Conflict with AB 32 or other applicable plan, policy or regulation adopted for the purpose of reducing emissions of greenhouse gases; or
- Conflict with SB 375 GHG emission reduction targets.

CEQA Guidelines Section 15064.4(a) confirms that lead agencies retain the discretion to determine the significance of GHG emissions. The Guidelines advise lead agencies to consider the following factors in determining the significance of GHG emissions: whether the project increases or reduces GHG emissions compared to the existing environmental setting, whether project emissions exceed a threshold of significance identified by the lead agency as appropriate to the project, and the extent to which the project compiles with regulations or requirements of certain adopted GHG reduction plans. (CEQA Guidelines Section 15064.4(b).) But fundamentally, the courts recognize that lead agencies are allowed to decide what threshold

of significance they will apply to a project. (See *Citizens for Responsible Equitable Development v. City of Chula Vista* (2011) 197 Cal.App. 4th 327, upholding an AB 32-based approach to setting significance thresholds.)

This PEIR uses three thresholds of significance: increase in GHG emissions compared to existing conditions, conflict with SB 375 GHG emission reduction targets, and conflict with other applicable GHG reduction plans. SCAG selected the SB 375-based threshold, because complying with SB 375 is the responsibility of this Plan. The other two thresholds are also consistent with CEQA Guidelines suggestions.

SCAG chose not to use the 2050 Executive Order emissions reduction target as a threshold of significance because the Executive Order is not an adopted GHG reduction plan within the meaning of CEQA Guidelines Section 15064.4(b)(2), and furthermore, the 2050 target is well beyond the horizon year (2035) of the Plan. Although the Attorney General has advised that the Executive Order 2050 target can *inform* CEQA analysis, there is no requirement to use it as a threshold of significance. Further, the Plan, in meeting its SB 375 2035 target is in line with the goals of the Executive Order.

Methodology

The following section summarizes the methodology used to evaluate the expected impacts of implementation of the Plan on GHG emissions.

Cumulative Analysis

The 2012-2035 RTP/SCS addresses transportation projects and land use distribution patterns, including land use scenarios. These land use distribution patterns identify growth distribution and anticipated land use development to accommodate growth projections. The Regional Travel Demand Model (RTDM) used for this analysis captures pass-through traffic that does not have an origin or destination in the region, but does impact the region, so that too is included in the project analysis. Although a similar level of development is anticipated even without the 2012-2035 RTP/SCS, this Plan would influence growth, including distribution patterns, throughout the region. To address this, the analysis in the PEIR covers overall impacts of all transportation projects and land development described in the 2012-2035 RTP/SCS. In addition, this PEIR considers cumulative impacts from other regional plans (e.g., the South Coast Air Quality Management Plan), which could result in additional impacts inside and outside the region.

Comparison with the No Project Alternative

The analysis of GHG emissions includes a comparison between the expected future conditions with the Plan and the expected future conditions if no Plan (No Project Alternative) were adopted. This evaluation is not included in the determination of the significance of impacts (which is based on a comparison of future conditions with the Plan to existing conditions); however, it provides a meaningful perspective on the effects of the Plan.

Determination of Significance

Analysis of the potential GHG impacts of the Plan was conducted based on detailed modeling of on-road and gross estimates of stationary sources.

The GHG analysis calculates the mobile emissions associated with the 2012-2035 RTP/SCS using SCAG's Regional Travel Demand Model outputs and ARB's EMFAC2007 emissions model. Stationary source GHG emissions were calculated using the Rapid Fire Model (see Appendix E). Construction-related GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod). In the analysis below, future year emissions are compared to 2005, 2011 and 15% below 2005. Estimates of energy and water use are based on 1) current demand factors and 2) emission rates associated with current power generation operations and water supply.

It is anticipated that future conservation (as a result of increased pressure to conserve and increased prices) will result in reduced demand. As energy providers and water suppliers respond to AB 32 and the Scoping Plan emission rates associated with power and water delivery are anticipated to decrease. However, in order to present a conservative analysis and without specific information on future demand factors, only modest reductions in demand are assumed. It is anticipated that AB 32 will be implemented, but at the present time sector-specific improvement cannot be quantified for this analysis.

IMPACTS

Impact 3.6-1: Under the Plan, GHG emissions from residential and commercial building construction and operational energy demand and total mobile source emissions would increase (from 141 million metric tons) when compared to existing conditions (130 million metric tons). Therefore, the Plan would result in a significant impact related to total emissions.

The GHG emissions resulting from the Plan would be significant if the project caused an increase over existing (2011) levels. This impact threshold has been developed for use in this PEIR based on CEQA's requirement that impacts be compared to existing conditions. However, since existing rates of GHG emissions are already harmful to the environment it is necessary that existing emissions be reduced in order to reduce climate change.

In addition to transportation improvements, the Plan identifies projected growth for the SCAG region in accordance with policies identified to reduce vehicle trips and vehicle trip length. Between 2011 and 2035 the region is anticipated to experience substantial increases in population, households and jobs (see Chapter 2 Project Description and Section 3.10 Population and Housing). The Plan focuses development in a compact pattern, which reduces per capita GHG emissions as compared to No Project or business-as-usual (BAU) because compact development generally uses less energy (e.g., multi-family housing units are insulated by each other as compared to single-family units and, therefore, require less heating and cooling) and water (e.g., multi-family units have less landscaping requiring irrigation as compared to single-family units).

GHG emissions result from direct and indirect sources. Direct emissions include emissions from fuel combustion in vehicles (i.e., autos, trucks, trains, buses, planes ships and trains) and natural gas combustion from stationary sources. Indirect sources include off-site emissions occurring as a result of electricity and water consumption and solid waste. Regional GHG emissions are estimated for years 2011 and 2035. Forecasts of regional GHG emissions for 2035 have been developed for this PEIR using SCAG's regional growth factors and anticipated growth under the Plan.

In addition, construction activities (of both transportation projects and development) throughout implementation of the Plan will result in direct and indirect emissions. Construction activities, including worker vehicle trips, transport of materials to and from the construction site, and operation of construction equipment, result in GHG emissions. Construction of individual projects occurs over a relatively short period of time as compared to the life of a project. Emissions due to construction activities are often amortized over the life of a project (e.g., 30 years).

Typically, individual project construction characteristics are identified, such as the timing of construction phases and equipment fleet mix. However, due to the scale of construction activity associated with implementation of the Plan, construction would be expected to occur continuously throughout the life of the Plan as individual projects are constructed and, therefore, could result in significant emissions. Although annual construction-related GHG emissions would be expected to vary depending on the number and type of projects being constructed in a given year (which would vary according to the economy), for purposes of this analysis annual construction emissions were estimated based on forecasted development in the region.

To estimate annual construction emissions due to development, total development was estimated based on forecasted housing units and jobs. The total number of residential projects was obtained based on annual household growth and assuming each residential project accounted for 100 units. Emissions from one 100-unit residential project was obtained from CalEEMod and used to determine emissions for total residential projects. Job growth was converted into nonresidential square footage based on SCAG's Employment Density Study Summary Report.[19] Similar to the residential analysis, nonresidential emissions were estimated based on one 250,000-square-foot project.

Non-mobile emissions associated with growth and development were analyzed using the Rapid Fire Model. A core concept in the Rapid Fire model is the allocation/designation of growth (in population, housing, and jobs) to one of three Land Development Categories (LDCs). The LDCs are Urban, Compact, and Standard. Urban is the most intense and most mixed LDC, often found within and directly adjacent to moderate and high-density urban centers. The Compact LDC is less intense than the Urban LDC, but highly walkable with rich mix of retail, commercial, residential, and civic uses. The Compact form is likely to occur as new growth on the urban edge or large-scale redevelopment. The Standard LDC represents the majority of separate-use auto-oriented development that has dominated the American suburban landscape over the past decades. See Appendix E for a detailed discussion of the Rapid Fire Model methodology.

Energy use factors for the four building types by which all new homes are categorized – single-family large lot, single-family small lot, single-family attached, and multifamily – were derived from the CEC Residential Appliance Saturation Survey (RASS) dataset. The RASS data includes per-unit electricity and gas consumption factors by climate zone (California Title 24 building climate zones), building type, and building size. Average per-square foot energy use for new and existing commercial buildings was estimated using the CEC Commercial End-Use Survey (CEUS) dataset. GHG emissions rate baselines and projections are based on California's statewide energy portfolio. The projected rates are made for the scenario horizon years of 2020 and 2035, with rates following a straight-line trend in between. The emissions rate for electricity generation is expected to decline over time, while that for natural gas use is expected to remain constant. The Plan assumes modest improvements in the electricity generation portfolio over time, with increases to about 28 percent renewables by 2020, and 35 percent by 2035. Emissions from natural gas combustion remain constant. The building energy emission rates are summarized in **Table 3.6-2**.

TABLE 3.6-2: BUILDING ENERGY GHG EMISSION RATES

Source	2005	2020	2035
Electricity Emissions (lbs/kWh)	0.81	0.69	0.62
Natural Gas Emissions (lbs/therm)	11.7	11.7	11.7

SOURCE: SCAG, 2012-2035 RTP/SCS, SCS Background Documentation Appendix, Page 61, 2011

Residential water use is calculated as a function of three basic sets of assumptions: a) average base-year water use for existing units; b) base-year water use for new units by building type; and c) reductions in building water use resulting from advances in water efficiency policy and technology. Average water use for existing units is assumed to be approximately 0.5 acre-feet per household per year. For new units, indoor water use is based on per-capita average rates by type, while outdoor water use is based on lot size and irrigation assumptions, evapotranspiration zone, and reference evapotranspiration according to the California Irrigation Management Information System. Water use reductions are applied to reflect an assumption of modest improvements in building efficiency standards. By 2035, the residential water use of new units is assumed to be 20 percent lower than baselines. The GHG emissions rates for water-related energy use are assumed to be the same as for building energy use shown in **Table 3.6-2**, above.

Sources of land use (residential and commercial) emissions assessed in the GHG analysis include construction, building energy consumption (electricity and natural gas), and water-related energy

[19]SCAG, *Employment Density Study Summary Report*, October 31, 2001.

consumption. Emissions not related to residential and commercial land uses (agricultural and industrial emissions, planes, trains and ships) are not included in this analysis since 1) the Plan would not have the ability to affect these emissions sectors, and 2) estimates of emissions associated with these sectors requires detailed understanding of acres of land in production, farming techniques, numbers of trips, engine sizes, length of travel in regional air or waters and detailed understanding of industrial processes some of which have not yet been invented. Emissions not included in the following analysis are related to the following: solid waste, waterborne navigations, trains, aviation, agricultural uses, ozone depleting substances commercially produced (e.g., hydrofluorocarbons), and industrial processes.

Forecast increases in population and jobs induce land use change (development projects), resulting in direct and indirect GHG emissions. The Plan supports sustainable growth through a compact development pattern. The Plan focuses growth in existing urban regions, where transit and infrastructure are already in place. Locating people and jobs near each other and near transit encourages use of transit, carpooling, and active transportation options (biking and walking), thereby reducing vehicle trips and trip lengths and associated emissions on a per capita basis. Encouraging multi-family developments instead of single-family homes also reduces energy and water consumption on a per capita basis.

GHG emissions from construction are generally associated with construction equipment and worker trips. Construction equipment typically consists of heavy-duty vehicles that are not subject to the same efficiency regulations that passenger vehicles must follow (e.g., Pavley), although their emissions benefit from lower carbon intensity fuel regulations, such as the low carbon fuel standards. The Heavy-Duty National Program, adopted on August 9, 21011, is expected to increase fuel efficiency by between 7 and 20 percent for medium- and heavy-duty vehicles. However, these efficiencies would be gradual, beginning in 2014, and would depend on the turnover rate of vehicles. Even with reduced emissions, these vehicles would still result in GHG emissions in 2035, and the regulations would not apply to all construction equipment.

On-road transportation emissions include fuel consumption from passenger vehicles, heavy-duty trucks, buses, and other motor vehicles. Transportation accounts for the greatest proportion of GHG emissions on a regional and State level. As part of the Plan, transportation network improvements would be made and compact, mixed-use growth strategies would be encouraged to accommodate increases in population and travel demand.

Other than the mobile source emissions, the other emissions (residential and commercial building energy, water energy and construction) analysis presents gross estimates based on simplified assumptions for purposes of this programmatic analysis. The analysis is presented for purposes of internal comparison, and not for purposes of assessing whether overall the AB 32 GHG reduction target is met. As noted above, a number of sources of emission are not included in this analysis because the Plan would not have the ability to significantly change those emissions (industrial process emissions, planes, trains and ship emissions).

Table 3.6-3 shows GHG emissions by county for the GHG baseline (2005), existing (2011), and Plan and No Plan conditions in 2020 and 2035. Baseline (2005) emissions are estimated to be 142 million metric tons (MMT) of CO_2e compared to an estimated 144 MMT of CO_2e under existing (2011) conditions. It is estimated (based on simplified gross estimates of construction, energy use and water use) that in 2035 total (for the sources analyzed) emissions under the Plan would be more than existing and 2005 baseline conditions. Implementation of Mitigation Measures **MM-GHG1** through **MM-GHG12** would reduce total GHG emission impacts; however, impacts would remain significant.

TABLE 3.6-3: GREENHOUSE GAS EMISSIONS BY COUNTY

Area and Source	CO_2e Emissions (Million Metric Tons per Year)					
	Baseline (2005)	Existing (2011)	Future No Project (2020)	Plan (2020)	Future No Project (2035)	Plan (2035)
IMPERIAL COUNTY						
Construction	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	1.3	1.3	1.7	1.7	2.4	2.4
Building Energy	0.40	0.49	0.56	0.41	0.62	0.39
Water-Related Energy	0.05	0.04	0.05	0.03	0.06	0.02
Subtotal	1.8	1.8	2.3	2.2	3.1	2.8
LOS ANGELES COUNTY						
Construction	0.17	0.16	0.16	0.16	0.15	0.15
Transportation	43	40	43	41	48	44
Building Energy	25	23	23	23	22	21
Water-Related Energy	2.0	2.5	2.1	2.2	1.9	1.9
Subtotal	70	66	68	66	72	67
ORANGE COUNTY						
Construction	0.04	0.04	0.04	0.04	0.04	0.04
Transportation	13	13	14	13	15	14
Building Energy	7.3	7.1	6.2	6.0	5.9	5.6
Water-Related Energy	0.63	0.76	0.62	0.64	0.57	0.59
Subtotal	21	21	21	20	22	20
RIVERSIDE COUNTY						
Construction	0.13	0.11	0.11	0.11	0.11	0.11
Transportation	11	12	14	14	19	18
Building Energy	4.8	5.4	5.5	4.8	6.5	4.9
Water-Related Energy	0.51	0.53	0.48	0.42	0.57	0.38
Subtotal	16	18	20	19	26	23
SAN BERNARDINO COUNTY						
Construction	0.07	0.07	0.07	0.07	0.07	0.07
Transportation	12	12	14	13	19	17
Building Energy	4.9	5.1	4.9	4.4	5.4	4.3
Water-Related Energy	0.45	0.48	0.41	0.38	0.48	0.34
Subtotal	17	18	19	18	25	22
VENTURA COUNTY						
Construction	0.01	0.01	0.01	0.01	0.01	0.01
Transportation	3.3	3.6	3.7	3.7	4.1	3.9
Building Energy	2.1	2.1	2.0	1.9	2.0	1.8
Water-Related Energy	0.18	0.21	0.17	0.17	0.17	0.09
Subtotal	5.6	5.9	5.9	5.8	6.3	5.8
Total Emissions	**132**	**130**	**137**	**131**	**154**	**141**
Plan (2020) Compared to Existing (2011)						**1**
Plan (2035) Compared to Existing (2011)						**11**
Future No Project (2020) Compared to Existing (2011)						**7**
Future No Project (2035) Compared to Existing (2011)						**24**

Note: The estimation of GHG emissions does not include the following sources: solid waste, aircraft, watercraft, trains, and industrial process sources. Total emissions resulting from construction, energy and water use are gross estimates based on simplified assumptions for purposes of this programmatic analysis.
SOURCE: TAHA, 2011; SCAG Transportation Modeling, 2011; Calthorpe, 2011.

Impact 3.6-2: Regarding the AB 32 GHG emission reduction targets (based on mobile sources and residential and commercial building energy use) the Plan would meet the applicable AB 32 reduction targets (identified in SB 375) with respect to light duty vehicles. However, without technical details as to how each sector of the economy will comply with AB 32, growth anticipated to occur under the Plan could result in a significant impact related to AB 32 and the Scoping Plan.

The Plan alone is not intended to meet the AB 32 target. By meeting the SB 375 targets (see Impact 3.6-3 below), the Plan has successfully contributed its share, if not greater, to meeting the AB 32 target.

This impact analysis estimates whether the emissions from the residential and commercial building energy consumption combined with mobile source emissions anticipated to occur under the Plan would be at or below 1990 levels as required by AB 32. The following analysis is extremely conservative because it assumes that the AB 32 implementation measures in the Scoping Plan will not be undertaken (except for the measures associated with SB 375, i.e., the SCS). Moreover, because future demand for energy and water are unknown and SCAG has no control over these emission factors, conservative assumptions have been applied.

As indicated by CEQA Appendix G, a significant GHG impact is identified if the Plan could conflict with applicable GHG reduction plans, policies, or regulations. AB 32 calls for GHG emissions to be reduced to 1990 levels by 2020. ARB's Scoping Plan functions as a roadmap to achieve AB 32 GHG reductions. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 169 MMT, or 28.4 percent below the State's projected 2020 emissions level of 596 MMT CO_2e under a business-as-usual (BAU) scenario. In the absence of reliable 1990 GHG emissions estimates, ARB recommends an equivalent metric of 15 percent below 2005 GHG emissions. The following programmatic analysis prepared for this PEIR estimates emissions from 1) residential and commercial building construction and energy consumption (including energy needed to transport water); and 2) transportation activities (for all mobile sources, not just light duty vehicles) for 2005 to be 48.3 and 83.6 MMT CO_2e, respectively.

Because the Scoping Plan time horizon is limited to 2020, analysis of the Scoping Plan is presented for the year 2020 only, not for 2035 or 2050. The Governor's Executive Order EO-S-3-05 sets a goal that Statewide GHG emissions be reduced to 80 percent below 1990 levels by 2050. It is anticipated that a number of business and industry sectors, including energy and water providers, will be involved in meeting these targets through aggressive conservation and through emission reductions associated with their operations. However, this PEIR is not able to identify reasonably foreseeable new demand rates or emission factors based on available information.

Residential and Commercial Buildings; GHG Emissions Associated with Construction and Energy Demand

By 2020, population within the region is expected to increase by approximately 1,137,000 people and housing by approximately 486,000 units. The expected increase in population by 2020 would lead to a need for additional housing units and commercial development (as well as other GHG sources such as industrial processes, ship activity in the region, agricultural activity as well as planes and trains).

AB 32 legislation requires that the State achieve 1990-level emissions by 2020, or an equivalent of 15 percent reductions from 2005 levels by 2020. Based on the above-described estimation of GHG emissions, SCAG residential and commercial construction and operational energy emissions were estimated to be 48.3 MMT CO_2e in 2005. A 15- percent reduction would require 2020 emissions to be 41.1 MMT CO_2e. Estimated emissions for the SCAG region (from construction and commercial and residential energy demand) are predicted to be 44.4 MMT CO_2e in 2020.

As further discussed below, the Plan encourages compact development. In particular the Plan emphasizes a mix of housing types that substantially increases the development of apartments, condominiums and townhomes, and small lot single-family, relative to large lot single-family. Because of this smaller overall development footprint, the Plan will have reduced per household emissions. However, without further

conservation and reduced emission factors (anticipated to result from implementation strategies included in the AB 32 Scoping Plan), the substantial overall growth in population and development may result in higher , total emissions(see **Table 3.2-3**).

Transportation Network Improvements

The 2012-2035 RTP/SCS focuses transportation network improvements on transit, systems management, and demand management, lowering the need to drive alone and making roadways more efficient in order to reduce GHG emissions. The Scoping Plan explicitly establishes the responsibility for regional transportation planning's share of emissions reductions needed to meet AB 32 goals by referencing the SB 375 GHG emissions reduction targets. As discussed in Impact 3.2-3 below, the Plan meets the SB 375 targets.

Nevertheless, SCAG estimates 83.6 MMT CO_2e in transportation-related GHG emissions (all sources not just light duty vehicles) in 2005. A 15-percent reduction would require 2020 emissions to be 71.1 MMT CO_2e. Calculated GHG emissions (using EMFAC2007 and the SCAG Transportation Demand Model) in 2020 would be 86.4 MMT CO_2e. This represents an increase over 2005 conditions. However, as discussed above, this analysis assumes that the strategies included in the AB 32 Scoping plan are not implemented (except for the strategies contained in the SCS). For example, pursuant to AB 32, state measures have been adopted that will lower the carbon intensity of fuels and increase the efficiency of passenger vehicles (Pavley). These State measures have not been accounted for in this analysis because the precise fuel and vehicle fleet associated with their full implementation is not known at this time. If all the strategies in the AB 32 Scoping Plan (including Pavely) are implemented, SCAG would expect the GHG emissions to meet the AB 32 target, including the transportation related emissions.

Total GHG Emissions from Commercial and Residential Construction and Energy Demand and Mobile Sources in the 2012/2035 RTP/SCS

As shown in **Table 3.6-4**, GHG emissions from commercial and residential energy use, building construction and mobile sources in 2020 are expected to be greater than the GHG emissions target set by AB 32. The total residential, commercial and transportation emissions expected under the Plan in 2020 would be 130.8 MMT CO_2e. According to AB 32, emissions in 2020 must be equal to 1990 levels, or 15 percent below 2005 levels. Based on the estimates presented above, this would require emissions to be no greater than 111.2 MMT CO_2e in 2020. The calculated emissions (based on demand and emission factors that do not take into account the implementation strategies in the AB 32 Scoping Plan except for strategies in the SCS) are greater than 111.2 MMT CO_2e. Therefore, implementation of the Plan (including all emissions factors) could still yield an overall increase in GHG emissions compared to 2005 levels if the AB 32 Scoping Plan is not fully implemented by all the required sectors. However, as mentioned above and discussed in more detail below, where SCAG has SB 375-related responsibilities, the Plan meets the SB 375 targets. Implementation of Mitigation Measures **MM-GHG1** through **MM-GHG12** would reduce the impact related to AB 32; however, impacts would remain potentially significant because of the lack of definition in how AB 32 targets will be achieved by all the applicable sectors of the economy.

TABLE 3.6-4: GREENHOUSE GAS AB 32 ANALYSIS BY COUNTY

Scenario	CO_2e Emissions (% change)
Plan vs. 2005 Baseline Change in Emissions (AB 32 Target is 15% below 2005 levels by 2020)	1%
No Project vs. 2005 Baseline Change in Emissions (AB 32 Target is 15% below 2005 levels by (2020)	3%

Note: The estimation of GHG emissions does not include the following sources: solid waste, waterborne navigations, trains, aviation, agricultural uses, ozone depleting substances commercially produced (e.g., hydrofluorocarbons), and industrial processes.
SOURCE: TAHA, 2011; SCAG Transportation Modeling, 2011; Calthorpe, 2011.

The Scoping Plan sets out emission reduction requirements by sector that would achieve the goals of AB 32 when fully implemented. As of this writing, many of the policies in the Scoping Plan have not been fully implemented and, therefore, are not quantified in the GHG estimates presented above. Also as noted above, the analysis presented here relies on gross assumptions for construction and residential and commercial land uses and average energy and water consumption factors to present a simplified programmatic analysis of land use emissions. In addition, the analysis does not include a number of sources of emissions including solid waste, waterborne navigations, trains, aviation, agricultural uses, ozone depleting substances commercially produced (e.g., hydrofluorocarbons), and industrial processes.

SGAG fulfills its direct responsibilities for the State's overall GHG reduction goals through the SCS. The SCS combines the transportation projects and strategies from the overall Plan with improved land use, development and other policies. The result of the SCS package of strategies is a more efficient pairing of land use and transportation that reduces trips, increases transit usage, and promotes non-motorized modes. As noted in below under Impact 3.6-3, the SCS meets the GHG reduction targets for both 2020 and exceeds the target for 2035 established by ARB.

Conclusion

As stated above, the Plan alone is not intended to meet the AB 32 target. By meeting the SB 375 targets, the Plan has successfully contributed its share of meeting the objectives of AB 32. However, given the unknowns associated with the other required sectors, such as the demand for water and energy, and the projected population growth in the region, estimated total emissions could result in a significant impact without assuming that the strategies in the AB 32 Scoping Plan are implemented.

Impact 3.6-3: Per capita CO_2 emissions from light duty trucks and autos would meet the ARB 8 percent less than 2005 in 2020 target and would achieve even greater emission reductions in 2035 as compared to the 13 percent less than 2035 target (the region would achieve 16 percent per capita emission reductions in 2035). Therefore, the Plan would result in a less-than-significant impact related to per capita emissions and SB 375.

As described in the Regulatory Framework above, SB 375 requires ARB to develop regional CO_2 emission reduction targets, compared to 2005 emissions, *for cars and light trucks only* for 2020 and 2035 for each of the State's MPOs. Each MPO is to prepare an SCS as part of the RTP in order to reduce CO_2 by better aligning transportation, land use, and housing. For SCAG, the targets are to reduce per capita emissions 8 percent below 2005 levels by 2020 and 13 percent below 2005 levels by 2035. Determining the per capita CO_2 emissions requires modeling VMT by passenger vehicles and light trucks that emit CO_2 and dividing that number by the total population. SCAG estimates the per capita 2005 emissions from cars and light-duty trucks as 23.9 pounds CO_2 per person per day.[20]

2020

CO_2 emissions reductions achieved through SCS land use strategies are incorporated into the analysis of the transportation network improvement emissions reductions. The Plan includes proposed transportation improvements and land use changes that would lead to reduced congestion and increased transit options. State measures will be in place that would augment the reductions achieved by the Plan through reduced carbon intensity of fuels and increased fuel efficiency in passenger vehicles. As shown in **Table 3.6-5**, per capita CO_2 emissions from cars and light trucks (only) are calculated to be 21.9 pounds per day in 2020.[21] The result of the Plan is an 8 percent decrease in per capita CO_2 emissions from 2020 to 2005. The percent decrease would achieve the 8 percent emissions reduction target for the region. Therefore, the Plan would result in a less-than-significant impact related to per capita emissions and SB 375.

[20]The per capita emissions estimation for existing conditions is based on a resident population of 17,164,041, which does not include group quarters such as prisons, long-term hospitals, and university dormitories.

[21]The per capita emissions estimation for 2020 is based on a resident population of 19,349,757.

2035

As shown in **Table 3.6-5**, per capita CO_2 emissions *from cars and light trucks only* would be 20.5 pounds per day in 2035.[22] The result of the Plan is a 16 percent decrease in per capita CO_2 emissions from 2035 to 2005. The percent decrease would more than satisfy the 13 percent SCAG emissions reduction target.

TABLE 3.6-5: SB 375 ANALYSIS

County	Baseline (2005)	Future No Project (2020)	Plan (2020)	Future No Project (2035)	Plan (2035)
Resident Population (per 1,000)	17,161	19,344	19,346	21,769	21,773
CO_2 Emissions (per 1,000 Tons)	204.7	220.6	211.4	249.2	222.9
Per Capita Emissions (Pounds)	23.9	22.8	21.9	22.9	20.5
Percent Difference from Plan (2020) to Baseline (2005)					(8)
Percent Difference from Plan (2035) to Baseline (2005)					(14%)
(Additional Reductions from 4D Model)					(2%)
Total Reductions					(16%)
Percent Difference from Future No Project (2020) to Baseline (2005)					(4%)
Percent Difference from Future No Project (2035) to Baseline (2005)					(4%)

/a/ Population estimates exclude the group quarter population (e.g., dorms, prisons, long term hospitals).
/b/ Emissions are from passenger vehicles and light-duty trucks from Regional Travel Demand Model and EMFAC2007.
/c/ For description of 4D Model, see SCAG NHTS Model Documentation Report
SOURCE: SCAG Transportation Modeling, 2011.

Summary

The Plan would meet ARB per capita emission targets (more than meet in 2035) set pursuant to SB 375; therefore, this impact would be less-than-significant.

MITIGATION MEASURES

The following SCAG mitigation measures would also reduce GHGs:

Air Quality: MM-AQ1 (TCMs).

Transportation: MM-TR3 (sustainability workshop); MM-TR15 (congestion pricing); MM-TR16 (land use and TDM); MM-TR17 (TDM, telework); MM-TR19 (TDM, rideshare); MM-TR20 (TDM, vanpool); MM-TR21 (Planning, transit).

Land Use: MM-LU3 (consistency of transportation projects and growth), MM-LU4 (work with cities on updating General Plans and encouraging consistency), MM-LU5 (implementation of RTP/SCS), MM-LU6 (local technical assistance), MM-LU7 (marketing of Compass Blueprint principles), MM-LU8 (project consistency with RTP and other regional planning efforts).

[22]The per capita emissions estimation for 2035 is based on a resident population of 21,778,469.

The following mitigation measures to be implemented by local jurisdictions, project sponsors and others would reduce GHG emissions:

Air Quality: MM-AQ2 (PM 2.5 and Ozone attainment, fuel and engine technology); MM-AQ13 (electric power for construction activities); MM-AQ14 (landscaping/xeriscaping); MM-AQ15 (commercial vehicle idling); MM-AQ19 (use of ARB land use handbook).

Transportation: MM-TR24 (ride share); MM-TR25 (car sharing); MM-TR28 (TDM); MM-TR30 (transit quality); MM-TR31 (active transportation); MM-TR32 (bicycle infrastructure); MM-TR35 (parking); MM-TR36 (transit stops); MM-TR37 (transit incentives); MM-TR38 (least polluting modes); MM-TR39 (bicycle lanes); MM-TR40 (active transportation amenities); MM-TR41 (active transportation); MM-TR42 (active transportation routes, open space); MM-TR43 (active transportation, schools); MM-TR44 (active transportation, schools); MM-TR45 (alternative modes); MM-TR46 (public education); MM-TR47 (zero emissions vehicles); MM-TR48 (light vehicles, NEVs); MM-TR49 (idling time); MM-TR50 (low emission vehicles); MM-TR51 (alternative fuels, transportation technologies); MM-TR52 (public transit, development standards); MM-TR53 (public transit prioritization); MM-TR54 (pedestrian access); MM-TR56 (interconnectivity); MM-TR57 (transit maintenance); MM-TR58 (transit customer service); MM-TR59 (transit funding); MM-TR60 (transit, impact fees); MM-TR61 (roadway management); MM-TR63 (arterial management); MM-TR65 (HOV); MM-TR67 (trip reduction programs); MM-TR68 (ride share programs); MM-TR69 (employer trip reduction); MM-TR70 (ride home program); MM-TR71 (local area shuttle); MM-TR72 (low cost shuttles); MM-TR73 (shuttle coordination); MM-TR74 (low travel employment); MM-TR75 (bicycle infrastructure); MM-TR76 (bicycle standards); MM-TR77 (bicycle facilities); MM-TR78 (bike/ped trails); MM-TR79 (bicycle safety programs); MM-TR80 (bicycle and pedestrian project funding); MM-TR81 (bicycle parking); MM-TR82 (private vehicle cost); MM-TR83 (parking policy); MM-TR84 (event parking); MM-TR85 (parking cash out); MM-TR86 (EV/alt fuel parking); MM-TR87 (EV/alt fuel promotion); MM-TR88 (EV infrastructure); MM-TR89 (idling); MM-TR90 (active transportation); MM-TR91 (GHG reduction workshops); MM-TR92 (fleet replacement); MM-TR93 (municipal travel); MM-TR94 (trip reduction programs); MM-TR95 (bicycle programs); MM-TR96 (municipal parking management); MM-TR97 (carbon offsets); MM-TR98 (municipal facilities transit access).

Land Use: MM-LU12 (access to community facilities); MM-LU13 (active transportation facilities); MM-LU16 (TDR); MM-LU17 (open space, trees); MM-LU25 (resource efficient development); MM-LU26 (infill); MM-LU27 (mixed use); MM-LU41 (prioritizing use of existing infrastructure); MM-LU42 (urban growth boundary); MM-LU43 (public facilities); MM-LU44 (public facilities); MM-LU45 (growth to existing urban areas); MM-LU46 (density); MM-LU47 (density, mixed use); MM-LU48 (density, transit); MM-LU49 (density, accessory units); MM-LU50 (roadway widths); MM-LU51 (parking requirements); MM-LU52 (bicycle facilities); MM-LU53 (infill, density, mixed-use); MM-LU54 (mixed use); MM-LU55 (mixed use); MM-LU56 (mixed use); MM-LU57 (complete communities); MM-LU58 (jobs/housing); MM-LU59 (local business); MM-LU60 (form based codes); MM-LU62 (smart growth); MM-LU63 (smart growth principles); MM-LU64 (smart growth benchmarks); MM-LU66 (public transit): MM-LU67 (bicycle facilities); MM-LU68 (TOD); MM-LU69 (land use/transit): MM-LU71 (corridors); MM-LU72 (design standards, mixed use); MM-LU73 (TOD, affordability); MM-LU74 (jobs/housing balance); MM-LU77 (active transportation); MM-LU78 (neighborhood character, walkability); MM-LU79 (accessibility); MM-LU80 (fee structures); MM-LU83 (fee structures); MM-LU82 (permitting incentives); MM-LU83 (incentive funding); MM-LU84 (infrastructure incentives); MM-LU85 (pavement reduction).

Mitigation Measures **MM-GHG1** through **MM-GHG8** and **MM-GHG14** through **MM-GHG17** shall be implemented by SCAG over the lifetime of the 2012-2035 RTP/SCS. In addition, Mitigation Measures **MM-GHG9** through **MM-GHG17** can and should be implemented by SCAG project sponsors (for both development and transportation projects) as applicable. Project specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions. Projects taking advantage of CEQA Streamlining provisions of SB 375 can and should apply mitigation measures as appropriate to site-specific conditions.

MM-GHG1: SCAG shall update any future Regional Transportation Plans/Sustainable Community Plans and Regional Comprehensive Plans to incorporate policies and measures that lead to reduced greenhouse gas (GHG) emissions. Such policies and measures may be derived from the General Plans, local jurisdictions' Climate Action Plans (CAPs), and other adopted policies and plans of its member agencies that include GHG mitigation and adaptation measures or other sources.

MM-GHG2: SCAG shall, through its on-going outreach and technical assistance programs, work with and encourage local governments to adopt policies and develop practices that lead to GHG emission reductions. These activities will include, but are not limited to, providing technical assistance and information sharing on developing local Climate Action Plans

MM-GHG3: SCAG shall work with the business community, including the Southern California Leadership Council and the Global Land Use and Environment Council, to develop regional economic strategies that promote energy savings and GHG emission reduction.

MM-GHG4: SCAG shall develop statewide strategies and approaches to reducing GHG emissions and implement SB 375 through its on-going coordination effort with other MPOs.

MM-GHG5: SCAG shall assist ARB and air districts in efforts to implement the AB 32 Scoping Plan.

MM-GHG6: SCAG shall develop a regional climate and economic development strategy that assesses the cost effectiveness of GHG reduction measures and prioritizes strategies that have greatest overall benefit to the economy.

MM-GHG7: SCAG, in its capacity as a Clean Cities Coalition, shall work with member local governments to promote the use of alternative fuel technology.

MM-GHG8: SCAG shall work with utilities, sub-regions, and other stakeholders to promote accelerated penetration of zero emission electric vehicles in the region, including developing a strategy for the deployment of public charging infrastructure

MM-GHG9: SCAG member cities and the county governments can and should adopt and implement Climate Actions Plans (CAPs, also known as Plans for the Reduction of Greenhouse Gas Emissions as described in CEQA Guidelines Section 15183.5 Tiering and Streamlining the Analysis of Greenhouse Gas Emissions) that contain the following information:

a) Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within their respective jurisdictions;
b) Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;
c) Identify and analyze the GHG emissions resulting for specific actions or categories of actions anticipated within their respective jurisdictions;

d) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
e) Establish a mechanism to monitor the plan's progress toward achieving that level and to require amendment if the plan is not achieving specified levels; and
f) Be adopted in a public process following environmental review.

CAPs can and should, when appropriate, incorporate planning and land use measures from the California Attorney General's latest list of example policies to address climate change at both the plan and project level. Specifically, at the plan level, land use plans can and should, when appropriate, incorporate planning and land use measures from the California Attorney General's latest list of example policies to address climate change (http://ag.ca.gov/globalwarming/pdf/GP_policies.pdf), including, but not limited to policies from that web page such as:

- Smart growth, jobs/housing balance, transit-oriented development, and infill development through land use designations, incentives and fees, zoning, and public-private partnerships
- Create transit, bicycle, and pedestrian connections through planning, funding, development requirements, incentives and regional cooperation, and create disincentives for auto use
- Energy and water-efficient buildings and landscaping through ordinances, development fees, incentives, project timing, prioritization, and other implementing tools

In addition, member cities and the county governments can and should incorporate, as appropriate, policies to encourage implementation of the Attorney General's list of project specific mitigation measures available at the following web site: http://ag.ca.gov/globalwarming/pdf/ GW_mitigation_measures.pdf, including, but not limited to measures from the web page, such as:

- Adopt a comprehensive parking policy that discourages private vehicle use and encourages the use of alternative transportation
- Build or fund a major transit stop within or near development
- Provide public transit incentives such as free or low-cost monthly transit passes to employees, or free ride areas to residents and customers
- Incorporate bicycle lanes, routes and facilities into street systems, new subdivisions, and large developments
- Require amenities for non-motorized transportation, such as secure and convenient bicycle parking.

They should also incorporate, when appropriate, planning and land use measures from additional resources listed by the California Attorney General at the following webpage: http://ag.ca.gov/globalwarming/ceqa/resources.php.

In addition, CAPs can and should also incorporate analysis of climate change adaptation, in recognition of the likely and potential effects of climate change in the future regardless of the level of mitigation and in conjunction with Executive Order S-13-08, which seeks to enhance the State's management of climate impacts including sea level rise, increased temperatures, shifting precipitation, and extreme weather events by facilitating the development of State's first climate adaptation strategy.

MM-GHG10: Project sponsors can and should require Best Available Control Technology (BACT) during construction and operation of projects, including:

a) Solicit bids that include use of energy and fuel-efficient fleets;
b) Solicit preference construction bids that use BACT;
c) Employ use of alternative fueled vehicles;
d) Use lighting systems that are energy efficient, such as LED technology;
e) Use CEQA Guidelines Appendix F, Energy Conservation, to create an energy conservation plan;
f) Streamline permitting process to infill, redevelopment, and energy-efficient projects;
g) Use an adopted emissions calculator to estimate construction-related emissions;
h) Use the minimum feasible amount of GHG-emitting construction materials that is feasible;
i) Use of cement blended with the maximum feasible amount of flash or other materials that reduce GHG emissions from cement production;
j) Use of lighter-colored pavement where feasible;
k) Recycle construction debris to maximum extent feasible; and
l) Plant shade trees in or near construction projects where feasible.

MM-GH11: SCAG shall in its capacity as a Clean Cities Coalition, and local jurisdictions can and should establish a coordinated, creative public outreach campaign, including publicizing the importance of reducing GHG emissions and steps community members can take to reduce their individual impacts.

MM-GHG12: Pedestrian and Bicycle Promotion: SCAG shall and local jurisdictions can and should work with local community groups and downtown business associations to organize and publicize walking tours and bicycle events, and to encourage pedestrian and bicycle modes of transportation.

MM-GHG13: Waste Reduction: Local jurisdictions can and should organize workshops on waste reduction activities for the home or business, such as backyard composting, or office paper recycling, and will schedule recycling drop-off events and neighborhood chipping/mulching days.

MM-GHG14: Water Conservation: SCAG shall and local jurisdictions can and should organize workshops on water conservation activities, such as selecting and planting drought tolerant, native plants in landscaping, and installing advanced irrigation systems.

MM-GHG15: Energy Efficiency: SCAG shall and local jurisdictions can and should organize workshops on steps to increase energy efficiency in the home or business, such as weatherizing the home or building envelope, installing smart lighting systems, and how to conduct a self-audit for energy use and efficiency.

MM-GHG16: Climate Protection Summit/Fair: SCAG shall and local jurisdictions can and should organize an annual Climate Protection Summit or Fair, to educate the public on current climate science, projected local impacts, and local efforts and opportunities to reduce GHG emissions, including exhibits of the latest technology and products for conservation and efficiency.

MM-GHG17: Schools Programs: SCAG shall and local jurisdictions can and should develop and implement a program to present information to school children about climate change and ways to reduce GHG emissions, and will support school-based programs for GHG reduction, such as school based trip reduction and the importance of recycling.

SIGNIFICANCE OF IMPACTS AFTER MITIGATION

Total GHG Emissions

Impacts related to total GHG emissions were determined to be significant even after mitigation as a result of a number of factors explained above. In addition the effectiveness of the mitigation measures identified above cannot be reasonably quantified at this time. Implementation of Mitigation Measures **MM-GHG1** through **MM-GHG17** would reduce GHG emissions through adoption of measures and policies that encourage GHG emissions reduction in regional plans, adoption of Climate Action Plans by member agencies, and using BACT during construction and operation of implemented projects.

AB 32 Analysis

Implementation of Mitigation Measures **MM-GHG1** through **MM-GHG17** would reduce GHG emissions through adoption of measures and policies that encourage GHG emissions reduction in regional plans, adoption of Climate Action Plans by member agencies, and using BACT during construction and operation of implemented projects.

The projected increase in GHG emissions from existing conditions to 2035 and beyond would primarily be due to changes in regional growth/land use. While the mitigation measures listed would encourage reduction in GHG emissions, they do not provide a mechanism that guarantees GHG emission reductions. Additional measures that were considered but found infeasible included the following:

- Requiring all vehicles driven within the SCAG region to be zero-emission vehicles (ZEVs) or requiring all vehicles driven within the region to be powered by renewable energy was found to be infeasible due to the rate of turnover of vehicles on the roadway and limited number of ZEVs available. ARB has estimated that 50 percent of passenger cars are retired from service in 16.09 years and 18.63 years for light-duty trucks. As of 2010, there were an estimated 26,905,700 vehicles in California, with only 1.7 million ZEVs or low-emission vehicles. Similarly, conversion of existing vehicles to renewable energy fuel sources would likely result in greater demand than supply of renewable energy fuels.

- Requiring all future construction be net-zero energy use. While renewable energy is available and a feasible option for obtaining a portion of a project's energy needs, it is infeasible for all projects to have net-zero emissions. For projects with consistent-energy requirements, such as hospitals or manufacturing centers, renewable energy may not fulfill operational standards. In addition, some energy-consuming services that are part of new projects may not be feasible to change to renewable sources at the project level. For example, water is transported from long distances and a project may not be able to affect the power source for water transport. Similarly, wastewater is generally treated at a central location and operated independently from a project. For each project to treat its own wastewater with renewable energy sources may cause other environmental impacts.

- Requiring all future construction activity to include only retrofitted equipment. Some construction equipment may be retrofitted to significantly reduce the GHG emissions associated with construction activities; however, not all equipment has retrofit components and is therefore technologically infeasible at this time.

Implementation of the Plan would result in an increase in GHG emissions as a result of the estimated mobile source emissions (other than light duty vehicles which would meet the applicable target – see SB 375 discussion) and construction and energy demand associated with residential and commercial buildings. Consequently, Impact 3.6-2 would remain a significant impact.

SB 375 Analysis

Impacts related to the SB 375 analysis were determined to be less than significant without mitigation.

COMPARISION WITH THE NO PROJECT ALTERNATIVE

Direct Impacts

The Plan focuses development in a compact pattern designed to increase the efficiency of the transportation system as well as the efficiencies of these land uses (as discussed above more dense development consumes less energy and less water per capita). Without changes to land use patterns, regional GHG emissions would increase and SCAG would not meet SB 375 CO_2 reduction goals. **Table 3.6-3** shows that total regional GHG emissions under the No Project Alternative would increase in 2020 and 2035 as compared to the Plan condition. **Table 3.6-4** shows that, as with the Plan the No Project Alternative would not meet the AB 32-related 15 percent reduction in GHG emissions from 2005 levels by 2020, however emissions under the No Project Alternative would be greater than under the Plan. **Table 3.6-4** shows that regional per capita GHG emissions would increase under the No Project Alternative. As a result, the No Project Alternative would not achieve the SB 375 emissions targets (as compared to the Plan which would meet the targets). **Based on this analysis, the Plan impacts would be less than the No Project Alternative impacts for Impacts 3.6-1 and 3.6-2.**

The Plan includes transportation and land use strategies that focus growth along existing corridors and in urbanized areas, rather than development of vacant, open space/recreation and agricultural lands. This compact development pattern included in the Plan would concentrate population in urban areas and encourage alternative modes of travel other than automobiles. As a result of this growth pattern, it is anticipated that the Plan would generate less regional VMT when compared to the No Project Alternative. In addition, various components of the Plan (e.g., increased density and energy efficiency measures) ensure that the Plan would use less energy and water than the No Project Alternative. When compared to the Plan, the No Project Alternative would result in more total GHG emissions and would push the region further from achieving the AB 32 reduction goals (Impacts 3.6-2). In addition, the No Project Alternative would reduce per capita car and light truck emissions by only approximately four percent in both 2020 and 2035 compared to 2005. This reduction would not meet ARB per capita emission targets of 8 percent in 2020 and 13 percent in 2035 (Impact 3.6-3). **The Plan impacts would be less than significant while the No Project Alternative impacts for GHG emissions would be significant.**

Cumulative Impacts

The Plan meets SB 375 targets for reducing greenhouse gas emissions and contributes to reductions in statewide emissions required under AB 32. The No Project Alternative would not achieve these targets or emission reductions. **As noted above, the Plan impacts would be less than significant while No Project Alternative impacts would be significant.**