

## 4.2 GREENHOUSE GAS EMISSIONS

This section provides an overview of existing greenhouse gas (GHG) emissions inventories and regulations and evaluates the construction and operational impacts associated with the proposed projects. Topics addressed include construction emissions and consistency with applicable GHG reduction plans and policies.

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<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), keep the average surface temperature of the Earth close to 60 degrees Fahrenheit (°F). Without the greenhouse effect, the Earth would have an average surface temperature of about 5°F.

In addition to CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, GHGs include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), and water vapor. Of all the GHGs, CO<sub>2</sub> is the most abundant pollutant that contributes to climate change through fossil fuel combustion. In 2002, CO<sub>2</sub> comprised 83.3 percent of the total GHG emissions in California.<sup>1</sup> The other GHGs are less abundant but have higher global warming potential than CO<sub>2</sub>. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO<sub>2</sub>, denoted as CO<sub>2</sub>e. The CO<sub>2</sub>e of CH<sub>4</sub> and N<sub>2</sub>O 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.<sup>2</sup> In addition, there are a number of human-caused emissions (e.g., carbon monoxide, nitrogen oxide, non-methane volatile organic compounds, and sulfur dioxide) that influence the formation or destruction of climate change pollutants.

### REGULATORY FRAMEWORK

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In response to growing scientific and political concern with global climate change, a series of federal and State laws have been adopted to reduce GHG emissions.

#### Federal

**Supreme Court Ruling.** The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that CO<sub>2</sub> and other GHGs are pollutants under the federal Clean Air Act (CAA), which the United States 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) the current and projected concentrations of the six key GHGs in the atmosphere (i.e., CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>) threatens the public health and welfare of current and future generations; and 2) the combined emissions of these GHGs from motor vehicle engines contribute to 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 GHG emissions as a result. First, this Act sets a Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022.<sup>3</sup> Second, this Act increases Corporate Average Fuel Economy

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<sup>1</sup>California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March 2006, p. 11.

<sup>2</sup>*Ibid.*

<sup>3</sup>According to the United States Energy Information Administration, 36 billion gallons of fuel represents approximately 26 percent of current gasoline consumption.

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

**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 GHG pollution.<sup>4</sup> This policy is expected to increase fuel economy by more than five 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.

## State

**California's Energy Efficiency Standards for Residential and Nonresidential Buildings.** Located in 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.<sup>5</sup> 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 Assembly Bill (AB) 32 and to pursue California energy policy that energy efficiency is the resource of first choice for meeting California's energy needs.

**Assembly Bill 1493 (Pavley I).** AB 1493 (referred to as Pavley I), adopted in 2002, required the California Air Resource Board (CARB) to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and the Low Emission Vehicle (LEV) III GHG will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016.

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.

**Senate Bill (SB) 1078, Senate Bill (SB) 107, and Executive Order (E.O.) S-14-08 (Renewables Portfolio Standard).** Signed on September 12, 2002, SB 1078 requires California to generate 20 percent of its electricity from renewable energy by 2017. SB 107, signed on September 26, 2006 changed the due date for this goal from 2017 to 2010, which was achieved by the State. On November 17, 2008, E.O. S-14-08, which established a Renewables Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent 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 GHG from the energy sector.

**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.

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<sup>4</sup>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/](http://www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/), accessed on February 14, 2012.

<sup>5</sup>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 on August 2011.

E.O. S-3-05 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.<sup>6</sup>

In response to the E.O. S-3-05, the Secretary of the Cal-EPA created the Climate Action Team (CAT). California’s CAT originated as a coordinating council and 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 original mandate for the CAT was to develop proposed measures to meet the emission reduction targets set forth in E.O. S-3-05. 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;
- 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.

**Senate Bill (SB) 1 and Senate Bill (SB) 1017 (Million Solar Roofs).** SB 1 and SB 1017 enacted in August 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 32 (AB 32).** In September 2006, the California Global Warming Solutions Act of 2006, also known as AB 32, was signed into law. AB 32 focuses on reducing GHG emissions in California, and

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<sup>6</sup>California Energy Commission, *California’s Energy Future – The View to 2050*, May 2011.

requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to Statewide levels in 1990 by 2020. The CARB has determined that the total Statewide aggregated GHG 1990 emissions level and 2020 emissions limit is 427 million metric tons of CO<sub>2</sub>e. The 2020 target reductions are currently estimated to be 174 million metric tons of CO<sub>2</sub>e.

To achieve the goal, AB 32 mandates that the CARB 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. 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 CARB with the responsibility to monitor and regulate sources of GHG emissions in order to reduce those emissions. On June 1, 2007, CARB 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.<sup>7</sup> On October 25, 2007, CARB 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 PFCs emissions from the semiconductor industry, reducing propellants in consumer products, promoting proper tire inflation in vehicles, and reducing SF<sub>6</sub> emissions from the non-electricity sector.

The CARB AB 32 Scoping Plan (Scoping Plan) contains the main strategies to achieve the 2020 emissions cap. The Scoping Plan was developed by the CARB 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, 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 the State, and pursuing policies and incentives to achieve those targets; and
- Adopting and implementing measures to reduce transportation sector emissions.

CARB has also developed the GHG mandatory reporting regulation, which required reporting beginning on January 1, 2008 pursuant to requirements of AB 32. The regulation requires reporting for major facilities that make up the bulk of the stationary source emissions in California (i.e., facilities that generate more than 25,000 metric tons of CO<sub>2</sub> 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<sub>2</sub> per year, make up 94 percent of the point source CO<sub>2</sub> emissions in California.

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<sup>7</sup>California Air Resources Board, *Proposed Early Action Measures to Mitigate Climate Change in California*, April 20, 2007.

**Senate Bill (SB) 1368.** SB 1368, adopted September 19, 2006, directs the California Energy Commission and the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future electricity used in California, regardless of whether it is generated in-state or purchased from other states.

**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 are CARB's responsibility. The Low Carbon Fuel Standard has been identified by CARB as a discrete early action item in the CARB Scoping Plan. CARB expects the Low Carbon Fuel Standard to achieve the minimum ten percent reduction goal; however, many of the early action items outlined in the 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 Scoping Plan has modified the aggregate reduction expected from the Low Carbon Fuel Standard to 9.1 percent.

**Assembly Bill (AB) 811.** AB 811, enacted July 21, 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.

**Senate Bill (SB) 375.** SB 375, adopted in September 30, 2008, provides a means for achieving AB 32 goals through the reduction in emissions by cars and light trucks. SB 375 requires Regional Transportation Plan (RTPs) prepared by metropolitan planning organizations (MPOs) 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 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."

**Executive Order (E.O.) S-13-08.** E.O. 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 Green Building Code.** The California Green Building Code, 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, CalGreen lays out minimum requirements for newly constructed buildings in California, which will reduce GHG 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. CalGreen is updated every three years.

**CEQA Guideline Amendments.** California SB 97, adopted on August 24, 2011, 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 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 CARB’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.

## EXISTING SETTING

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GHGs are the result of both natural and human-influenced activities. Forest fires, decomposition, industrial processes, landfills, consumption of fossil fuels for power generation, transportation, heating, and cooling are the primary sources of GHG 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 is a rise in the average global 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,<sup>8</sup> which would induce further changes in the global climate system during the current century. Adverse impacts from global climate change worldwide and in California include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in atmospheric water vapor due to the atmosphere’s ability to hold more water vapor at higher temperatures;<sup>9</sup>
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets;<sup>10</sup>

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<sup>8</sup>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).

<sup>9</sup>*Ibid.*

<sup>10</sup>Intergovernmental Panel on Climate Change, “Climate Change 2007.”

- 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;<sup>11</sup>
- Declining Sierra Mountains 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;<sup>12</sup>
- Increasing the number of days conducive to ozone formation (e.g., clear days with intense sun light) by 25 percent 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 21<sup>st</sup> Century;<sup>13</sup> and
- 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.<sup>14</sup>

Scientific understanding of the fundamental processes responsible for global climate change has improved over the past decade. 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 climate system, the uncertainty surrounding the implications of 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 15<sup>th</sup> largest emitter of GHG on the planet, representing about two percent of the worldwide emissions.<sup>15</sup> **Table 4.2-1** shows the California GHG emissions inventory for years 2000 to 2009. Statewide GHG emissions slightly decreased in 2009 due to a noticeable drop in on-road transportation, electricity generation, and industrial emissions.

<b>TABLE 4.2-1: CALIFORNIA GREENHOUSE GAS EMISSIONS INVENTORY</b>										
<b>Sector</b>	<b>CO<sub>2</sub>e Emissions (Million Metric Tons)</b>									
	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Transportation	172	175	181	179	183	186	187	187	178	173
Electric Power (In-State)	60	64	51	49	50	46	51	55	55	56
Electric Power (Imports)	46	59	59	65	66	63	55	60	66	48
Commercial and Residential	43	41	43	41	43	41	42	42	42	43
Industrial	97	93	94	92	94	93	92	90	87	81
Recycling and Waste	7	7	7	7	7	7	7	7	7	7
Agriculture	29	29	32	31	32	33	34	33	33	32
Forest Net Emissions	(4.5)	(4.3)	(4.2)	(4.2)	(4.2)	(4.0)	(3.9)	(3.9)	(3.8)	(3.8)
<b>Emissions Total</b>	<b>459</b>	<b>475</b>	<b>475</b>	<b>472</b>	<b>484</b>	<b>479</b>	<b>478</b>	<b>485</b>	<b>481</b>	<b>453</b>

**SOURCE:** CARB, *California Greenhouse Gas Inventory 2000-2009*, December 2011.

<sup>11</sup>Intergovernmental Panel on Climate Change, “Climate Change 2007.”  
<sup>12</sup>California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature*. 2006.  
<sup>13</sup>California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. 2006.  
<sup>14</sup>*Ibid.*  
<sup>15</sup>California Air Resource Board, *Climate Change Scoping Plan*, December 2008.

The transportation sector – largely the cars and trucks that move people and goods – is the largest contributor with 38 percent of the State’s total GHG emissions in 2009. On-road emissions (from passenger vehicles and heavy duty trucks) constitute 93 percent of the transportation sector total emissions. Of the on-road vehicles, light duty passenger vehicles accounted for approximately 74 percent of the total sector emissions in 2009 GHG emissions. Transportation emissions showed a decline from 187 million metric tons of CO<sub>2</sub>e in 2007 to 173 million metric tons of CO<sub>2</sub>e in 2009.

The electricity sector is the next largest contributor at approximately 23 percent of the Statewide GHG emissions. This sector includes power plants and cogeneration facilities that generate electricity for on-site use and for sale to the power grid. In 2009, this sector emitted approximately 105 million metric ton of CO<sub>2</sub>e. Emissions from imported electricity generation from specified imports, unspecified imports, and transmission and distribution accounts for 68, 31, and less than one percent, respectively. In-State electricity generation includes CHP commercial, CHP industrial, merchant owned, transmission and distribution, and utility owned.<sup>16</sup> The percent contributions from CHP commercial is approximately two, CHP industrial is approximately 30, merchant owned is approximately 57, transmission and distribution is approximately one, and utility owned is approximately 18. Emissions from natural gas accounts for 87 percent of in-State GHG emissions associated with electricity generation.

The industrial sector is the third largest contributor to the Statewide GHG emissions. California’s industrial sector includes industrial CHP useful heat, landfills, manufacturing, mining, oil and gas extraction, petroleum refining, petroleum marketing, pipelines, wastewater treatment, and other large industrial sources. Of these emitters, petroleum refining, manufacturing accounts for 32, oil extraction accounts for 25, gas extraction accounts for 15, CHP accounts for 12, and landfills accounts for 8 percent.

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 (e.g., PFCs, HFCs, and SF<sub>6</sub>) 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. These gases are used in growing industries such as semiconductor manufacturing.

The forest sector GHG inventory includes CO<sub>2</sub> uptake and greenhouse gas emissions from wild and prescribed fires, the decomposition and combustion of residues from harvest and conversion/development, and wood products decomposition. The forest sector is unique in that forests both emit GHGs and absorb CO<sub>2</sub> through carbon sequestration. While the current inventory shows forests absorb 3.8 million metric tons of CO<sub>2</sub>e, carbon sequestration has declined since 2000 due to losses of forest area and emission increases from decomposing wood products consumed in the State. 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. Opportunities to sequester CO<sub>2</sub> in the agricultural sector may also exist; however, additional research is needed to identify and quantify potential sequestration benefits.

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<sup>16</sup>A combined heat and power (CHP) system generates electricity and utilizes the waste heat for steam generation, heating or drying.



## THRESHOLDS OF SIGNIFICANCE

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In accordance with Appendix G of the State CEQA Guidelines, the proposed projects would have a significant impact related to GHG if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The SCAQMD has not approved a GHG significance threshold for the development of non-SCAQMD and non-industrial projects. The significance threshold is based on the methodologies recommended by the California Air Pollution Control Officers Association (CAPCOA) CEQA and Climate Change white paper (January 2008). CAPCOA conducted an analysis of various approaches and significance thresholds, ranging from a zero threshold (all projects are cumulatively considerable) to a high of 40,000 to 50,000 metric tons of CO<sub>2</sub>e per year. For example, an approach assuming a non-zero threshold and compliance with AB 32 2020 targets would require all discretionary projects to achieve a 16 percent reduction from projected “business-as-usual” emissions to be considered less than significant. A zero threshold approach could be considered on the basis that climate change is a global phenomenon, and not controlling small source emissions would potentially neglect a major portion of the GHG inventory.<sup>17</sup> However, the CEQA Guidelines also recognize that there may be a point where a project’s contribution, although above zero, would not be a considerable contribution to the cumulative impact (CEQA Guidelines Section 15130 [a]). Therefore, a threshold of greater than zero is considered more appropriate for the analysis of GHG emissions under CEQA.

Another method would use a quantitative threshold of greater than 900 metric tons CO<sub>2</sub>e per year based on a market capture approach that requires mitigation for greater than 90 percent of likely future discretionary development. This threshold would generally correspond to office projects of approximately 35,000 square feet, retail projects of approximately 11,000 square feet, or supermarket space of approximately 6,300 square feet. Another potential threshold would be the 10,000 metric tons standard used by the Market Advisory Committee for inclusion in a GHG Cap and Trade System in California. A 10,000 metric ton significance threshold would correspond to the GHG emissions of approximately 550 residential units, 400,000 square feet of office space, 120,000 square feet of retail, and 70,000 square feet of supermarket space. This threshold would capture roughly half of new residential or commercial development. The basic concepts for the various approaches suggested by CAPCOA are used herein to determine whether or not the proposed project’s GHG emissions are “cumulatively considerable.”

CAPCOA’s suggested quantitative thresholds are generally more applicable to development on sites at the periphery of metropolitan areas, also known as “greenfield” sites, where there would be an increase in vehicle miles traveled (VMT) and associated GHG emissions than to infill development, which would generally reduce regional VMT and associated emissions. As the City of Los Angeles is generally built out, most commercial development within the City is infill or redevelopment and would be expected to generally reduce VMT and reliance on the drive-alone automobile use as compared to further suburban growth at the periphery of the region. A reduction in vehicle use and vehicle miles traveled can result in a reduction in fuel consumption and in air pollutant emissions, including GHG emissions. Recent research indicates that infill development reduces VMT and associated air pollutant emissions, as compared to greenfield sites. For example, a 1999 simulation study conducted for the USEPA, comparing infill development to greenfield development, found that infill development results in substantially fewer VMT per capita (infill development

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<sup>17</sup>California Air Pollution Control Officers Association, *CEQA & Climate Change*, January 2008.

generates 48 percent less VMT than greenfield development) and generates fewer emissions of most air pollutants and GHGs.<sup>18</sup>

For this reason, the most conservative (i.e., lowest) thresholds, suggested by CAPCOA, would not be appropriate for the proposed projects given that it is located in a community that is highly urbanized. Similarly, the 900-ton threshold was also determined to be too conservative for general development in the South Coast Air Basin. Consequently, the threshold of 10,000 metric tons CO<sub>2</sub>e is used as a quantitative benchmark for significance.

## IMPACTS

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### **CONSTRUCTION**

The GHG analysis considered only project emissions associated with construction activity because the proposed projects would not include operational activities upon completion of roadway striping. Construction activity would generate GHG emissions from equipment exhaust and on-road mobile vehicle operations. Construction emissions were estimated using a spreadsheet methodology based on the equipment type and hours and worker commute trips. Equipment engine emissions were estimated using OFFROAD2007 and commute trip emissions were estimated using EMFAC2011. The proposed projects would generate approximately 82 metric tons of CO<sub>2</sub>e. The SCAQMD recommends that construction be amortized over the life of the project (defined as 30 years). Hence, the GHG amortized construction emission is approximately three metric tons of CO<sub>2</sub>e per year. Estimated GHG emissions would be less than the 10,000 metric tons of CO<sub>2</sub>e per year quantitative significance threshold. Construction activity is a short-term source of GHG emissions and GHG emissions are a long-term climate change concern. Therefore, the proposed projects would result in a less-than-significant impact related to construction GHG emissions.

### **OPERATIONS**

#### **Greenhouse Gas Emissions**

The proposed projects are intended to promote bicycle as a viable alternative to private automobile. Bicycle travel is an environmentally sustainable means of transportation - there are no tailpipe emissions, no evaporative emissions, no emissions from gasoline pumping or oil refining, and zero CO<sub>2</sub> or other GHGs that contribute to global warming. The outcome of having fewer private automobile travelers would be beneficial for reducing GHG emissions. Therefore, the proposed projects would result in a less-than-significant impact related operational GHG emissions.

#### **Applicable Plans, Policies, and Regulations**

The proposed projects' consistency with GHG reduction plans, policies, and regulations was assessed by examining the SCAG 2012-2035 RTP/SCS and SB 375. The proposed projects are consistent with the Constrained Plan included in the SCAG 2012-2035 RTP/SCS, which proposes to develop over 7,000 miles of bikeways through a three-tiered strategic bikeway system (i.e., Regional Bikeway Network, Citywide Bikeway, and Neighborhood Bikeway). The proposed projects are consistent with the Citywide Bikeway, which link neighborhood bikeways and major city destinations, such as employment, retail and entertainment centers. The proposed projects are also consistent with the Complete Street Act of 2008 (AB 1358) included in the 2012-2035 RTP/SCS, which encourages local jurisdiction to adopt and implement the proposed SCAG

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<sup>18</sup>United States Environmental Protection Act, Urban and Economic Development Division, *The Transportation and Environmental Impacts of Infill Versus Greenfield Development: A Comparative Case Study Analysis*, October 1, 1999.

Regional Bikeway Network. AB 1358 also supports local jurisdiction to connect all of the cities within the SCAG region via bicycle facilities.

As previously mentioned, the proposed projects would reduce GHG emissions; hence, the proposed projects would be consistent with SB 375 goal to reduce GHG emissions from passenger vehicles by 8 percent per capita by 2020 and 13 percent per capita by 2035 compared to 2005.

Therefore, the proposed projects would result in less-than-significant impacts related to applicable plans, policies, and regulations for reducing GHG emissions.

## MITIGATION MEASURES

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### ***CONSTRUCTION***

Construction impacts related to GHG emissions and applicable plans, policies, and regulations would be less than significant. No mitigation measures are required.

### ***OPERATIONS***

Operational impacts related to GHG emissions and applicable plans, policies, and regulations would be less than significant. No mitigation measures are required.

## SIGNIFICANCE OF IMPACTS AFTER MITIGATION

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### ***CONSTRUCTION***

Construction impacts related to GHG emissions and applicable plans, policies, and regulations were determined to be less than significant without mitigation.

### ***OPERATIONS***

Operational impacts related to GHG emissions and applicable plans, policies, and regulations were determined to be less than significant without mitigation.

## CUMULATIVE IMPACTS

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Under the proposed projects, bicycle lanes would be installed in existing City of Los Angeles right-of-ways. Because project-related GHG emissions are only important in the context of cumulative emissions, the focus of the GHG analysis is on answering the question of whether incremental contributions of GHGs are a cumulatively considerable contribution to global warming effects. As previously discussed, the proposed projects would not result in significant GHG impacts during construction. Instead, the consequences of implementation of the proposed projects is a reduction in GHG emissions. The proposed projects would be consistent with adopted plans and policies. Therefore, the proposed projects would not contribute to a cumulative impact related to GHG emissions.