3.6 GREENHOUSE GAS EMISSIONS

INTRODUCTION

This section provides an assessment of the potential for greenhouse gas (GHG) impacts from construction and operation of the proposed project. It describes the existing global, national, and statewide conditions for GHGs and global climate change and provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions. The impacts associated with the proposed project are compared with the proposed draft thresholds of significance put forth by the South Coast Air Quality Management District (SCAQMD). The assessment indicates that construction and operation of the proposed project would generate emissions that would be below the SCAQMD draft thresholds of significance. The proposed project would also not conflict with implementation of plans adopted for the purpose of reducing GHG emissions. The proposed project would have a less than significant impact on global climate. Emission calculations for the proposed project are provided in **Appendix 3.2**.

ENVIRONMENTAL SETTING

Background

The natural process through which heat is retained in the troposphere[1] is called the greenhouse effect. The greenhouse effect traps heat in the troposphere through a three-fold process: (1) short-wave radiation in the form of visible light emitted by the Sun is absorbed by the Earth as heat; (2) long-wave radiation re-emitted by the Earth; and (3) greenhouse gases (GHGs) in the atmosphere absorbing or trapping the long-wave radiation and re-emitting it back towards the Earth and into space. Human activities that affect this third process is the focus of current climate change actions.

While water vapor and carbon dioxide (CO_2) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. Scientists have established a Global Warming Potential (GWP) to gauge the potency of each GHG's ability to absorb and re-emit long-wave radiation. The GWP of a gas is determined using CO_2 as the reference gas with a GWP of 1 over 100 years. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The sum of each

1 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

GHG multiplied by its associated GWP is referred to as carbon dioxide equivalents (CO_2e). State law defines GHGs to include the following compounds:[2]

- **Carbon Dioxide (CO_2).** CO_2 is primarily generated from fossil fuel combustion from stationary and mobile sources. CO_2 is the reference gas (GWP of 1) for determining the GWPs of other GHGs.
- **Methane (CH_4).** CH_4 is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The GWP of methane is 21.
- **Nitrous Oxide (N_2O).** N_2O produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.
- **Hydrofluorocarbons (HFCs).** HFCs are typically used as refrigerants in both stationary refrigeration and mobile air conditioning. The GWPs of HFCs ranges from 140 for HFC-152a to 11,700 for HFC-23.
- **Perfluorocarbons (PFCs).** PFCs are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. The GWPs of PFCs range from 5,700 to 11,900.
- **Sulfur Hexafluoride (SF_6)**. SF_6 is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride has a GWP of 23,900. It is not prevalent in the atmosphere (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm] of CO_2).[3]

The primary GHGs of concern relative to the proposed project are CO_2, CH_4, and N_2O. These three GHGs are generally emitted from combustion activities. HFCs are associated with refrigeration and air conditioning and are accounted for in this analysis with respect to motor vehicle air conditioning system leakage. The other GHGs listed above are related to specific industrial uses and are not anticipated to be emitted in measurable or substantial quantities by the proposed project.

State of California Greenhouse Gas Emissions Inventory

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 20012 GHG inventory data (i.e., the latest year for which data are available), California emitted 459 million metric tons of CO_2e ($MMTCO_2e$) including emissions resulting from imported electrical power in 2012.[4] Based on the CARB inventory data, California's total statewide GHG emissions rank

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2 All Global Warming Potentials are given as 100-year values. Unless noted otherwise, all Global Warming Potentials were obtained from the Intergovernmental Panel on Climate Change. *Climate Change 1995: The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge (UK): Cambridge University Press, 1996.

3 US Environmental Protection Agency, "High GWP Gases and Climate Change," http://www.epa.gov/highgwp/scientific.html#sf6. n.d.

4 California Air Resources Board, "California Greenhouse Gas 2000-2012 Inventory by Scoping Plan Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2014.

second in the United States (Texas is number one) with emissions of 439 $MMTCO_2e$ excluding emissions related to imported power.[5]

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, manufacturing, agriculture and forestry, and other sources, which include commercial and residential activities. **Table 3.6-1, GHG Emissions in California**, provides a summary of GHG emissions reported in California in 1990 and 2012 separated by categories defined by the United Nations Intergovernmental Panel on Climate Change (IPCC).

Table 3.6-1
GHG Emissions in California

Source Category	1990 ($MMTCO_2e$)	Percent of Total	2012 ($MMTCO_2e$)	Percent of Total
ENERGY	**386.41**	**89.2%**	**381.68**	**83.2%**
Energy Industries	157.33	36.3%	144.72	31.6%
Manufacturing Industries and Construction	24.24	5.6%	19.89	4.3%
Transport	150.02	34.6%	166.56	36.3%
Other (Residential/Commercial/Institutional)	48.19	11.1%	45.25	9.9%
Fugitive Emissions from Fuels	2.31	0.5%	5.26	1.1%
INDUSTRIAL PROCESSES AND PRODUCT USE	**18.34**	**4.2%**	**31.95**	**7.0%**
Mineral Industry	4.85	1.1%	4.69	1.0%
Chemical Industry	2.34	0.5%	0.05	0.0%
Non-Energy Products from Fuels & Solvent Use	2.29	0.5%	1.64	0.4%
Electronics Industry	0.59	0.1%	0.45	0.1%
Substitutes for Ozone Depleting Substances	0.04	0.0%	17.73	3.9%
Other Product Manufacture and Use	3.18	0.7%	0.85	0.2%
Other	5.05	1.2%	6.54	1.4%
AGRICULTURE, FORESTRY, AND OTHER LAND USE	**19.11**	**4.2%**	**34.14**	**7.4%**
Livestock	11.67	2.7%	16.28	3.5%
Aggregate Sources and Non-CO_2 Sources on Land	7.26	1.7%	7.95	1.7%
WASTE	**9.42**	**2.2%**	**9.41**	**2.1%**
Solid Waste Disposal	6.26	1.4%	6.71	1.5%
Wastewater Treatment and Discharge	3.17	0.7%	2.70	0.6%
TOTAL CALIFORNIA EMISSIONS	**433.29**		**458.68**	

Sources:
[1] *California Air Resources Board, "California Greenhouse Gas 1990-2004 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/archive/archive.htm. 2014.*
[2] *California Air Resources Board, "California Greenhouse Gas 2000-2012 Inventory by IPCC Category - Summary," http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_sum_2014-03-24.pdf. 2014.*

5 California Air Resources Board, "California Greenhouse Gas 2000-2012 Inventory by Scoping Plan Category - Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. 2014.

Between 1990 and 2010, the population of California grew by approximately 7.5 million (from 29.8 to 37.3 million).[6] This represents an increase of approximately 25 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $773 billion in 1990 to $1.85 trillion in 2009 representing an increase of approximately 139 percent (over twice the 1990 gross state product).[7] Despite the population and economic growth, California's net GHG emissions only grew by approximately 6 percent.

Effects of Global Climate Change

The overall effect of global climate change has been a rise in the average global (land and ocean surface combined) temperature of 0.85 degree Celsius (°C) between 1880 and 2012.[8] Climate change modeling shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century.[9] Changes to the global climate system and ecosystems and to California could include:

- 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;[10]

- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (model-based projections of global average sea level rise at the end of the 21st century (2090–2099) range from 0.26 meter to 0.98 meter or 0.85 foot to 3.21 feet);[11]

- 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;[12]

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6 US Census Bureau, http://www.census.gov/prod/www/decennial.html /. 2009; California Department of Finance, "E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark," http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/. 2010.

7 California Department of Finance, "Financial & Economic Data: Gross Domestic Product, California," http://www.dof.ca.gov/HTML/FS_DATA/LatestEconData/FS_Misc.htm. 2012. Amounts are based on current dollars as of the data of the report (July 2011).

8 Intergovernmental Panel on Climate Change, "Climate Change 2013: The Physical Science Basis, Summary for Policymakers,"

9 IPCC, "Climate Change 2013: The Physical Science Basis, Summary for Policymakers," 2013.

10 IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

11 IPCC, "Climate Change 2013: The Physical Science Basis, Summary for Policymakers," (2013).

12 IPCC, "Climate Change 2007: The Physical Science Basis, Summary for Policymakers," (2007).

- Sierra snowpack levels declining a further 25 to 40 percent from their mid-20th century average by 2050;[13]
- 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;[14]
- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level;[15]
- Increasing pest infestation making California more susceptible to forest fires;[16]
- Increasing the demand for electricity due to rising temperatures, coupled with an accompanying loss of transmission efficiency and hydropower generation capacity;[17] and
- Warming projections of 2 to 5 °F by 2050 and 4 to 9 °F by 2100.

In 2009, the California Natural Resources Agency (CNRA) published the *California Climate Adaptation Strategy*[18] as a response to the Governor's Executive Order S-13-2008. The CNRA report lists specific recommendations for state and local agencies to best adapt to the anticipated risks posed by a changing climate. In accordance with the *California Climate Adaptation Strategy*, the California Energy Commission (CEC) was directed to develop a website on climate change scenarios and impacts that would beneficial for local decision makers.[19] The website, known as Cal-Adapt, became operational in 2011.[20] According to the Cal-Adapt website, the project region could result in an average increase in temperature of approximately 5 to 10 percent (about 3.5 to 6.1 degrees Fahrenheit [°F]) by 2070–2090, compared to the baseline 1961-1990 period. According to the Cal-Adapt website, these numbers represent a projection of potential future climate scenarios. The data are comprised of the average values from a variety of scenarios and models and is meant to illustrate how the climate may change based on a variety of different potential social and economic factors.

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13 California Environmental Protection Agency, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, (2006).

14 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

15 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

16 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

17 California EPA, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger*, (2006).

18 California Natural Resources Agency, Climate Action Team, *2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008*, (2009).

19 California Natural Resources Agency, *2009 California Climate Adaptation Strategy*, (2009). 9

20 The Cal-Adapt website address is: http://cal-adapt.org.

REGULATORY FRAMEWORK

Federal

The US Environmental Protection Agency (EPA) adopted a mandatory GHG reporting rule in September 2009. The rule would require suppliers of fossil fuels or entities that emit industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to the US EPA beginning in 2011 (covering the 2010 calendar year emission). Vehicle and engine manufacturers began reporting GHG emissions for model year 2011.

On September 15, 2009, the US EPA and the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards would be phased in and would require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks would have to meet an average emissions standard of 295 grams of CO_2 per mile and 30.1 miles per gallon.[21] By 2016, the vehicles would have to meet an average standard of 250 grams of CO_2 per mile and 35.5 miles per gallon.[22] The final standards were adopted by the US EPA and DOT on April 1, 2010.

On December 7, 2009, the US EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

While these findings do not impose additional requirements on industry or other entities, this action is a prerequisite to finalizing the US EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the US EPA and the NHTSA. On April 1, 2010, the US EPA and NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average

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21 US Environmental Protection Agency, "EPA and NHTSA Propose Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," http://epa.gov/otaq/climate /regulations/420f09047a.htm. 2009.

22 US EPA, "EPA and NHTSA Propose Historic Nation Program," 2009.

vehicle emission level of 250 grams CO_2 per mile, which is equivalent to 35.5 miles per gallon as measured by US EPA standards. These agencies are currently in the process of developing more stringent vehicle emissions standards for the 2017-2025 model years. The proposed standard would reduce emissions from all passenger cars, light-duty trucks, and medium-duty passenger vehicles (including SUVs) to an average of 163 grams CO_2 per mile for model year 2025, which is equivalent to 54.5 miles per gallon if the standard were met solely through fuel economy improvements.[23]

State

Title 24

The CEC first adopted the Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions; increased energy efficiency and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods. The latest revisions were adopted in 2013 and became effective on July 1, 2014.

Part 11 of the Title 24 Building Standards Code is referred to as the California Green Building Standards Code (CALGreen Code). The purpose of the CALGreen Code is to:

> *improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: 1) Planning and design; 2) Energy efficiency; 3) Water efficiency and conservation; 4) Material conservation and resource efficiency; and 5) Environmental air quality.*[24]

The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). The CBSC has released the *2013 Green Building Standards Code* on its website.[25] The update to Part 11 of the Title 24 Building Standards Code became effective on January 1, 2014. The updates include clarifications and improvements to the CALGreen Code

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23 US Environmental Protection Agency, "EPA and NHTSA Propose to Extend the National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," http://www.epa.gov/oms/climate/regulations.htm. 2011.

24 California Building Standards Commission, 2008 California Green Building Standards Code, (2009) 3.

25 California Building Standards Commission, "CALGreen," http://www.bsc.ca.gov/CALGreen/default.htm. 2010.

requirements. Unless otherwise noted in the regulation, all newly constructed buildings in California are subject to the requirements of the CALGreen Code.

Assembly Bill 1493

In response to the transportation sector's contribution of more than half of California's CO_2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles whose primary use is noncommercial personal transportation. CARB adopted the standards in September 2004. The new standards would phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22 percent in greenhouse gas emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30 percent.

Before these regulations could go into effect, the US EPA had to grant California a waiver under the federal Clean Air Act (CAA), which ordinarily preempts state regulation of motor vehicle emission standards. On June 30, 2009, the US EPA formally approved California's waiver request. As previously discussed, in the September 2009, the US EPA and the NHTSA issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. These standards were formally adopted by the US EPA and DOT on April 1, 2010. In light of the federal US EPA and NHTSA standards, California—and states adopting California emissions standards—agreed to defer to the national standard through model year 2016. The 2016 endpoint of the two standards is similar, although the national standard ramps up slightly more slowly than what was required under the California standard. The Pavley standards require additional reductions in CO_2 emissions beyond 2016 (referred to as Phase II standards). The Phase II standards are currently in development for the 2017-2025 model years. As was done with the Phase I standards, the US EPA and NHTSA have proposed a national standard that all passenger cars, light-duty trucks, and medium-duty passenger vehicles (including SUVs) achieve an average of 163 grams CO_2 per mile for model year 2025, which is equivalent to 54.5 miles per gallon if the standard were met solely through fuel economy improvements.[26]

[26] US Environmental Protection Agency, "EPA and NHTSA Propose to Extend the National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks," http://www.epa.gov/oms/climate/regulations.htm. 2011.

Executive Order S-3-05 and the Climate Action Team

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Secretary of California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various agencies in order to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the Secretary of the Business, Transportation and Housing Agency, the Secretary of the Department of Food and Agriculture, the Secretary of the Resources Agency, the Chairperson of CARB, the Chairperson of the CEC, and the President of the Public Utilities Commission. Representatives from these agencies comprise the Climate Action Team.

Renewables Portfolio Standard

In 2002, Senate Bill 1078 (SB 1078, Sher) established California's Renewables Portfolio Standard (RPS) which requires investor-owned utilities, such as Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric, to increase energy production from renewable sources 1 percent per year up to a minimum of 20 percent of total energy generation by 2017. SB 107 (Simitian), signed by the Governor on September 26, 2008, accelerated the Renewable Portfolio Standard by requiring investor-owned utilities to meet the 20 percent target by 2010.

On September 15, 2009, the Governor issued Executive Order S-21-0911 requiring CARB, under its AB 32 authority, to adopt regulations to meet a 33 percent RPS target by 2020. The CARB regulations would use a phased-in or tiered requirement to increase the amount of electricity from eligible renewable sources over an eight-year period beginning in 2012. CARB adopted the regulation in September 2010.

In March 2011, the Legislature passed SB X1-2, which was signed into law by the Governor. SB X1-2 requires utilities to procure renewable energy products equal to 33 percent of retail sales by December 31, 2020 and also established interim targets: 20 percent by December 31, 2013 and 25 percent by December 31, 2016. SB X1-2 also includes publicly owned utilities in California. According to the California Public Utilities Commission (CPUC), California's three large investor-owned utilities (IOUs) collectively served 19.6 percent of their 2012 retail electricity sales with renewable power, with Southern California Edison achieving 19.9 percent.[27]

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27 California Public Utilities Commission, "California Renewables Portfolio Standard (RPS)," http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm. 2014.

Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the Legislature enacted Assembly Bill 32 (AB 32, Nuñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. AB 32 requires the State to undertake several actions – the major requirements are discussed below:

State of California 1990 Greenhouse Gas Inventory and 2020 Limit

As required under AB 32, on December 6, 2007, CARB approved the 1990 greenhouse gas emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 $MMTCO_2e$. The inventory revealed that in 1990 transportation, with 35 percent of the state's total emissions, was the largest single sector generating carbon dioxide, followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; commercial uses, 3 percent; and forestry emissions (excluding sinks) less than 1 percent. These figures represent the 1990 values. AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 threshold by 2020.

AB 32 Climate Change Scoping Plan

As indicated above, AB 32 requires CARB to adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. CARB released the *Climate Change Scoping Plan* in October 2008, which contained an outline of the proposed State strategies to achieve the 2020 GHG emission limits. The CARB Governing Board approved the *Climate Change Scoping Plan* on December 11, 2008, and a supplement was approved in 2011. The *Climate Change Scoping Plan* indicates how emissions reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions. The *Climate Change Scoping Plan* identifies 18 recommended strategies the state should implement to achieve AB 32. CARB has identified a number of ongoing programs and has adopted regulations for individual measures to reduce GHG emissions in accordance with the *Climate Change Scoping Plan* strategies. Key elements of the *Climate Change Scoping Plan* include the following:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix 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 greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

Under the *Climate Change Scoping Plan*, approximately 85 percent of the state's emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. The emissions cap incorporates a margin of safety whereby the 2020 emissions limit will still be achieved even in the event that uncapped sectors do not fully meet their anticipated emission reductions. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations.

An update to the Scoping Plan is currently under way, with a Draft First Proposed Update released February 10, 2014. The update contains information on progress towards goals to date, defines goals for the next five years, and provides recommendations for meeting both the short-term goals of AB 32 and the long-term goals of S-3-05. New strategies are also proposed, including a recommendation for an intermediate reduction target to be adopted for 2035. The update indicates that California is on track to achieve the reduction target set for 2020, due largely to programs and regulations recently adopted. However, the Cap and Trade program provides a hard cap on emissions that can be adjusted based on projected emissions in order to assure reaching the emissions limit for 2020.

Executive Order S-1-07 (Low Carbon Fuel Standard)

On January 18, 2007, California set a new Low Carbon Fuel Standard (LCFS) for transportation fuels sold within the state. Executive Order S-1-07 sets a declining standard for GHG emissions measured in CO_2-equivalent grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The LCFS will apply to refiners, blenders, producers, and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods. CARB identified the LCSF as an early action item under AB 32 and the final rule became effective January 12, 2010.

Senate Bill 375

SB 375 requires CARB, working in consultation with the metropolitan planning organizations (MPOs), to set regional greenhouse gas reduction targets for the automobile and light truck sector for 2020 and 2035. The target must then be incorporated within that region's Regional Transportation Plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy (SCS). Certain transportation planning and programming activities would then need to be consistent with the SCS; however, SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plan) are not required to be consistent with either the RTP or SCS.

CARB staff proposed draft per capita reduction targets for the four largest MPOs (Bay Area, Sacramento, Southern California, and San Diego) of 7 to 8 percent for 2020 and reduction targets between 13 to 16 percent for 2035. For the Southern California Association of Governments (SCAG), which is the metropolitan planning organization (MPO) for the region in which the proposed project is located, CARB established a draft target of 8 percent for 2020 and 13 percent for 2035.[28] Of note, the proposed reduction targets explicitly exclude emission reductions expected from the AB 1493 and the low carbon fuel standard regulations. CARB adopted the final targets (the same targets as the proposed draft targets) on September 23, 2010.

In April 2012, SCAG adopted the 2012-2035 RTP/SCS. The RTP/SCS demonstrates GHG reductions that exceed the targets set by CARB by achieving a 9 percent reduction by 2020 and 16 percent reduction by 2035 compared to the 2005 level on a per capita basis. This RTP/SCS also meets criteria pollutant emission budgets set by the US EPA. The reduction in emissions are largely achieved by more sustainable planning, integrating transportation and land use decisions to allow Southern Californians to live closer to where they work and play, and to high-quality transit service.

Local

South Coast Air Quality Management District

In April 2008, the SCAQMD, in order to provide guidance to local lead agencies on determining the significance of GHG emissions identified in California Environmental Quality Act (CEQA) documents, convened a GHG CEQA Significance Threshold Working Group.[29] The goal of the working group is to

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28 California Air Resources Board (CARB), *Staff Report: Proposed Regional Greenhouse Gas Emission Reduction Targets For Automobiles And Light Trucks Pursuant To Senate Bill 375*, (2010).

29 For more information see: http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html.

develop and reach consensus on an acceptable CEQA significance thresholds for GHG emissions that may be utilized on an interim basis until CARB (or some other state agency) develops guidance on assessing the significance of GHG emissions under CEQA.

Initially, SCAQMD staff presented the working group with a significance threshold that could be applied to various types of projects – residential, non-residential, industrial, etc.; however, the threshold is still under development. In December 2008, staff presented the SCAQMD Governing Board with a Draft Guidance Document that included a significance threshold for stationary source projects where it is the lead agency, which the SCAQMD adopted. This threshold uses a tiered approach to determine a project's significance, with 10,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) as a screening numerical threshold. The guidance document also includes a proposal for a single threshold for residential and commercial projects of 3,000 $MTCO_2e$, which was not adopted at the time.

At present time, the SCAQMD has still not adopted thresholds for residential or commercial projects such as the one analyzed in this study. As proposed in 2008, the SCAQMD is considering a tiered approach to determine the significance of residential and commercial projects. However, the most recent draft approach (provided in materials used for a presentation to the Working Group in 2010) is as follows:

- Tier 1: Is the project exempt from further analysis under existing statutory or categorical exemptions? If yes, there is a presumption of less than significant impacts with respect to climate change.

- Tier 2: Is the project's GHG emissions within the GHG budgets in an approved regional plan? (The plan must be consistent with *State CEQA Guidelines* §§15064(h)(3), 15125(d), or 15152(s).) If yes, there is a presumption of less than significant impacts with respect to climate change.

- Tier 3: Is the project's incremental increase in GHG emissions below or mitigated to less than the significance screening level? If yes, there is a presumption of less than significant impacts with respect to climate change.

- Tier 4: Does the project meet one of the following performance standards? If yes, there is a presumption of less than significant impacts with respect to climate change.

  - Option #1: Achieve some percentage reduction in GHG emissions from a base case scenario, including land use sector reductions from AB 32 (e.g., 29 percent reduction as recommended by the San Joaquin Valley Air Pollution Control District).

  - Option #2: For individual projects, achieve a project-level efficiency target of 4.8 $MTCO_2e$ per service population by 2020 or a target of 3.0 $MTCO_2e$ per service population by 2035. For plans, achieve a plan-level efficiency target of 6.6 MTCO2e per service population by 2020 or a target of 4.1 $MTCO_2e$ per service population by 2035.

- Tier 5: Projects should obtain GHG emission offsets to reduce significant impacts. Offsets in combination with any mitigation measures should achieve the target thresholds for any of the above Tiers. Otherwise, project impacts would remain significant.

For Tier 3, above, the SCAQMD proposes that lead agencies choose between two options: Option #1 provides screening levels of 3,500 $MTCO_2e$ for residential projects, 1,400 $MTCO_2e$ for commercial projects and 3,000 $MTCO_2e$ for mixed-use; whereas Option #2 is a single threshold of 3,000 $MTCO_2e$ for all land use types. The SCAQMD has not announced when staff is expecting to present a finalized version of these thresholds to the Governing Board. The SCAQMD has also adopted Rules 2700, 2701, and 2702 that establishes a GHG reduction program within the SCAQMD; however, GHG emission reduction protocols pursuant to these rules have only been established for boilers and process heaters, forestry, and manure management reduction projects.

City of Malibu

The City of Malibu General Plan identifies goals and policies relating to the improving the safety and health of the community. The current General Plan does not specifically address emissions of GHGs; however, the City supports the SCAQMD's mission to protect public health and welfare from the adverse effects of air pollution. The City has also adopted a number of ordinances and programs to reduce energy consumption and reduce water usage and waste generation. These are summarized as follows:

- Chapter 15.24 of the Malibu Municipal Code incorporates by reference the CALGreen Code. The Municipal Code also amends the CALGreen code to require that irrigation controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plant needs as weather conditions change, and that weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

- Chapter 15.18 of the Malibu Municipal Code provides local energy efficiency standards for residential and non-residential new construction and substantial remodels. The Code requires that non-residential construction exceed the current energy standards using the Title 24 performance approach by 15.0 percent.

- Chapter 9.22 of the Malibu Municipal Code adopts Landscape Water Conservation Standards, which contains design standards for landscaping and irrigation systems.

- The City has implemented a Construction and Demolition (C&D) debris-recycling program that requires that projects recycle or reuse 50 percent of the waste generated. Its purpose is to increase the diversion of C&D debris from disposal facilities (landfills) and will assist the City in meeting the state's 50 percent waste reduction mandate (AB 939).

Project Design Features

Several sustainable design features are included in the proposed project's design to decrease the project's energy consumption. Landscape features include green walls and mature trees to provide shade and reduce the heat island effect and the need for air conditioning. Bicycle parking, electrical vehicle charging stations, and walkways would reduce energy usage and air pollution from vehicle trips. High efficiency systems including filtration, air conditioning would be installed, and ENERGY STAR windows and appliances. Lighting features would include LED lighting where applicable, daylight sensor controls, lighting occupancy sensors, and bi-level[30] lighting controls in parking areas.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

The following thresholds for determining the significance of impacts related to greenhouse gas emissions are contained in the environmental checklist form contained in Appendix G of the most recent update of the *CEQA Statutes and Guidelines*. Impacts related to greenhouse gas emissions are considered significant if the proposed project would:

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

The *State CEQA Guidelines* Section 15064.7 provides the significance criteria established by the applicable air quality management district or air pollution control district, when available, may be relied upon to make determinations of significance. The SCAQMD Working Group has released draft recommendations for screening levels of GHG emissions. If a project exceeds these screening thresholds, the Working Group's draft documents recommend that projects reduce their emissions via project design features and mitigation measures. Projects may optionally demonstrate GHG reductions from a base case scenario, which includes any applicable land use sector reductions from AB 32. While SCAQMD has not formally adopted these thresholds, the Working Group draft recommendations represent the best available information with which to evaluate the significance of the proposed project's GHG emissions.

30 Bi-level control allows for switch lighting between a high and low setting rather than simply on or off.

Methodology

The proposed project is evaluated in this EIR for potential impacts related to GHG emissions and climate change, utilizing approved emissions models and guidelines as tools to create the analytical basis for the assessment. The Office of Planning and Research (OPR), in its Climate Change Technical Advisory recommended that GHG emissions from project-related traffic, energy consumption, water usage, and construction activities, should be identified and estimated, to the extent that data is available to calculate such emissions. In addition, CARB believes that indirect energy usage provides a more complete picture of the emissions footprint of a facility. According to CARB:

> *As facilities consider changes that would affect their emissions – addition of a cogeneration unit to boost overall efficiency even as it increases direct emissions, for example – the relative impact on total (direct plus indirect) emissions by the facility should be monitored. Annually reported indirect energy usage also aids the conservation awareness of the facility.*

For these reasons, CARB has proposed requiring the calculation of direct and indirect GHG emissions as part of the AB 32 reporting requirements, and this analysis does so.

Emissions modeling were conducted using the California Emissions Estimator Model (CalEEMod) and information provided in the CalEEMod *User's Guide*.[31] CalEEMod is a program that calculates air pollutant emissions from land use sources and incorporates the CARB on-road and off-road vehicle emissions models. Site-specific or project-specific data were used in the CalEEMod model where available. Construction of the proposed project would be completed over a period of 16 to 18 months, with full occupancy targeted for 2018. Default assumptions included in CalEEMod were used for the construction fleet makeup and equipment list. The proposed project would not include substantial stationary sources of GHG emissions. Mobile source GHG emissions from vehicles traveling to and from the proposed project would generate the bulk of the operational emissions. The mobile source emissions are based on the trip rates provided in the traffic report for the proposed project. Additional sources were consulted for this analysis as referenced. Emission calculations conducted for the proposed project are contained in **Appendix 3.2**.

[31] South Coast Air Quality Management District, *California Emissions Estimator Model User's Guide*, (2013). The model and User's Guide may be downloaded from the following website: http://www.caleemod.com.

Impact Analysis

Threshold 3.6-1 **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.**

The proposed project would develop a regional shopping center consisting of five separate buildings totaling approximately 38,400 square feet. The center would be anchored by a Whole Foods market, and would also provide a variety and goods and services including restaurant space.

Construction Emissions

The proposed project would result in short-term emissions of GHGs during construction—that is, the emissions would occur only during active construction and would cease after the proposed project was built.

The construction activities associated with the buildout of the proposed project would include the use of heavy-duty construction equipment. The vast majority of construction equipment (e.g., backhoes, cranes, rubber-tired loaders, scrapers, and haul trucks) rely on fossil fuels, primarily diesel, as an energy source. The combustion of fossil fuels in construction equipment results in GHG emissions of CO_2 and much smaller amounts of CH_4 and N_2O. Emissions of GHG would also result from the combustion of fossil fuels from haul trucks and vendor trucks delivering materials, and construction worker vehicles commuting, to and from the project site. Typically, light-duty and medium-duty automobiles and trucks would be used for worker trips and heavy-duty trucks would be used from vendor trips. The vast majority of motor vehicles used for worker trips rely on gasoline as an energy source while motor vehicles used for vendor trips rely on diesel as an energy source. The combustion of gasoline and diesel in motor vehicles results in GHG emissions of CO_2 and smaller amounts of CH_4 and N_2O. The other primary GHGs (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) are typically associated with specific industrial sources and would not be emitted by the proposed project. The emissions of CO_2 were estimated using the CalEEMod model.

Construction activity was modeled based on the construction schedule provided by the project applicant, and equipment types and activity levels provided as default values in CalEEMod. **Table 3.6-2, Estimated Construction Greenhouse Gas Emissions**, lists the estimated GHG emissions associated with construction of the proposed project. The SCAQMD recommends annualizing construction-related GHG emissions over a project's lifetime, defined as a 30-year period, in order to include these emissions as part of the annual total operational emissions. Therefore, construction-related GHG emissions have been annualized over this period and included in the annual operational emissions discussed below.

Table 3.6-2
Estimated Construction Greenhouse Gas Emissions

GHG Emissions Source	Emissions (Metric Tons CO_2e/year)
One-Time Emissions:	
Construction Year 2016	117
Construction Year 2017	368
One-Time Total GHG Emissions	**484**
Annualized over Project Lifetime	**16**

Source: Impact Sciences, Inc. (2015). Emission calculations are provided in ***Appendix 3.2****.*
Totals in table may not appear to add exactly due to rounding.

Operational Emissions

It is anticipated the proposed project would be operational by 2018. Once operational, the proposed project would result in GHG emissions, primarily CO_2, CH_4, and N_2O, as a result of fuel combustion from building heating systems and motor vehicles. Building and motor vehicle air conditioning systems may use HFCs (and hydrochlorofluorocarbons [HCFCs] and CFCs to the extent that they have not been completely phased out at later dates); however, these emissions are not quantified since they would only occur through accidental leaks. It is not possible to estimate the frequency or volume of accidental leaks without speculation, and accidental leaks are generally not considered a part of operation of a proposed project. Additionally the SCAQMD does not include refrigerant leaks in sources to be assessed with regards to CEQA significance thresholds. Energy use associated with refrigeration is accounted for within the total energy use of the project. It should also be noted that CARB has drafted a proposed "Regulation for Management of High Global Warming Potential Refrigerants" that would reduce emissions of these refrigerants from stationary refrigeration and air conditioning systems by requiring persons subject to the rule to reclaim, recover, or recycle refrigerant and to properly repair or replace faulty refrigeration and air conditioning equipment.[32] Lastly, one of the project design features is the inclusion of CFC- and HCFC-free air conditioning systems, which would reduce potential leaks.

Direct emissions of CO_2 emitted from operation of the proposed project include area source emissions (from natural gas consumption) and mobile source emissions. Area source emissions were calculated using CalEEMod using default assumptions for a regional shopping center, which includes the types of land uses proposed for the project. Mobile source emissions were calculated using CalEEMod, based on

32 California Air Resources Board, "Stationary Equipment Refrigerant Management Program," http://www.arb.ca.gov/cc/reftrack/reftrack.htm. 2009. This regulation is an early action measure under AB 32.

the traffic study prepared for the project and the Institute of Transportation and Engineering 8th Edition trip generation rates.[33]

The proposed project would also result in indirect GHG emissions due to the electricity demand. The emission factor for CO_2 due to electrical demand from Southern California Edison, the electrical utility serving the proposed project, was selected in the CalEEMod model. The emission factor takes into account the current mix of energy sources used to generate electricity and the relative carbon intensities of these sources. Electricity consumption was based on default data found in CalEEMod.

In addition to electrical demand, the proposed project would also result in indirect GHG emissions due to water consumption, wastewater treatment, and solid waste generation. GHG emissions from water consumption are due to the electricity needed to convey, treat, and distribute water. The default CalEEMod assumptions were used for GHG emissions from water consumption, wastewater production, and solid waste generation.

A summary of the operational emissions of the proposed project is provided below in **Table 3.6-3, Estimated Operational GHG Emissions**. Detailed emission calculations are provided in **Appendix 3.2**. The estimates represent emissions under "business as usual" conditions – that is, GHG emissions that would occur as a result of development of the proposed project without the reductions from policies, strategies, and mitigation measures from AB 32, other GHG reduction plans or regulations, or the requirements of the Los Angeles County Green Building Program and the Malibu Municipal Code with which the proposed project would comply.

As shown in **Table 3.6-3**, the estimated emissions from the proposed project would not exceed the applicable threshold. Therefore, the proposed project's impact would be considered less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant.

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33 Institute of Transportation and Engineering, *ITE Trip Generation Rates – 8th Edition*, 2008. Note that the ITE rates are built into CalEEMod.

Table 3.6-3
Estimated Operational GHG Emissions

Source	GHG Emissions (Metric Tons CO_2e/year)
Energy	168
Mobile Sources	1,455
Area	0
Waste	18
Water	19
Amortized Construction	16
Total GHG Emissions	**1,677**
SCAQMD Threshold	**3,000**
Exceeds Threshold?	**NO**

*Source: Impact Sciences, Inc. (2015). Emission calculations are provided in **Appendix 3.2**.*
Note: Totals in table may not appear to add exactly due to rounding.

Threshold 3.6-2 **Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.**

Neither the County of Los Angeles nor the City of Malibu has adopted plans, policies, or regulations that contain more specific requirements with respect to GHG emissions. Therefore, the applicable plan for reducing GHG emissions is AB 32. The draft significance thresholds proposed by the SCAQMD are specifically designed to allow attainment of AB 32 goals within the jurisdiction of the SCAQMD. Therefore if emissions from a proposed project are below these thresholds, the project would not conflict with the requirements of AB 32. As shown in **Table 3.6-3**, the proposed project's GHG emissions would be below the SCAQMD significance threshold. The proposed project would also comply with the requirements of the Los Angeles County Green Building Program, which include energy efficiency above the requirements of Title 24, recycling or reuse of construction materials, drought tolerant landscaping, smart irrigation, and tree planting. Similarly, the proposed project would meet the requirements of the Malibu Municipal Code described above. Therefore the project would be less than significant with respect to this criterion.

In addition, the proposed project includes a large number of sustainable design features that exceed the requirements of both County and Municipal requirements which would further reduce the carbon footprint of the proposed development. These features include:

Site

- Planting: Low water use and Santa Monica Mountains native plants comprise a majority of the plants in the landscape plan. Native plants would increase the habitat area and biodiversity of the site.
- Irrigation: The irrigation system would utilize subsurface equipment and weather based sensors to determine the amount of watering needed to support the plantings and provide the water in the most efficient manner available.
- Use of Local Materials: to the extent possible materials including plants, soil amendments, natural stone, and irrigation equipment would be locally fabricated and sourced.
- Heat Island Reduction: The shade provided by trees in paved areas would reduce ambient temperatures and the need for air conditioning in adjacent buildings.
- Provide areas for the depositing, storage, and collection of materials for recycling.
- Reduce heat island effect with roof solar reflectance.
- Storm Water Quality/Quantity: Where feasible, storm water runoff would be filtered and cleansed through bio swales. Rainwater taken up by plants would be naturally transpired back into the atmosphere reducing the need for drainage infrastructure.
- Vehicle Trip Reduction: The creation of comfortable and interesting walkways would encourage walking in the Civic Center area and reduce energy use and air pollution from vehicle trips.
- Provide bike racks for minimum 5 percent of motorized parking capacity.
- Provide electric vehicle charging stations. Eight percent of total spaces would be designated for low emitting, fuel efficient, and carpool/van pool vehicles.

Energy efficiency and indoor environmental quality

- High efficiency AC equipment.
- High efficiency HVAC systems such as variable refrigerant flow.
- CFC and HCFC free AC equipment.
- Economizer on AC equipment.
- Energy recovery/enthalpy wheel.
- High efficiency electric motor.
- Effective ventilation system and proper air circulation.
- Hot water solar heating, where possible.

- Use exposed concrete as finished floor where possible.
- Install demonstrated long-term durability.
- ENERGY STAR appliances.
- ENERGY STAR windows.
- Efficient insulation for envelope, ducts, and piping.
- High efficiency filtration.
- Provide for future installation of renewable energy systems.
- Passive solar design.
- Use building materials with recycled content to extent possible.
- Use rapidly renewable materials.
- Provide narrow floor plates to enable natural ventilation.
- Introduce daylight to indoor spaces and reduce artificial lighting.
- Provide shading on south and west facing windows.
- Provide ceiling fans.

Electrical/Lighting

- Metering of loads
- LED signs/lighting where possible
- Occupancy sensors for lighting, where appropriate
- Daylight/photo sensor controls
- Parking lot –bi-level lighting controls

Water Efficiency

- Ultra low flow dual flush water closets.
- Waterless or low-flow urinals.
- Lavatories/sinks with metering faucets.
- Use tankless water heaters

- Pre-plumb and provide conduit for solar water heating

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant.

Cumulative Impacts

Global climate change is by definition a cumulative impact as GHG emissions do not have a localized impact; they impact the global climate as a whole. The analysis presented in the section provides an adequate analysis of the proposed project's cumulative impact related to GHG emissions. No further analysis is required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts

Impacts would be less than significant.