5.6 GREENHOUSE GAS EMISSIONS

This section of the Torrance General Plan Update DEIR evaluates the potential for implementation of the project to impact or be impacted by global climate change. The analysis in this section is based on an air quality analysis completed by The Planning Center, which is based on land uses associated with buildout of the Proposed Land Use Plan for year 2030 (see Tables 3-3 and 3-4). The air quality model output sheets are included as Appendix D.

5.6.1 Environmental Setting

Greenhouse Gases and Climate Change

Climate change is the variation of Earth's climate over time, whether due to natural variability or as a result of human activities. The climate system is interactive, consisting of five major components: the atmosphere, the hydrosphere (ocean, rivers, and lakes), the cryosphere (sea ice, ice sheets, and glaciers), the land surface, and the biosphere (flora and fauna). The atmosphere is the most unstable and rapidly changing part of the system. It is made up of 78.1 percent nitrogen (N_2), 20.9 percent oxygen (O_2), and 0.93 percent argon (Ar). These gases have only limited interaction with the incoming solar radiation and do not interact with infrared (long-wave) radiation emitted by the Earth. However, there are a number of trace gases, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3), that absorb and emit infrared radiation and therefore affect climate. These are greenhouse gases (GHG), and while they comprise less than 0.1 percent of the total volume mixing ratio in dry air,[1] they play an essential role in influencing climate (IPCC 2001).

Non-CO_2 GHGs are those listed in the Kyoto Protocol[2] (CH_4, N_2O, hydrofluorocarbons [HFC], perfluorocarbons [PFC], and sulfur hexafluoride [SH_6])and those listed under the Montreal Protocol and its Amendments[3] (chlorofluorocarbons [CFC], hydrochlorofluorocarbons [HCFC], and halons). Table 5.6-1 lists a selection of some of the GHGs and their relative global warming potentials (GWP) compared to CO_2. Although not included in this table, water vapor (H_2O) is the strongest GHG, but is also the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant in the atmosphere (IPCC 2001), and therefore is not evaluated. The major GHGs are briefly described below.

[1] In the atmosphere, the volume of a gas is described in terms of dry weight because water vapor is the most significant contributor to the change in molecular weight of air.

[2] Kyoto Protocol: Established by the United Nations Framework Convention on Climate Change (UNFCC) and signed by more than 160 countries (excluding the United States) stating that they commit to reduce their GHG emissions by 55 percent or engage in emissions trading.

[3] Montreal Protocol and Amendments: International Treaty signed in 1987 and subsequently amended in 1990 and 1992. Stipulated that the production and consumption of compounds that deplete ozone in the stratosphere (CFC, halons, carbon tetrachloride, and methyl chloroform) were to be phased out by 2000 (2005 for methyl chloroform).

Table 5.6-1
Greenhouse Gases and Their Relative Global Warming Potential Compared to CO_2

GHG	Atmospheric Lifetime (years)	Global Warming Potential[1]
Carbon Dioxide (CO_2)	50 to 200	1
Methane (CH_4)[2]	12 (±3)	21
Nitrous Oxide (N_2O)	120	310
Hydrofluorocarbons:		
HFC-23	264	11,700
HFC-32	5.6	650
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
Perfluoromethane: CF_4	50,000	6,500
Perfluoroethane: C_2F_6	10,000	9,200
Perfluorobutane: C_4F_{10}	2,600	7,000
Perfluoro-2-methylpentane: C_6F_{14}	3,200	7,400
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: USEPA
[1] 100-Year Time Horizon based on the GWP relative to CO_2.
[2] The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

Carbon dioxide (CO_2) enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, respiration, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

Nitrous oxide (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Fluorinated gases are synthetic, strong greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as high global warming potential gases.

- *Chlorofluorocarbons (CFCs)* are greenhouse gases covered under the 1987 Montreal Protocol and are used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (e.g., the troposphere or stratosphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone. These gases are being replaced by other non-ozone depleting compounds that are greenhouse gases covered under the Kyoto Protocol.

- *Perfluorocarbons (PFCs)* are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF_4] and perfluoroethane [C_2F_6]) were introduced as alternatives, along with HFCs, to ozone-depleting substances, like CFCs. In addition, PFCs are emitted as by-products of industrial processes and are also used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they are strong greenhouse gases.

- *Sulfur Hexafluoride (SF_6)* is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. It is a strong greenhouse gas used primarily as an insulator in electrical transmission and distribution systems.

- *Hydrochlorofluorocarbons (HCFCs)* contain hydrogen, fluorine, chlorine, and carbon atoms. Although they are ozone-depleting substances, they are less potent at destroying stratospheric ozone than CFCs and thus have been introduced as temporary replacements for CFCs and are also greenhouse gases.

- *Hydrofluorocarbons (HFCs)* contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer but are strong greenhouse gases (USEPA 2007).

California's GHG Sources and Relative Contribution

California is the second largest total emitter of GHGs in the United States, surpassed only by Texas, and the tenth largest GHG emitter in the world (CEC 2005). However, because of more stringent air pollutant emission regulations, in 2001 California ranked fourth lowest in carbon emissions per capita and fifth lowest among states in CO_2 emissions from fossil fuel consumption per unit of gross state product (total economic output of goods and services). In 2004, California produced 492 million metric tons (MMTons) of CO_2-equivalent (CO_{2e}) GHG emissions,[4] of which 81 percent were CO_2 from the combustion of fossil fuels, 2.8 percent were from other sources of CO_2, 5.7 percent were from methane, and 6.8 percent were from N_2O. The remaining 2.9 percent of GHG emissions were from high global warming potential gases (CEC 2006).

CO_2 emissions from human activities make up 84 percent of the total GHG emissions. California's transportation sector is the single largest generator of GHG emissions, producing 40.7 percent of the state's total emissions. Electricity consumption is the second largest source, comprising 22.2 percent. While out-of-state electricity generation comprises 22 to 32 percent of California's total electricity supply, it contributes 39 to 57 percent of the GHG emissions associated with electricity consumption in the state. Industrial activities are California's third largest source of GHG emissions, comprising 20.5 percent of state's total emissions. Other major sources of GHG emissions include mineral production, waste combustion and land use, and forestry changes. Agriculture, forestry, commercial, and residential activities comprise the balance of California's greenhouse gas emissions (CEC 2006).

Human Influence on Climate Change

For approximately 1,000 years before the Industrial Revolution, the amount of GHG in the atmosphere remained relatively constant. During the 20th century, however, scientists observed a rapid change in the climate and in the levels of climate change pollutants that is attributable to human activities. The amount of CO_2 has increased by more than 35 percent since preindustrial times, and has increased at an average rate

[4] CO_2-equivalence is used to show the relative potential that different GHG have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, the global warming potential of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

of 1.4 parts per million (ppm) per year since 1960, mainly due to the combustion of fossil fuels and deforestation (IPCC 2007). These recent changes in the levels of climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is warming at a rate that cannot be explained by natural causes alone. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants (CAT 2006).

Climate-change scenarios are affected by varying degrees of uncertainty (IPCC 2007). The Intergovernmental Panel on Climate Change's (IPCC) *2007 IPCC Fourth Assessment Report*, projects that the global mean temperature increase from 1990 to 2100, under different climate-change scenarios, will range from 1.4 to 5.8 °C (2.5 to 10.4°F). In the past, gradual changes in the earth's temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic timeframe but within a human lifetime.

Potential Climate Change Impacts for California

Climate change is not a local environmental impact but a global impact. Unlike criteria pollutants, CO_2 emissions cannot be attributed to a direct health effect. However, human-caused increases in GHG have been shown to be highly correlated with increases in the surface and ocean temperatures on Earth (IPCC 2007). What is not clear is the extent of the impact on environmental systems, and therefore on human beings.

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the Earth's temperature are also hard to predict, and there are varying degrees of uncertainty in environmental impact scenarios. Because of this uncertainty, the IPCC uses five different confidence levels to quantify climate change impacts on the environment: Very High Confidence (95 percent or greater chance of occurrence), High Confidence (67 to 95 percent), Medium Confidence (33 to 67 percent), Low Confidence (5 to 33 percent), and Very Low Confidence (5 percent or less).

In California and western North America, observations of the climate indicate that 1) there is a trend toward warmer winter and spring temperatures, 2) a smaller fraction of precipitation is falling as snow instead of rain, 3) there is a decrease in the amount of spring snow accumulation in the lower and middle elevation mountain zones, 4) there is an advance snowmelt of 5 to 30 days earlier in the spring, and 5) there is a similar shift (5 to 30 days earlier) in the timing of spring flower blooms (CAT 2006). According to the California Climate Action Team (CAT), even if actions could be taken to immediately curtail climate change emissions, the potency of emissions that have already built up, their long atmospheric lifetimes (see Table 5.6-1), and the inertia of the Earth's climate system could produce as much as 0.6°C (1.1°F) of additional warming. Consequently, some impacts from climate change are now unavoidable.

CAT and the California Environmental Protection Agency (Cal/EPA) use the results from the recent analysis of global climate change impacts for California under three IPCC scenarios: lower emissions (B1), medium-high emissions (A2), and high emissions (A1F1); each is associated with an increasing rise in average global surface temperatures. According to the California Energy Commission (CEC) in their 2006 report, *Our Changing Climate; Assessing the Risks to California*, global climate change risks to California include public health impacts (poor air quality made worse and more severe heat), water resources impacts (decreasing Sierra Nevada snowpack, challenges in securing adequate water supply, potential reduction in hydropower, and loss of winter recreation), agricultural impacts (increasing temperatures, increasing threats from pests and pathogens, expanded ranges of agricultural weeds, and declining productivity), coast sea level impacts (rising sea levels, increasing coastal floods, and shrinking beaches), forest and biological resource impacts (increasing wildfires, increasing threats from pest and pathogens, declining forest productivity, and shifting vegetation and species distribution), and electricity impacts (increased energy demand). Specific climate

change impacts that could affect the City of Torrance include health impacts from a reduction in air quality, water resources impacts from a reduction in water supply, and increased energy demand.

Existing Emissions Inventory

An existing emissions inventory for the City of Torrance was conducted based on the existing land uses (see Tables 3-3 and 3-4) and is shown in Table 5.6-2. The existing GHG emissions were calculated using the URBEMIS2007 emissions model. In addition, indirect CO_{2e} emissions for energy use, water, and waste disposal were included in the emissions inventory. CO_{2e} emissions for energy use were calculated using energy usage factors and emission rates from the U.S. Energy Information Administration and Southern California Edison. In addition, Southern California Edison provided energy information specific to municipal government operations. Based on year 2005 data, municipal government operations in Torrance generated a demand for 21,150 gigawatt hours of electricity, which represented approximately 1.78 percent of the total community-wide demand for electricity in Torrance. CO_{2e} emissions from project-related water demand were calculated using southern California energy-intensity factors obtained from the CEC. CO_{2e} emissions from project-related waste disposal were calculated using the USEPA's Waste Reduction Model. Lifecycle emissions[5] are not included in this analysis because sufficient information is not available for this type of analysis for the proposed project and therefore lifecycle GHG emissions would be speculative. Air quality modeling and details on the modeling assumptions are included as Appendix D.

Table 5.6-2
2005 GHG Emissions Inventory – Existing Land Uses in the City

Source	*CO_2 Emissions MTons/Year*	*Percent of Total*
Transportation Sector[1]	2,074,138	63.5%
Electricity Sector		
Purchased Energy[2]	663,040	20.3%
Water Demand and Treatment[3]	46,897	1.4%
Total Energy Emissions	709,936	21.7%
Recycling and Waste[4]	262,098	8.0%
Area Sources[1]	222,303	6.8%
Total	**3,268,476**	**100%**

Source: URBEMIS2007, Version 9.2.4.
MTons = metric tons; MMTons = million metric tons
1 short ton (Ton) equals 0.9071847 metric tons

[1] URBEMIS2007, Version 9.2.4. Assumes CO_2 represents 99.6 percent of total CO_{2e} emissions from gasoline and 99.7 percent of total from diesel CO_{2e} while CH_4, N_2O, and fluorinated gases comprise the remaining percent are based on Bay Area Air Quality Management District's Source Inventory of Bay Area Greenhouse Gas Emissions.

[2] CO_{2e} emissions calculated using energy usage factors and emission rates from the United States Department of Energy, EIA, 2003 Commercial Building Energy Consumption, December 2006, Table C20 and C14; EIA, Residential Energy Consumption Survey, Table US1. Total Energy Consumption, Expenditures, and Intensities, 2005, Part 1: Housing Unit Characteristics and Energy Usage Indicators, released January 2009.

[3] CO_{2e} emissions from the energy intensity of water are based on the CEC's California's Water Energy Relationship (2005) of 12,700 Kwh/MG for Southern California.

[4] CO_{2e} emissions from waste generation are based on the waste reduction model (WARM) created by the USEPA and the waste stream jurisdictional profile for the City of Torrance.

[5] Lifecycle emissions are the GHG emissions from raw material production, manufacture, distribution, use, and disposal and include all intervening transportation emissions caused by the product's existence. Because the amount of materials consumed during the operation or construction over the lifetime of the proposed Torrance General Plan Update is not known, the origin of the raw materials purchased is not known, and manufacturing information for those raw materials are also not known, calculation of lifecycle emissions would be speculative.

Regulatory Setting

Regulation of GHG Emissions on a National Level

Currently there are no adopted regulations to combat global climate change on a national level. However, recent statutory authority has been granted to the USEPA that may change the voluntary approach taken under the current administration to address this issue. On April 2, 2007, the United States Supreme Court ruled that the USEPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA) if it determines that it poses a threat to human health. On April 17, 2009, the USEPA declared CO_2 a threat to public health and welfare, which is the first step toward development of AAQS standards for this air pollutant.

Regulation of GHG Emissions on a State Level

Assembly Bill 32 (AB 32), the Global Warming Solutions Act, was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG. AB 32 follows the emissions reduction targets established in Executive Order S-3-05, signed on June 1, 2005, which requires the state's global warming emissions to be reduced to 1990 levels by the year 2020 and by 80 percent of 1990 levels by year 2050. Projected GHG emissions in California are estimated at 596 million metric tons (MMTons) of CO_{2e} on 2020. In December 2007, the California Air Resources Board (CARB) approved a 2020 emissions limit of 427 MMTons (471 million tons) of CO_{2e} for the state. The 2020 target requires emissions reductions of 169 MMTons, approximately 30 percent of the projected emissions compared to business as usual in year 2020.

In order to effectively implement the cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor global warming emissions levels, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012. Pursuant to AB 32, the Climate Action Registry Reporting Online Tool was established through the Climate Action Registry to track GHG emissions. On December 11, 2008, CARB adopted the *Climate Change Scoping Plan.* Key elements of CARB's GHG reduction plan are:

- Expand and strengthen existing energy efficiency programs, as well as building and appliance standards.
- Achieve a statewide renewable energy mix of 33 percent.
- Develop a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system.
- Establish targets for transportation-related GHG emissions for regions throughout California, and pursue policies and incentives to achieve those targets.
- Adopt and implement measures pursuant to state laws and policies, including California's clean car standards, goods movement measures, and the low carbon fuel standard.
- Create target 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.

Table 5.6-3 shows the proposed reductions from regulations and programs outlined in the Scoping Plan. While local government operations were not accounted for in achieving the 2020 emissions reduction, local land use changes are estimated to result in a reduction of 5 MMTons of CO_{2e}, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments will

play in successful implementation of AB 32, CARB is recommending GHG reduction goals of 15 percent of today's levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. Measures that local governments take to support shifts in land use patterns are anticipated to emphasize compact, low-impact growth over development in greenfields, resulting in fewer vehicle miles traveled. According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 MMTons tons of CO_{2e} (or approximately 1.2 percent of the GHG reduction target).

Table 5.6-3
Scoping Plan Greenhouse Gas Reduction Measures and Reductions toward 2020 Target

Recommended Reduction Measures	*Reductions Counted toward 2020 Target of 169 MMT CO_{2e}*	*Percentage of Statewide 2020 Target*
Cap and Trade Program and Associated Measures		
California Light-Duty Vehicle GHG Standards	31.7	19%
Energy Efficiency	26.3	16%
Renewable Portfolio Standard (33 percent by 2020)	21.3	13%
Low Carbon Fuel Standard	15	9%
Regional Transportation-Related GHG Targets[1]	5	3%
Vehicle Efficiency Measures	4.5	3%
Goods Movement	3.7	2%
Million Solar Roofs	2.1	1%
Medium/Heavy Duty Vehicles	1.4	1%
High Speed Rail	1.0	1%
Industrial Measures	0.3	0%
Additional Reduction Necessary to Achieve Cap	34.4	20%
Total Cap and Trade Program Reductions	**146.7**	**87%**
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	12%
Sustainable Forests	5	3%
Industrial Measures (for sources not covered under cap and trade program)	1.1	1%
Recycling and Waste (landfill methane capture)	1	1%
Total Uncapped Sources/Sectors Reductions	**27.3**	**16%**
Total Reductions Counted toward 2020 Target	**174**	**100%**
Other Recommended Measures – Not Counted toward 2020 Target		
State Government Operations	1.0 to 2.0	1%
Local Government Operations	To Be Determined[2]	NA
Green Buildings	26	15%
Recycling and Waste	9	5%
Water Sector Measures	4.8	3%
Methane Capture at Large Dairies	1	1%
Total Other Recommended Measures – Not Counted toward 2020 Target	**42.8**	**NA**

Source: CARB. 2008,
MMTons CO_{2e}: million metric tons of CO_{2e}
[1] Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 regional target.
[2] According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 million metric tons of CO_{2e} (or approximately 1.2 percent of the GHG reduction target). However, these reductions were not included in the Scoping Plan reductions to achieve the 2020 target.

Senate Bill 97

In addition to the requirements under AB 32 to address GHG emission and global climate change in general plans and CEQA documents, Senate Bill 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines on how to address global warming emissions and mitigate project-generated GHG. In June 2008, OPR released the Technical Advisory for addressing climate change through CEQA review. Pursuant to the requirements of SB 97, OPR transmitted the proposed changes to the CEQA Guidelines to the Natural Resource Agency on April 13, 2009. The California Natural Resources Agency is required to adopt the proposed changes to the CEQA Guidelines on or before January 1, 2010.

Regulation of GHG Emissions on a Regional Level

In 2008, Senate Bill 375 (SB 375) was adopted to connect the GHG emissions reductions targets established in the Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce vehicle miles traveled and vehicle trips. Specifically, SB 375 requires CARB to establish GHG emissions reduction targets for each of the 17 regions in California managed by a metropolitan planning organization (MPO). The Southern California Association of Governments (SCAG) is the MPO for the southern California region, which includes the counties of Los Angeles, Orange, San Bernardino County, Riverside, Ventura, and Imperial. The subregional government within SCAG for southwestern Los Angeles County, which includes the City of Torrance, is the South Bay Cities Council of Governments (SBCCOG).

The GHG emission reduction targets for each region are required to be established no later than September 30, 2010. Once these targets have been established, SB 375 requires the MPOs to prepare a sustainable communities strategy (SCS) in their regional transportation plan. While there is no deadline for adoption of the SCS, it is anticipated that the first plans will not be released until 2011 at the earliest. The SCS sets forth a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement). The SCS is meant to provide individual jurisdictions with growth strategies that achieve the regional GHG emissions reduction targets. The SCS does not require that local general plans, specific plans, or zoning be consistent with the SCS but provides incentives for consistency for governments and developers. If the SCS is unable to achieve the regional GHG emissions reduction targets, then the MPO is required to prepare an alternative planning strategy that shows how the GHG emissions reduction target could be achieved through other development patterns, infrastructure, and/or transportation measures.

5.6.2 Thresholds of Significance

OPR is in the process of updating the CEQA guidelines to address global warming. On April 13, 2009, OPR transmitted the proposed changes to the CEQA Guidelines to California Natural Resource Agency. Based on the draft thresholds for GHG emissions, a significant impact relative to global climate change is considered to occur if the project would:

GHG-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance.

GHG-2 Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Governor's Office of Planning and Research – SB 97

OPR released a Technical Advisory for addressing climate change through CEQA in June 2008. In the guidance document, OPR recommends that each public agency develop its own consistent approach to performing a climate change analysis based on best available information. OPR states that compliance with CEQA for global climate change analyses entails three basic steps: 1) identify and quantify GHG emissions associated with vehicular traffic, energy consumption, water usage, and construction activities; 2) assess the significance of the impact on climate change; and 3) if the impact is found to be significant, identify alternatives and/or mitigation measures that will reduce the impact below significance. For projects where GHG emissions are considered significant, the California Attorney General has prepared a fact sheet listing various mitigation measures to reduce the project's contribution to global climate change impacts.

California Air Resources Board

On October 24, 2008, CARB released the first preliminary draft of recommended approaches for setting interim significance thresholds for GHG under CEQA. The draft approach seeks to establish GHG thresholds and/or performance standards based on sector types, as defined in the Scoping Plan. Sectors identified in the Scoping Plan are transportation, electricity, industrial, commercial and residential, agricultural, high global warming potential, and recycling and waste. CARB has not yet finalized the proposed thresholds/performance standards.

South Coast Air Quality Management District

The issue of global climate change is, by definition, a cumulative environmental impact. In accordance with the South Coast Air Quality Management District (SCAQMD) methodology, any project that produces a significant regional air quality impact in an area with regard to the criteria pollutants (such as VOC, CO, NO_x, SO_x, PM_{10}, and $PM_{2.5}$) adds to the cumulative impact. The SCAQMD is the local air district responsible for establishing thresholds for air quality. To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, the SCAQMD has convened a GHG CEQA Significance Threshold Working Group. Currently the SCAQMD is in the process of establishing a threshold for GHG emissions to determine a project's regional contribution toward global climate change impacts for California.[6] On December 5, 2008, SCAQMD adopted a threshold of 10,000 MTons of CO_{2e} for industrial projects for which it is the lead agency under CEQA.

5.6.3 Environmental Impacts

The project is implementation of the proposed Torrance General Plan update. The proposed land use plan for the ultimate development of the City is not linked to a timeline. In addition, the proposed Torrance General Plan update provides policy level guidance and does not contain specific project proposals. Operational GHG emissions were calculated using the URBEMIS2007 emissions model, which includes an inventory of CO_2 emissions from stationary and vehicle emissions sources. In addition, CO_{2e} emissions for project-related energy use were calculated using energy usage factors and emission rates from the U.S. Energy Information Administration. CO_{2e} emissions from project-related water demand were calculated using Southern California energy-intensity factors obtained from the CEC, and CO_{2e} emissions from project-related waste disposal were calculated using the USEPA's Waste Reduction Model. Air quality modeling is included as Appendix D.

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

[6] http://www.aqmd.gov/ceqa/handbook/GHG/GHG.html

IMPACT 5.6-1: BUILDOUT OF THE CITY OF TORRANCE WOULD GENERATE GREENHOUSE GAS EMISSIONS THAT WOULD SIGNIFICANTLY CONTRIBUTE TO GLOBAL CLIMATE CHANGE IMPACTS IN CALIFORNIA. [THRESHOLDS GHG-1 AND GHG-2]

Impact Analysis: Global climate change is not confined to a particular project area and is generally accepted as the consequence of global industrialization over the last 200 years. A typical project, even a very large one, does not generate enough greenhouse gas emissions on its own to influence global climate change significantly; hence, the issue of global climate change is, by definition, a cumulative environmental impact. The State of California, through its governor and its legislature, has established a comprehensive framework for the substantial reduction of GHG emissions over the next 40 years or so. This will occur primarily through the implementation of AB 32, Executive Order S-3-05, and SB 375, which will address GHG emissions on a statewide cumulative basis.

On January 8, 2009, OPR released the draft CEQA guidelines on how to address global warming emissions and mitigation of project-specific GHG emissions. OPR recommends that projects identify and quantify GHG emissions, assess the significance of the impact on climate change, and, if it is determined to be significant, identify alternatives and/or mitigation measure that would reduce the impact. Annual CO_2 emissions from project-related mobile and stationary sources and for project-related indirect emissions from purchased energy and water were calculated for construction and operation of the project and evaluated for the potential to interfere with the State of California's ability to achieve GHG reduction goals and strategies, as identified in AB 32 through a consistency analysis with CARB's Scoping Plan.

Project-Related GHG Emissions

The proposed project is a regionally significant project pursuant to SCAG Intergovernmental Review criteria and the CEQA Guidelines. Buildout of the proposed Torrance General Plan update would contribute to global climate change through direct emissions of GHG from on-site area sources, off-site energy production required for on-site activities, and indirect emissions from water use and vehicle trips. Lifecycle emissions are not included in this analysis because no information is available for the proposed project and therefore lifecycle GHG emissions would be speculative.[7]

Construction

Construction activities to support the buildout of the proposed land use plan would consume fuel and result in the direct generation of GHG emissions. Construction-related GHG emissions would cease upon completion of the construction phase of individual development projects. Information regarding specific development projects would be needed in order to quantify the level of impact associated with construction activity. The proposed Torrance General Plan update proposed land use plan for the ultimate development of the City is not linked to a timeline. In addition, the proposed Torrance General Plan update provides policy level guidance and does not contain specific project proposals. Consequently, it is speculative to determine the number of developments occurring simultaneously, construction equipment fleet mix, and construction schedules. However, for the purpose of this evaluation, a sample construction emission model run using the URBEMIS2007 computer model was conducted to determine annual GHG emissions. Due to the scale of development activity associated with buildout of the proposed land use plan, emissions would cumulatively contribute to significant climate change impacts.

[7] Lifecycle emissions include indirect emissions associated with materials manufacture. However, these indirect emissions involve numerous parties, each of which is responsible for GHG emissions of their particular activity. Because of the programmatic nature of the proposed Torrance General Plan update, evaluation and quantification of raw material usage and production are unknown. Industrial Sector GHG emissions are covered under the cap and trade program in CARB's Scoping Plan and are not covered in the analysis.

Site Operations

CO_2 emissions from operational activities within the City of Torrance are shown in Table 5.6-4. For operation, the project's GHG emissions are separated into emission sources. The City of Torrance is projected to have an emissions inventory of 3.4 MMTons at buildout year 2030. In comparison, the state of California's 2020 GHG emissions target is 427 MMTons.[8] Emissions generated by vehicle miles traveled (VMT) within the City comprise the majority of the City's GHG emissions (78 percent). Emissions from energy use, including purchased energy and energy associated with the transport, treatment, and use of water, are the next highest source of GHG emissions. No numeric threshold has been formally adopted. In addition, GHG emissions from construction activities, described above, would be added to these values.

Table 5.6-4
GHG Emissions Inventory –Torrance General Plan Update

Source	CO_2 Emissions MTons/Year			
	Existing	General Plan Buildout	Percent of Total	Increase
Transportation Sector[1]	2,074,138	2,195,703	63.2%	121,565
Electricity Sector				
Purchased Energy[2]	663,040	722,619	20.8%	59,579
Water Demand and Treatment[3]	46,897	49,979	1.4%	3,082
Total Energy Emissions	709,936	772,597	22.2%	62,661
Recycling and Waste[4]	262,098	276,473	8.0%	14,374
Area Sources[1]	222,303	228,339	6.6%	6,036
Total	**3,268,476**	**3,473,113**	**100%**	**204,637**

Source: URBEMIS2007, Version 9.2.4.
MTons = metric tons; MMTons = million metric tons
1 short ton (Ton) equals 0.9071847 metric tons.
[1] URBEMIS2007, Version 9.2.4. Assumes CO_2 represents 99.6 percent of total CO_{2e} emissions from gasoline and 99.7 percent of total from diesel CO_{2e} while CH_4, N_2O, and Fluorinated Gases comprise the remaining percent based on Bay Area Air Quality Management District's Source Inventory of Bay Area Greenhouse Gas Emissions.
[2] CO_{2e} emissions calculated using energy usage factors and emission rates from the United States Department of Energy, EIA, 2003 Commercial Building Energy Consumption, December 2006, Table C20 and C14; EIA, Residential Energy Consumption Survey, Table US1. Total Energy Consumption, Expenditures, and Intensities, 2005, Part 1: Housing Unit Characteristics and Energy Usage Indicators, released January 2009.
[3] CO_{2e} emissions from the energy intensity of water are based on the CEC's California's Water Energy Relationship (2005) of 12,700 Kwh/MG for Southern California.
[4] CO_{2e} emissions from waste generation are based on the waste reduction model (WARM) created by the USEPA and the waste stream jurisdictional profile for the City of Torrance.

AB 32 Scoping Plan and SB 375 Sustainable Communities Strategies

While California alone cannot stabilize the climate, the state's actions set an example and drive global progress toward reduction of GHG. If the industrialized world were to follow the emission reduction targets established by California, and industrializing nations reduced emissions according to the lower emissions path (lower emissions IPPC scenario B1), medium or higher warming ranges of global temperature increases

[8] It should be noted that the emissions inventory for the state of California for transportation emissions was compiled using gasoline sales obtained from the California Board of Equalization in the state in year 2007. To forecast on-road transportation emissions, CARB estimated 2020 emissions based on the growth in projected VMT derived from EMFAC2007. In comparison, the proposed Torrance General Plan update's GHG emissions are based on a projection of trips and VMT traveled in the City in year 2005 and year 2030 based on the URBEMIS2007 computer model.

might be avoided, along with the most severe consequences of global warming. In 2007 the CEC published *The Role of Land Use in Meeting California's Energy and Climate Change Goals.* In this publication, the CEC acknowledged that California's land use patterns shape energy use and the production of GHG. Transportation contributes a large percentage of the state's GHG emissions and research shows that increasing a community or development's density and accessibility to job centers are the two most significant factors for reducing vehicle miles traveled through design (CEC 2007). CARB adopted the Scoping Plan in December 2008. Table 5.7-5 lists applicable recommended GHG reduction measures and consistency of the general plan policies with the applicable GHG emissions reduction strategies of the Scoping Plan. While the buildout of City under the proposed General Plan will cumulatively generate GHG emissions that would contribute global climate change, the land use, transportation, conservation, and housing policies of the updated General Plan facilitate and encourage smarter growth practices and environmentally sustainable development (providing more opportunities for mixed-use and transit oriented development, providing a range housing types and affordability for the workforce, and striving for jobs-housing balance to reduce VMT and vehicle trips; increasing opportunities for mass transit and alternatives modes of transportation; promoting green building design, energy, water, and resource conservation) that help counter-act greenhouse gas emissions and are inline with the goals of AB32 and SB 375. These policies are a proactive response that helps promote mobility and reduce GHG emissions by discouraging inefficient land development patterns, transportation, and housing practices that would have a greater contribution to GHG emissions.

Table 5.6-5
Scoping Plan Consistency Analysis with Applicable GHG Reduction Measures to Mitigate Climate Change in California

Applicable Recommended Reduction Strategies for Local Jurisdictions		*Project Consistency*
Sector	***Description***	
Electricity Sector/ Commercial and Residential Sector	Energy use and related activities by buildings is the second largest contributor to California's GHG emissions. Significant GHG emissions reductions can be achieved through the design and construction of new green buildings because green buildings offer a comprehensive approach to reducing GHG emissions across multiple sectors (Energy Use, Water, Waste, and Transportation). Use of solar water heaters can reduce natural gas in homes and businesses. Combined heat and power systems maximize efficiency by making use of heat to generate electricity. The draft Scoping Plan considers using the green building frameworks as a mechanism that enables GHG reductions in other sectors.	**Energy**: The City of Torrance supports energy conservation in the City. The City promotes use of energy-efficient building practices, including construction of homes that exceed Title 24 standards (Policies CR.13.8, CR.21.4, and CR.21.6). The City is considering a green building program that draws from the Leadership in Energy and Environmental Design (LEED) standards (Policies CR.24.1 and CR.24.3) and requires City buildings to achieve as many LEED-related prerequisites as possible (Policy CR.24.2). For existing homes, the City encourages owners to retrofit buildings with energy-efficient lighting (Policy CR.21.7). In addition, the City will partner with utility providers and regional agencies to inform residents and businesses about the benefits of energy conservation (Policies CR.21.2 and CR.21.5). The City also supports the development of renewable energy sources (Policy CR.21.3).
	Water use also requires significant amounts of energy. Approximately one-fifth of the electricity and a third of the non-power plant natural gas consumed	**Water**: It is the policy of the City to reduce the amount of water used for landscaping by planting native and drought-tolerant plants, using efficient irrigation systems, and collecting and recycling

Table 5.6-5
Scoping Plan Consistency Analysis with Applicable GHG Reduction Measures to Mitigate Climate Change in California

Applicable Recommended Reduction Strategies for Local Jurisdictions		Project Consistency
Sector	**Description**	
	in the state are associated with water use. Measures to increase water use efficiency and reduce water demand would reduce electricity demand from the Water sector, therefore reducing GHG emissions.	runoff (Policies CR.15.6 and CR.24.4). The City encourages use of recycled/reclaimed water (Policies CR.15.6, CR.15.8, and CR.15.9). In addition, the City will implement of water conservation projects set forth in the City's Urban Water Management Plan (Policy CR.15.7).
Transportation	Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces greenhouse gases associated with vehicle travel, as well as energy, water, and waste. Integration of the sustainable communities strategies or alternative planning strategies with local general plans will be key to the achievement of these goals.	**Transportation:** The General Plan Update for the City of Torrance includes policies that reduce vehicle miles traveled in the City through site and building design (Policies CI.3.5 and LU.4.1). It is the policy of the City of Torrance to pursue trip reduction and transportation management measures to reduce and limit congestion in the City, including use of Intelligent Transportation Systems (Policies CI.3.1, CI.3.3, and CI.4.3). In addition, the City also supports alternative transportation options. The City encourages use of regional rail, buses, bicycling, carpools, and vanpools for work trips to alleviate congestion (Policies CI.3.4 and CR.13.5), supports expanded transit use (Policies CI.7.1, CI.7.2, CI.7.3, CI.7.4, CI.7.5, CR.7.4, and CR.9.7), and encourages use of development design and amenities that encourage use of other alternative forms of transportation, including bicycling and walking (Policies LU.4.1, LU.4.2, LU.11.7, and CR.7.3). The City also promotes walking and bicycling throughout the community by installing sidewalks and requiring new development to provide pedestrian gateways (Policies CI.8.1, CI.8.2, CI.8.3, CI.8.4, and CI.8.5). The City is also exploring use of alternative fueled vehicles for Municipal operations (Policy CR.21.8)
Recycling and Waste	Recycling in the commercial sector could be substantially increased. This could be implemented, for example, through voluntary or mandatory programs, including protocols, enhanced partnerships with local governments, and provision of appropriate financial incentives.	**Recycling and Waste**: It is the policy of the City of Torrance to provide residents and business with comprehensive and efficient solid recycling services that meet state diversion requirements (Policy CR.23.1). The City will implement the policies and programs of the source reduction and recycling element (Policies CR.23.2, CR.23.5. CR.23.6. CR.23.7). In addition, the City requires recycling of a large percentage of construction and demolition waste (Policy CR.23.4).

Source: CARB 2008

CARB's Scoping Plan states that a 30 percent reduction in GHG emissions from business as usual is necessary for the state to meet the 1990 GHG emissions goal by 2020. For individual cities, CARB is recommending a GHG reduction goal of 15 percent of today's levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. Based on the objective of 15 percent reduction for Torrance's 2005 levels, Torrance's GHG emissions reduction goal is 3.1 MMTons of CO_{2e}, which represents a 0.5 MMTons CO_{2e} reduction target from existing levels (in the absence of growth in population and employment). The increase in CO_{2e} emissions at buildout year 2030, relative to current conditions, is 0.2 MMTons pursuant to the proposed Torrance General Plan update (see calculations in Appendix D).

5.6.4 Relevant General Plan Update Policies

Circulation Element

Circulation Plan

- Regulate the operation of commercial vehicles to minimize conflicts with surrounding land uses and to optimize vehicular and pedestrian mobility. (Policy CI.1.4)

- Pursue trip reduction and transportation systems management measures to reduce and limit congestion at intersections and along streets throughout the City. (Policy CI.3.1)

- Interconnect traffic signals and perform similar Intelligent Transportation System (ITS) improvements to maximize the smooth progression of traffic flows and to minimize delay and stop-and-go conditions. (Policy CI.3.3)

- Encourage the use of regional rail, buses, bicycling, carpools, and vanpools for work trips to relieve regional traffic congestion. (Policy CI.3.4)

- Encourage site and building design that reduces automobile trips and parking space demand. (Policy CI.3.5)

- Increase average vehicle ridership through the implementation of transportation demand management programs. (Policy CI.4.3)

- Coordinate with the Torrance Unified School District to explore the establishment of drop-off zones at schools where school children can be safely dropped off and picked up while reducing traffic congestion at peak hours. (Policy CI.4.5)

- Establish a system for residents and businesses to receive real-time traffic information to help plan travel routes accordingly. (Policy CI.4.8)

- Expand parking opportunities by encouraging the use of public parking lots and exploring the use of multiple-story parking structures. (Policy CI.5.3)

Alternatives to the Automobile

- Maintain and expand a public relations and information awareness program to promote transit use. (Policy CI.7.1)

- Coordinate transit planning with regional and county planning agencies to maximize local and regional services. (Policy CI.7.2)

- Support and encourage the use of public transit for local trips, trips to major employment and commercial centers, and connections to regional transportation transfer points. Policy CI.7.3:

- Establish a transit center in the City. (Policy CI.7.4)

- Enhance and encourage the provision of attractive and appropriate transit amenities, including shaded bus stops, to facilitate use of public transportation. (Policy CI.7.5)

- Provide and maintain safe, efficient, and convenient pedestrian pathways that offer access to major activity centers, recreation facilities, schools, community facilities, and transit stops. (Policy CI.8.1)

- Promote walking throughout the community by installing sidewalks where they are missing and making improvements to existing sidewalks when needed for safety purposes. Particular attention will be given to sidewalk improvements near schools and activity centers. (Policy CI.8.2)

- Require that new residential developments provide pedestrian gateways or similar outlets to abutting roadways and sidewalks. (Policy CI.8.3)

- Provide and maintain a comprehensive system of bicycle lanes to meet the needs of cyclists traveling to all destinations within the City consistent with the Bicycle Master Plan. (Policy CI.8.4)

- Promote the provision of reasonable and secure bicycle storage and shower and locker facilities at major commercial developments and employment centers. (Policy CI.8.5)

- Encourage cyclists to use routes that allow for safe cycling. (Policy CI.8.6)

- Promote bicycle safety through educational programs designed for both bicyclists and drivers. (Policy CI.8.7)

- Seek county, State, federal, and private sector assistance to help finance development of bicycle facilities. (Policy CI.8.8)

- Promote the use of compact electric or similar powered vehicles for local trips. (Policy CI.8.9)

Utility Systems

- Support the installation of new technological infrastructure throughout the City, including broadband, fiber optics, wireless, and other developing technologies. (Policy CI.9.6)

Land Use Element

Maintaining a Balanced Community

- Consider both the impact of a proposed development on surrounding property and the impact of existing uses on new development. (Policy LU.2.3)

- Establish landscape or hardscape buffers between residential and non-residential uses, where appropriate, to minimize adverse effects. (Policy LU.2.5)

- To the extent possible, preserve the balance between jobs and housing in Torrance through land use decisions. (Policy LU.2.6)

- Protect natural resources by promoting superior sustainable development. (Policy LU.2.7)

- Encourage site and building design elements in new developments that reduce or better distribute travel demand by promoting and educating residents and developers about transportation demand management strategies. (Policy LU.4.1)

- Encourage the use of development design and amenities that support transit and other alternative forms of transportation, including bicycling and walking. (Policy LU.4.2)

- Require that new development projects provide their full fair share of the improvements necessary to mitigate project-generated impacts on the circulation and infrastructure systems. (Policy LU.4.3)

Urban Design

- Encourage the use of cohesive design elements that encourage movement of pedestrians, bicycles, and other non-automotive modes of transportation between distinct commercial establishments, between commercial and residential areas, and between residential areas, schools, recreational and cultural facilities, libraries, and transit corridors and hubs. (Policy LU.11.7)

- Encourage site and building design that integrates Low Impact Development (LID) Principles. (Policy LU.11.10)

Community Resources Element

Open Space

- Require the provision of on-site open space in new developments. (Policy CR.1.2)

- Require that development projects involving modifications or additions include plans to upgrade or add open space and landscaping. (Policy CR.1.3)

- Encourage planting of new trees and preserve existing street trees in residential neighborhoods. (Policy CR.3.3)

Parks, Recreation, Cultural, and Community Enrichment

- Develop a local bikeway system to provide access to the beach and other recreational and community facilities. (Policy CR.7.3)

- Encourage use of City-sponsored transportation, ride-sharing, and the Torrance Transit System by community residents for transportation to local recreational and community facilities. (Policy CR.7.4)

- Continue to support community access to fresh and local food items and other goods at the farmers market. (Policy CR.9.7)

Resources Conservation

- Continue to participate in the efforts of the State Air Resources Board and the South Coast Air Quality Management District to meet state and federal air quality standards. (Policy CR.13.1)
- Work with neighboring cities to implement local and regional projects that improve mobility on freeways and railways, reduce emissions, and improve air quality. (Policy CR.13.2)
- Support regional air quality goals through conscientious land use and transportation planning and the implementation of resource conservation measures. (Policy CR.13.3)
- Balance the achievement of clean air with other major goals of the City. (Policy CR.13.4)
- Support air quality and energy and resources conservation by encouraging alternative modes of transportation such as walking, bicycling, transit, and carpooling. (Policy CR.13.5)
- Promote citizen awareness and participation in programs to reduce air pollution and traffic congestion. (Policy CR.13.6)
- Encourage the use of alternative fuel vehicles and re-refined oil. (Policy CR.13.7)
- Promote energy-efficient building construction and operation practices that reduce emissions and improve air quality. (Policy CR.13.8)
- Support the California Air Resources Board in its ongoing plans to implement AB32, and fully follow any new AB32-related regulations. (Policy CR.14.1)
- Develop and implement greenhouse gas emissions reduction measures, including discrete, early-action greenhouse gas-reducing measures that are technologically feasible and cost-effective. (Policy CR.14.2)
- Pursue actions recommended in the U.S. Mayors Climate Protection Agreement to meet AB 32 requirements. (Policy CR.14.3)
- Act as a leader and example in sustainability and reduction in greenhouse gas emissions by conducting City business in the most greenhouse gas-sensitive way. (Policy CR.14.4)
- Promote continued research and programs by the Metropolitan Water District, the Water Replenishment District, the West Basin Municipal Water District, and county and state agencies regarding water recycling and desalination of groundwater for domestic use. (Policy CR.15.2)
- Maximize the use of local water resources to reduce imported water supplies. (Policy CR.15.3)
- Encourage residents and businesses in Torrance to practice water conservation through incentive programs and where necessary, programs that penalize wasteful practices. (Policy CR.15.4)
- Reduce the amount of water used for landscaping through such practices as the planting of native and drought-tolerant plants, use of efficient irrigation systems, and collection and recycling of runoff. (Policy CR.15.6)

- Implement the water conservation projects set forth in the City's Urban Water Management Plan. (Policy CR.15.7)
- Expand the use of recycled water at schools, parks, and all City facilities. (Policy CR.15.8)
- Identify opportunities for increased use of reclaimed water. (Policy CR.15.9)
- Preserve specimen trees whether they occur on public or private property, and promote the planting of new trees. (Policy CR.18.1)
- Provide, maintain, and encourage appropriate street trees along all sidewalks and property frontages. (Policy CR.18.2)
- Develop and implement a comprehensive citywide street tree program that includes sidewalk-appropriate, drought-tolerant, and native species. (Policy CR.18.3)
- Promote and encourage energy resource conservation by the public sector, private sector, and local school district. (Policy CR.21.1)
- Partner with utility providers and regional agencies to inform residents and business of the financial benefits of energy conservation. (Policy CR.21.2)
- Support the development and use of non-polluting, renewable energy resources. (Policy CR.21.3)
- Encourage the construction of homes and buildings that exceed Title 24 standards. Consider adoption of regulations requiring greater energy efficiency in new or remodeled larger homes and businesses. (Policy CR.21.4)
- Educate residents and businesses about the benefits of energy efficiency technologies and practices, such as solar panels and low-energy appliances. (Policy CR.21.5)
- Promote energy-efficient design features, including appropriate site orientation, use of light-colored roofing and building materials, and use of trees to reduce fuel consumption for heating and cooling. (Policy CR.21.6)
- Encourage owners to retrofit existing buildings with energy-conserving lighting fixtures. Also encourage owners to equip new buildings with energy-efficient lighting devices and to design projects to take full advantage of natural lighting. (Policy CR.21.7)
- Explore and consider the cost/benefits of alternative fuel vehicles—including hybrid, natural gas, and hydrogen-powered vehicles–when purchasing new City vehicles. (Policy CR.21.8)
- Support legislation that requires improved fuel economy in private and commercial vehicles. (Policy CR.21.9)
- Provide residents and businesses with comprehensive and efficient solid recycling services that, at a minimum, meet state diversion mandates. (Policy CR.23.1)
- Implement the policies and programs in the Source Reduction and Recycling Element. (Policy CR.23.2)

- Establish a construction waste recycling program that mandates the recycling of a high percentage of construction and demolition waste. (Policy CR.23.4)

- Maximize composting opportunities for Torrance residents and businesses. (Policy CR.23.5)

- Work with Los Angeles County and private businesses to continue programs that encourage the recycling of electronics, tires, and motor oil. (Policy CR.23.6)

- Establish permanent collection centers within the City to meet the recycling and hazardous materials disposal needs of residents, businesses, and City government. (Policy CR.23.7)

- Encourage sustainable construction practices and the use of energy-saving technology. Consider establishing a green building program that draws from the LEED (Leadership in Energy & Environmental Design) standards. (Policy CR.24.1)

- Renovate City buildings and facilities to achieve as many LEED or LEED-related pre-requisites and credits as feasible. (Policy CR.24.2)

- Explore the feasibility of adopting green building requirements for all new commercial and industrial development projects of large scale. (Policy CR.24.3)

- Provide information to the residents and the residential development community about options for "going green" in residential construction, including option for Low Impact Development. (Policy CR.24.4)

5.6.5 Existing Plans, Policies, and Programs

State and Federal Regulations

- Building Energy Efficiency Standards (Title 24 California Code of Regulations)
- Appliance Energy Efficiency Standards (Title 20 California Code of Regulations)
- Motor Vehicle Standards (AB 1493)
- AB 32: California Global Warming Solutions Act
- Executive Order S-3-05: Greenhouse Gas Emission Reduction Targets
- Executive Order S-01-07: Low Carbon Fuel Standard Program
- SB 1368: Statewide Retail Provider Emissions Performance Standards
- SB 1078: Renewables Portfolio Standards
- SB 375: Sustainable Communities Strategies

5.6.6 Level of Significance Before Mitigation

Without mitigation, the following impacts would be **potentially significant**:

- Impact 5.6-1 Buildout of the City of Torrance would generate greenhouse gas emissions that would significantly contribute to global climate change impacts in California.

5.6.7 Mitigation Measures

6-1 The City of Torrance shall prepare a Climate Action Plan within 18 months after adopting the proposed Torrance General Plan update. The climate action plan shall include an updated inventory of greenhouse gas emission sources, including those from municipal government

operations and the community as a whole (community-wide), and a quantifiable greenhouse gas emissions reduction target. Local measures to reduce municipal government operations and communitywide greenhouse gas emissions by a minimum of 15 percent from existing levels or by a minimum of 0.7 million metric tons of carbon dioxide-equivalent (CO_{2e}) emissions at buildout shall be detailed in the climate action plan and measures shall be enforceable. The City shall monitor progress toward the greenhouse gas emissions reduction goal and prepare reports every five years that detail that progress. Measures listed below shall be considered for all new development between the time of adoption of the proposed Torrance General Plan update and adoption of the climate action plan. Local measures considered in the climate action plan shall include:

- Require all new or renovated municipal buildings to seek silver or higher Leadership in Energy and Environmental Design (LEED) standard, or compliance with similar green building rating criteria. (municipal government operations strategy)

- Require all municipal fleet purchases to be fuel-efficient vehicles for their intended use based on the fuel type, design, size, and cost efficiency. (municipal government operations strategy)

- For new development projects in Torrance that require demolition, require a demolition plan to reduce waste by recycling and/or salvaging nonhazardous construction and demolition debris. (community-wide strategy)

- Require that new developments design buildings to be energy efficient by siting them to take advantage of shade, prevailing winds, landscaping, and sun screening to reduce energy required for cooling. (community-wide strategy)

- Require that cool roofs and cool pavement be incorporated into the site design for new development. (community-wide strategy)

- Evaluate the feasibility of implementing a public transit fee to support the Los Angeles County Metropolitan Transportation Authority (Metro) in developing additional transit service in the City. (community-wide strategy)

- Require diesel emission reduction strategies to eliminate and/or reduce idling at warehouses throughout the City. (community-wide strategy)

- Install energy-efficient lighting and lighting control systems in all municipal buildings. (municipal government operations strategy)

- Require all new traffic lights installed be energy-efficient traffic signals. (municipal government operations strategy)

- Require all new landscaping irrigation systems installed in the City to be automated, high-efficient irrigation systems to reduce water use, and require use of bubbler irrigation; low-angle, low-flow spray heads; or moisture sensors. (community-wide strategy)

- Conduct energy efficiency audits of existing municipal buildings by checking, repairing, and readjusting heating, ventilation, and air conditioning systems; lighting; water heating equipment; insulation; and weatherization. (municipal government operations strategy)

6-2 Pursuant to a goal of overall consistency with the sustainable communities strategies, the City of Torrance shall evaluate new development with the development pattern set forth in the sustainable communities strategies plan or alternative planning strategy, upon adoption of the plan by the Southern California Association of Governments or South Bay Cities Council of Governments.

5.6.8 Level of Significance After Mitigation

Mitigation Measure 6-1 would require that the City develop a plan to ensure that development within the City is consistent with statewide efforts of the Scoping Plan to reduce GHG emissions and associated climate change impacts. Pursuant to the Scoping Plan, CARB that recommends jurisdictions reduce GHG emissions by 15 percent from today's levels. The City's existing GHG emissions inventory is estimated at 3.3 MMTons of CO_{2e}. Consequently, the GHG emissions reduction goal for the City under AB32 is 2.8 MMTons of CO_{2e}. At General Plan buildout the City's GHG emissions are projected to be 3.5 MMTons of CO_{2e}, which amounts to an increase of 0.2 MMTons of CO_{2e} emissions by 2030 over existing conditions. Mitigation Measure 6-1 would require the City reduce GHG emissions by 0.7 MMTons CO_{2e} to achieve a 15 percent reduction from existing levels. In addition, Mitigation Measure 6-2 would require that the City to participate in planning efforts designed to achieve reductions. Furthermore, while the buildout of City under the proposed General Plan will cumulatively generate GHG emissions that would contribute global climate change, the land use, transportation, conservation, and housing policies of the updated General Plan facilitate and encourage smarter growth practices and environmentally sustainable development (providing more opportunities for mixed-use and transit oriented development, providing a range housing types and affordability for the workforce, and striving for jobs-housing balance to reduce VMT and vehicle trips; increasing opportunities for mass transit and alternatives modes of transportation; promoting green building design, energy, water, and resource conservation) that help counter-act greenhouse gas emissions and are inline with the goals of AB32 and SB 375. These policies are a proactive response that helps promote mobility and reduce GHG emissions by discouraging inefficient land development patterns, transportation, and housing practices that would have a greater contribution to GHG emissions. Consequently, with implementation of Mitigation Measures 6-1 through 6-2 in addition to the policies integrated into the updated General Plan, Impact 5.6-1 would be less than significant.

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