2.17 Global Climate Change

This section provides background information on global climate change in addition to evaluating the unincorporated County of San Diego greenhouse gas (GHG) contributions and an evaluation of the General Plan Update's consistency with the goals and strategies of AB 32. Potential adverse impacts as a result of global climate change on the County are also addressed. Information contained in this section has been compiled from the San Diego Foundation Regional Focus 2050 Study (San Diego Foundation 2008), the San Diego County Greenhouse Gas Inventory (EPIC 2008), the County of San Diego Greenhouse Gas Emissions Inventory (DPLU 2009g), and other sources as cited throughout the document.

A summary of the global climate change impacts identified in Section 2.17.3 is provided below.

Global Climate Change Summary of Impacts

Issue Number	Issue Topic	Project Direct Impact	Project Cumulative Impact	Impact After Mitigation
1	Compliance with AB 32	Potentially Significant	Significant Cumulative Contribution	Significant and Unavoidable
2	Potential Effects of Global Climate Change on the Proposed General Plan Update	Potentially Significant	Significant Cumulative Contribution	Significant and Unavoidable

2.17.1 Existing Conditions

2.17.1.1 Climate Change Overview

Global climate change refers to any substantial change in measures of climate (such as temperature, precipitation, or wind) lasting for decades or longer. Global warming is an average increase in the temperature of the atmosphere, which can contribute to changes in global climate patterns. Some GHG, such as water vapor, occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted through human activities.

According to the EPA, the Earth's climate has changed many times during the planet's history, with events ranging from ice ages to long periods of warmth. Historically, natural factors such as volcanic eruptions, changes in the Earth's orbit, and the amount of energy released from the Sun have affected the Earth's climate. Beginning late in the 18th century, human activities associated with the Industrial Revolution have also changed the composition of the atmosphere and therefore very likely are influencing the Earth's climate. For over the past 200 years, the burning of fossil fuels, such as coal and oil, and deforestation has caused the concentrations of heat-trapping GHG to increase substantially in the atmosphere.

The accumulation of GHG in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effects of GHG, the earth's temperature would be about 34 degrees Celsius (°C) cooler. However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

The Global Carbon Project recently released an update of the global carbon budget. The atmospheric carbon dioxide (CO_2) concentration in 2007 was 383 parts per million (ppm), 37 percent above the concentration at the start of the Industrial Revolution (about 280 ppm in 1750). The 2007 concentration was the highest known concentration during the last 650,000 years and probably during the last 20 million years. Results show that anthropogenic CO_2 emissions have been growing about four times faster since 2000 than the previous decade. The annual mean growth rate of atmospheric CO_2 was 2.2 ppm per year in 2007, up from 1.8 ppm in 2006.

2.17.1.2 Greenhouse Gases

GHG are gases that trap heat in the atmosphere, analogous to the way a greenhouse retains heat. Common GHG include water vapor, CO_2, methane (CH_4), nitrous oxides (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), ozone (O_3), and aerosols. Global atmospheric concentrations of CO_2, CH_4 and N_2O have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years.

Individual GHGs have varying potential to contribute to global warming (GWP) and atmospheric lifetimes (see Table 2.17-1). The CO_2 equivalent (CO_2e) is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent measure. The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of one. By comparison, the GWP of CH_4 is 21. This means that CH_4 has a greater global warming effect than CO_2 on a molecule per molecule basis. One million metric tons of CO_2 equivalent (MMT CO_2e) is the mass emissions of an individual GHG multiplied by its GWP.

State law defines GHGs to include the following compounds: CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 (Health and Safety Code, Section 38505(g).) Descriptions of these compounds and their sources are provided below.

Carbon Dioxide (CO2)

CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions such as through the manufacturing of cement. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil and gas in power plants, automobiles, industrial facilities and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production and the use of petroleum-based products can also lead to CO_2 emissions. Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Natural sources of CO_2 occur within the carbon cycle where billions of tons of atmospheric CO_2 are removed from the atmosphere by oceans and growing plants, also known as 'sinks,' and are emitted back into the atmosphere annually through natural processes also known as 'sources.' When in balance, the total carbon dioxide emissions and removals from the entire carbon cycle are roughly equal. Since the Industrial Revolution in the 1700s, human activities, such as the burning of oil, coal and gas or deforestation, have increased CO_2 concentrations in the atmosphere. In 2005, global atmospheric concentrations of CO_2 were 35 percent higher than they were before the Industrial Revolution (EPA 2008b).

Methane (CH_4)

CH_4 is emitted from a variety of both human-related and natural sources. Human-related activities include fossil fuel production, animal husbandry, rice cultivation, biomass burning, and waste management. CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. It is estimated that 60 percent of global CH_4 emissions are related to human-related activities. Natural sources of CH_4 include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. CH_4 emission levels from a source can vary significantly from one country or region to another, depending on many factors such as climate, industrial and agricultural production characteristics, energy types and usage, and waste management practices. For example, temperature and moisture have a significant effect on the anaerobic digestion process, which is one of the key biological processes that cause CH_4 emissions in both human-related and natural sources. Also, the implementation of technologies to capture and utilize CH_4 from sources such as landfills, coal mines, and manure management systems affects the emission levels from these sources (EPA 2008b).

Nitrous Oxide (N_2O)

N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. N_2O emission levels from a source can vary significantly from one country or region to another, depending on many factors such as industrial and agricultural production characteristics, combustion technologies, waste management practices, and climate. For example, heavy utilization of synthetic nitrogen fertilizers in crop production typically results in significantly more N_2O emissions from agricultural soils than that occurring from less intensive, low-tillage techniques. Also, the presence or absence of control devices on combustion sources, such as catalytic converters on automobiles, can have a significant affect on the level of N_2O emissions from these types of sources (EPA 2008b).

Fluorinated Gases

HFCs, PFCs, and SF_6 are synthetic, powerful GHGs that are emitted from a variety of industrial processes, including aluminum production, semiconductor manufacturing, electric power transmission, magnesium production and processing, and the production of Chlorodifluoromethane (HCFC-22), commonly used in air conditioning applications. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances, such as CFCs, Hydrochlorofluorocarbons (HCFCs), and halons. These gases are typically emitted in smaller quantities, but have higher GWP than other GHGs (EPA 2008b).

2.17.1.3 GHG Emissions

In an effort to evaluate and reduce the potential adverse impact of global climate change, international, State and local organizations have conducted GHG inventories to estimate their

levels of GHG emissions and removals. The following summarizes the results of these global, national, State and countywide GHG inventories.

Global

Worldwide anthropogenic emissions of GHG in 2006 were approximately 49,000 million metric tons (MMT) of CO_2e, including ongoing emissions from industrial and agricultural sources and emissions from land use changes (i.e., deforestation, biomass decay) (IPCC 2007). CO_2 emissions from fossil fuel use accounts for 56.6 percent of the total emissions of 49,000 MMT CO_2e (includes land use changes) and all CO_2 emissions are 76.7 percent of the total. CH_4 emissions account for 14.3 percent and N_2O emissions for 7.9 percent of GHG (IPCC 2007).

United States (U.S.)

The EPA publication, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006,* provides a comprehensive emissions inventory of the nation's primary anthropogenic sources and sinks of GHG. In 2006, total U.S. GHG emissions were 7,054.2 teragrams (Tg) or MMT CO_2e. Overall, total U.S. emissions have risen by 14.7 percent from 1990 to 2006, while the U.S. gross domestic product has increased by 59 percent over the same period. Emissions fell from 2005 to 2006, decreasing by 1.1 percent (75.7 MMT CO_2e). The publication indicated that the following factors were primary contributors to this decrease: 1) compared to 2005, 2006 had warmer conditions, which decreased consumption of heating fuels, as well as cooler summer conditions, which reduced demand for electricity, 2) restraint on fuel consumption caused by rising fuel prices, primarily in the transportation sector, and 3) increased use of natural gas and renewables in the electric power sector (EPA 2008c).

California

The State of California is a substantial contributor of GHG as it is the second largest contributor in the U.S. and the 16th largest in the world. According to the California Air Resources Board (CARB), California generated 484 MMT CO_2e in 2004. Table 2.17-2 provides CARB data on California GHG emissions by sector in 2004. GHG emissions in California are mainly associated with fossil fuel consumption in the transportation sector (38 percent) with the industrial sector as the second-largest source (20 percent). Electricity production, from both in-state and out-of-state sources, agriculture, forestry, commercial, and residential activities comprise the balance of California's GHG emissions. Emissions of GHG were offset slightly in 2004 by the sequestration (intake) of carbon within forests, reducing the overall emissions by 4.7 MMT CO2e, resulting in net emissions of about 480 MMT CO2e.

San Diego County

In addition to the State of California GHG Inventory, a more specific regional GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center (EPIC) in 2008. This San Diego County GHG Inventory is a detailed inventory that takes into account the unique characteristics of the region in calculating emissions. A summary of the inventory results, by category and percent contribution for the year 2006, is provided in Table 2.17-3.

Table 2.17-3 shows that in 2006, a total of 34.4 MMT CO_2e was generated by the County of San Diego. This total includes both the incorporated and unincorporated areas. Not surprisingly, the

largest contributor of GHG was from the on-road transportation category, which comprised 46 percent (16 MMT CO_2e) of the total amount. The second highest contributor was the electricity category, which contributed 9 MMT CO_2e, or 25 percent of the total. Together the on-road transportation and electricity category comprised 71 percent of the total GHG emissions for the County. The remaining amount was contributed by natural gas consumption, civil aviation, industrial processes, off-road transportation, waste, agriculture, rail, water-borne navigation, and other fuels.

Emissions associated with the County's operations and its jurisdictional land use area (the unincorporated area) were calculated by the County in an inventory prepared for this EIR (DPLU 2009g). The inventory is discussed in greater detail in Section 2.17.3.1 below and is included in Appendix K of the EIR. The County's inventory includes 2006 emissions, which can be considered a subset of the 2006 emissions in the EPIC inventory. Tables 2.17-4, 2.17-6, and 2.17-7 include the 2006 County emissions. A total of 5.6 MMT CO_2e was generated by the unincorporated communities and 0.16 MMT CO_2e from County government operations. These emissions account for about 17 percent of the total emissions from the region. Similar to the region, the two highest contributors for the unincorporated communities were the on-road transportation and electric categories with 52 and 25 percent, respectively. For the government operation, employee commute, buildings, and vehicle fleet, comprised the large majority of the contributions with 45, 34, and 19 percent of the emissions, respectively.

2.17.1.4 Potential Effects of Global Climate Change

Many elements of human society and the environment are sensitive to climate variability and change. Human health, agriculture, natural ecosystems, coastal areas, and heating and cooling requirements are examples of climate-sensitive systems. Rising average temperatures are already affecting the environment. Some observed changes include shrinking of glaciers, thawing of permafrost, later seasonal freezing and earlier break-up of ice on rivers and lakes, lengthening of growing seasons, shifts in plant and animal ranges and earlier flowering of trees. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide, methane, nitrous oxide, and other GHG (or heat-trapping) to the atmosphere.

The extent of climate change effects, and whether these effects prove harmful or beneficial, will vary by region, over time, and with the ability of different societal and environmental systems to adapt to or cope with the change (EPA 2008b). The IPCC estimates that for increases in global mean temperature of less than 1-3 °C (1.8-5.4 degrees Fahrenheit (°F)) above 1990 levels, some places and sectors will see beneficial impacts while others will experience harmful ones. However, some low-latitude and polar regions are expected to experience adverse effects even for small increases in temperature. For increases in temperature greater than 2-3 °C (3.6-5.4 °C), the IPCC says it is very likely that all regions will experience either declines in beneficial effects or increases in adverse effects. "Taken as a whole," the IPCC concludes, "the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time" (EPA 2008b).

2.17.2 Regulatory Framework

2.17.2.1 International

United Nations Framework Convention on Climate Change (UNFCCC)

On March 21, 1994, the U.S. joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and

adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Intergovernmental Panel of Climate Change (IPCC)

In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis for human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

Kyoto Protocol

The treaty known as the Kyoto Protocol was created as a result of UNFCC efforts. Countries signed the treaty to demonstrate their commitment to reducing GHG emissions or to engaging in emissions trading. More than 160 countries representing 55 percent of global emissions (not including the U.S.) are currently participating in the protocol. In 1998, U.S. Vice President, Al Gore, symbolically signed the Protocol; however, in order for the Protocol to be formally ratified the U.S. Congress must adopt it, which has not yet occurred.

2.17.2.2 Federal

U.S. Environmental Protection Agency (EPA)

The EPA is the federal agency responsible for setting and enforcing the federal ambient air quality standards for atmospheric pollutants. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The EPA also has jurisdiction over emission sources outside State waters (outer continental shelf), and establishes various emissions standards for vehicles sold in states other than California.

The EPA currently does not regulate GHG emissions from motor vehicles. In a recent court case, *Massachusetts v. EPA* (Supreme Court Case 05-1120) it was argued before the U.S. Supreme Court on November 29, 2006, in which it was petitioned that EPA regulate four GHG, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was rendered

on April 2, 2007, in which the Court held that petitioners have standing to challenge the EPA and that the EPA has statutory authority to regulate emission of GHG from motor vehicles. EPA is now in the midst of the rulemaking process to respond to this ruling. On May 19, 2009, President Obama proposed a new national fuel economy program which adopts uniform federal standards to regulate both fuel economy and GHG emissions while preserving the legal authorities of DOT, EPA and California. Development of this program is underway.

Federal Clean Air Act (CAA)

The Federal CAA, as amended, establishes air quality standards for several pollutants. These standards are divided into primary standards and secondary standards. Primary standards are designed to protect public health, and secondary standards are intended to protect public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. The CAA requires that regional plans be prepared for non-attainment areas illustrating how the federal air quality standards could be met. The CARB approved the most recent revision of the SIP in 1994, and submitted it to the EPA. The SIP, approved by the EPA in 1996, consists of a list of ROG and NOx control measures for demonstrating future attainment of ozone standards. The steps to achieve attainment will continue to require significant emissions reductions in both stationary and mobile sources.

Lieberman-Warner Climate Security Act

The Lieberman-Warner Climate Security Act (S. 2191) is the first GHG cap-and-trade legislation approved by a full Congressional committee on December 5, 2007. The bill, as passed by the Senate Environment and Public Works Committee in an 11-8 vote, would establish a cap-and-trade program within the U.S. requiring a 70 percent reduction in GHG emissions from covered sources, which represent over 80 percent of total U.S. emissions. The bill as amended also includes complementary policies, such as a low carbon fuel standard and provisions aimed at enhancing energy efficiency. The cap on facilities producing HFCs would start in 2010 at 300 MMT CO_2e and decline to 90 MMTCO_2e by 2037, remaining at that level through 2050. Emissions from all other covered facilities would be capped at 5,775 MMTCO_2e in 2012, with this cap decreasing annually to 1,732 MMTCO_2e in 2050. The two caps combined would result in roughly a 19 percent reduction from 2005 levels in 2020 and a 70 percent reduction from 2005 levels by 2050. Taken together, the bill would reduce overall U.S. GHG emissions by 63 percent by 2050.[1]

2.17.2.3 State

California Air Resources Board (CARB)

The CARB, a part of the California EPA (Cal EPA) is responsible for the coordination and administration of both federal and State air pollution control programs within California. In this capacity, the CARB conducts research, sets State ambient air quality standards, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. The CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular

[1] The Pew Center on Global Climate Change, U.S. Federal Action on Climate Change, <www.pewclimate.org/federal/analysis/congress/110/lieberman-warner>, accessed April 28, 2008.

emissions. The CARB also has primary responsibility for the development of California's State Implementation Plan, for which it works closely with the federal government and the local air districts.

California Code of Regulations (CCR) Title 24

Although it was not originally intended to reduce GHGs, California Code of Regulations Title 24 Part 6: *California's Energy Efficiency Standards for Residential and Nonresidential Buildings* were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The Energy Commission adopted 2008 Standards on April 23, 2008 and the Building Standards Commission approved them for publication on September 11, 2008. The 2008 updates will become effective on August 1, 2009. The Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards for the following reasons to: 1) provide California with an adequate, reasonably priced, and environmentally sound supply of energy; 2) respond to Assembly Bill 32, the Global Warming Solutions Act of 2006, which mandates that California must reduce its GHG emissions to 1990 levels by 2020; 3) pursue California energy policy that energy efficiency is the resource of first choice for meeting California's energy needs; 4) act on the findings of California's Integrated Energy Policy Report (IEPR), which finds that Standards are the most cost effective means to achieve energy efficiency; expects the Building Energy Efficiency Standards to continue to be upgraded over time to reduce electricity and peak demand; and recognizes the role of the Standards in reducing energy related to meeting California's water needs and in reducing GHG emissions; 5) meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of State building codes; and 6) meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards. Energy efficient buildings require less electricity, and electricity production by fossil fuels results in GHG emissions. Therefore, increased energy efficiency results in decreased GHG emissions.

California Assembly Bill (AB) 1493

California AB 1493 (Pavley) enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHG emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB will apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from the light duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030.[2] However, the Federal EPA has not issued a waiver needed by the State in order to enforce this law. The waiver was denied in 2007 but is currently being reconsidered.

Executive Order S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. The California Climate Action Team's first Report (CAT Report) to the Governor in 2006, contains recommendations and strategies to help ensure

[2] California Air Resources Board, *Fact Sheet, Climate Change Emission Control Regulations*, December 2004, <www.arb.ca.gov/cc/factsheets/cc_newfs.pdf>, accessed April 28, 2008.

the targets in Executive Order S-3-05 are met.[3] A second report is currently in draft form and available on the California Climate Action Team website: http://www.climatechange.ca.gov/publications/cat/index.html.

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 (Health and Safety Code Section 38500 et seq.)

In September 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing GHG in California. GHG as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Under AB 32, CARB has the primary responsibility for reducing GHG emissions and continues the CAT to coordinate Statewide efforts and promote strategies that can be undertaken by many other California agencies. AB 32 requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to State-wide levels in 1990 by 2020.

In general, AB 32 directs the CARB to do the following:

- Make publicly available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the Statewide GHG limit and the measures required to achieve compliance with the Statewide limit;
- Make publicly available a GHG inventory for the year 1990 and determine target levels for 2020;
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;
- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the Statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources that CARB finds necessary to achieve the Statewide GHG emissions limit; and
- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

Regarding the first two bullets, CARB has already made available a list of discrete early action GHG emission reduction measures. CARB has also published a staff report titled *California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit* that determined the Statewide levels of GHG emissions in 1990. CARB identified 427 MMT CO_2e as the total Statewide aggregated GHG 1990 emissions level and 2020 emissions limit. In December 2008, CARB adopted the AB 32 Scoping Plan which contains the main strategies California will use to reduce the GHGs that cause climate change. The scoping plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program.

[3] State of California, Environmental Protection Agency, Climate Action Team, *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*, March 2006.

AB 32 requires CARB to prepare a Scoping Plan to achieve reductions in GHG emissions in California. The AB 32 Scoping Plan contains the main strategies California will use to reduce the GHGs that contribute to climate change. The Scoping Plan includes a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. These measures have been introduced through four workshops that were held between November 30, 2007 and April 17, 2008. A draft Scoping Plan was released for public review and comment on June 26, 2008 followed by more workshops in July and August, 2008. The Proposed Scoping Plan was released on October 15, 2008 and approved at the Board hearing on December 11, 2008. The plan utilizes SB 375 as the mechanism to achieve land use and vehicle mile travel reduction goals and proposes full deployment of the California Solar Initiative, high-speed rail, water-related energy efficiency measures and a range of regulations to reduce emissions from trucks and from ships docked in California ports. There are also measures designed to safely reduce or recover a range of very potent GHG, such as CH_4 and N_20, which have a much higher GWP than CO_2 (see Table 2.17-1).

Executive Order S-01-07

Governor Arnold Schwarzenegger signed Executive Order S-01-07 on January 18, 2007. The order mandates that a State-wide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. The process for meeting the 2020 target includes coordination between Cal EPA, the University of California, and the California Energy Commission to develop and propose a draft compliance schedule to meet the 2020 Target by June 30, 2007. The order also requires that a Low Carbon Fuel Standard for transportation be established for California.

Senate Bill (SB) 97

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directs OPR to develop draft CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" by July 1, 2009 and directs the Resources Agency to certify and adopt the CEQA Guidelines by January 1, 2010. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the State CEQA Guidelines. The Natural Resources Agency will conduct formal rulemaking prior to certifying and adopting the amendments. In accordance with CEQA Guidelines Section 15007, this EIR will not need revisions as a result of the changes to the CEQA Guidelines if they go into effect after the EIR is sent out for public review.

Senate Bill (SB) 375

SB 375 provides a land use and transportation policy to meet the goals of AB 32. SB 375 builds on the existing regional transportation planning process (which is overseen by local elected officials with land use responsibilities) to connect the reduction of GHG emissions from cars and light trucks to land use and transportation policy. SB 375 requires the CARB to establish the GHG emission reduction targets for each region (as opposed to individual cities or households) and to review the region's determination that its plan achieves those targets. SB 375 has three goals to: 1) use the regional transportation planning process to help achieve AB 32 goals; 2) use CEQA streamlining as an incentive to encourage residential projects which help achieve AB

32 goals to reduce GHG emissions; and 3) coordinate the regional housing needs allocation process with the regional transportation planning process.

Senate Bill (SB) 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities by February 1, 2007. Similarly, the California Energy Commission (CEC) was tasked with establishing a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and the CEC. In January 2007, the PUC adopted an interim GHG Emissions Performance Standard, which requires that all new long-term commitments for baseload generation entered into by investor-owned utilities have emissions no greater than a combined cycle gas turbine plant (i.e., 1,100 pounds of CO_2 per megawatt-hour). A "new long-term commitment" refers to new plant investments (new construction), new or renewal contracts with a term of 5 years or more, or major investments by the utility in its existing baseload power plants. In May 2007, the CEC approved regulations that prohibit the State's publicly owned utilities from entering into long-term financial commitments with plants that exceed the standard adopted by the PUC of 1,100 pounds of CO_2 per megawatt hour.

Senate Bill (SB) 1078

SB 1078 establishes a renewable portfolio standard (RPS) for electricity supply. The RPS requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide 20 percent of their supply from renewable sources by 2017. This target date was moved forward by SB 107 to require compliance by 2010. In addition, electricity providers subject to the RPS must increase their renewable share by at least 1 percent each year. The outcomes of this legislation will impact regional transportation powered by electricity.

Additional California Climate Change Initiatives

The Western Regional Climate Action Initiative was signed on February 26, 2007 by five states: 1) Washington, 2) Oregon, 3) Arizona, 4) New Mexico, and 5) California. British Columbia, Canada joined on April 20, 2007. The Initiative calls for collaboration to identify, evaluate, and implement ways to reduce GHG emissions in the states collectively and to achieve related co-benefits. The Initiative calls for designing a regional market-based multi-sector mechanism, such as a load-based cap and trade program by August 2008. In addition, a multi-state registry will track, manage, and credit entities that reduce GHG emissions. California is also exploring the possibility of cap and trade systems for GHGs. The Market Advisory Committee to CARB published draft recommendations for designing a GHG cap and trade system for California.[4]

[4] Recommendations of the Market Advisory Committee to the California Air Resources Board, *Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California,* June 30, 2007, p. iii.

In December 2007, the CEC adopted requirements that new residential construction be designed to meet zero net energy by 2020 with commercial construction meeting this requirement by 2030.[5]

2.17.2.4 Local

San Diego Air Pollution Control District (APCD)

The APCD has jurisdiction over air quality programs in San Diego County. The APCD regulates most air pollutant sources, except for mobile sources, which are regulated by the CARB or EPA. State and local government projects, as well as projects proposed by the private sector, are subject to APCD requirements if the sources are regulated by the APCD. Additionally, the APCD, along with the CARB, maintains and operates ambient air quality monitoring stations at numerous locations throughout San Diego County. These stations are used to measure and monitor criteria and toxic air pollutant levels in the ambient air.

Under the requirements of the CCAA, each local air district is required to develop its own strategies to achieve both State and federal air quality standards for its air basin. Accordingly, the San Diego Regional Air Quality Strategy (RAQS) was developed pursuant to CCAA requirements and identifies feasible emission control measures to provide expeditious progress in San Diego County toward attaining the State ozone standard. The APCD is responsible for the overall development and implementation of the RAQS.

The ARB's Scoping Plan includes a role for APCD in adopting standards, inventories, and enforcement procedures for reducing GHG, similar to the way in which criteria pollutants are currently regulated in the County. APCD's strategy for regulating GHGs would be developed once the ARB adopts final regulations and programs pursuant to AB 32.

2.17.3 Analysis of Project Effects and Determination of Significance

2.17.3.1 Issue 1: Compliance with AB 32

Guidelines for Determination of Significance

The CARB has authority to regulate GHG emissions as necessary to meet the emission reduction goals of AB 32. This may include establishing GHG emission reduction requirements for new land use projects and recommendations for Statewide GHG significance thresholds for CEQA studies. However, the CARB has not yet acted on either item.

CEQA gives a lead agency the discretion to determine the significance of environmental impacts identified in its CEQA documents. The County of San Diego has not yet established guidelines for determining significance for climate change In order for the proposed General Plan Update to not conflict with the goals and strategies of AB 32, the Plan needs to reduce GHG emissions to 1990 levels by 2020.

[5] Keith Roberts, Greenhouse Gas Coordinator, City of Sacramento, Written Communication, May 2008.

Impact Analysis

As part of the EIR process for the General Plan Update, the County of San Diego conducted an inventory of GHG emissions for the unincorporated County for the years 1990, 2006 (baseline conditions), and 2020 (project conditions). Although the horizon year for the General Plan Update is 2030, AB 32 requirements indicate the year 2020 as the limit by which GHG emissions need to be reduced to 1990 levels. Therefore, in order to determine the required reduction necessary for the County to comply with AB 32, the future year of 2020 is used for this analysis. The full report is provided in Appendix K of this EIR. The GHG inventory is divided into two sources: emissions from 1) County government facilities and operations (Government Operations Analysis); and 2) emissions related to land uses within the unincorporated area (Community Analysis).

Governmental Operations Analysis

The GHG emissions for both the 1990 and 2006 Government Operations Analysis were calculated using the Clean Air & Climate Protection (CACP) model which was developed by the National Association of Clean Air Agencies (NACAA), the International Council for Local Environmental Initiatives (ICLEI) and Torre Smith Associates. This program was chosen to be used over the Local Government Operations Protocol released in September 2008 due to the lack of detailed data needed to use the newly released protocol.

The Government Analysis inventory focused on GHG emissions that result from five categories:

1. Electricity and natural gas usage from operation of County buildings;
2. Fuel consumption from operation of the County owned vehicles;
3. Fuel consumption from County employee-owned vehicles (commutes);
4. Water usage from County operations; and
5. Waste generation from County operations.

Emission estimates for 2006 are the most accurate, and are discussed first. Limited data was available for the 1990 inventory. Where data was unavailable, regressive estimates were made using assumptions from 2006 data. Projections of 2020 emissions were calculated using the CACP model based on existing (2006) emission rates. Results and assumptions of the Governmental Operations Analysis are discussed below. Table 2.17-4 summarizes the results of the GHG emissions from government operations.

Government Buildings

Overall, 2006 data for energy and natural gas consumption from County government buildings was readily available and provided by SDG&E. In 2006, the County's electricity consumption from all its buildings, including street lights, was 115,354,851 kWh. The total County operational natural gas consumption for 2006 was 2,540,445 therms. Based on these results, the CACP model calculated the 2006 GHG emissions from the County's electricity and natural gas consumption to be 54,429 metric tons of CO_2e.

Operation data for electricity and natural gas consumption in 1990 was not available from SDG&E. In order to estimate 1990 totals, electricity and natural gas usage were regressed using a methodology based on employee usage rates. The 2006 overall electricity and natural

gas consumption was divided by the number of employees to get an annual usage rate per employee. These numbers were then multiplied by the number of employees the County had in 1990 to calculate the total kWh and therms. Based on these results, the CACP model calculated the 1990 GHG emissions from the County's electricity and natural gas consumption to be 48,399 metric tons of CO_2e.

The projections for 2020 GHG emissions from County government buildings under a "Business as Usual" (BAU) scenario are estimated to increase to 71,022 metric tons of CO_2e. This scenario does not include any measures incorporated by the County designed to reduce GHG emissions.

Vehicle Fleet

Although 2006 information on County's vehicle fleet mix and fuel consumption was readily available, 1990 data was limited to fuel consumption only. Therefore, an assumption on the 1990 composition of the fleet mix was based on existing (2006) data.

In 2006, the County's fleet consumed 2,675,949 gallons of unleaded gasoline, 383,391 gallons of diesel and 14,315 gallons of natural gas. The details of the vehicles and equipment that compose the County's fleet are included in Appendix K. Fuel consumption for each vehicle category is based on its proportion within the entire County fleet. For example, the County owns 1,045 vehicles in the light truck/SUV/pickup vehicle category, which comprises about 32 percent of the overall fleet of gasoline engines. Therefore, this category is assumed to consume 32 percent of the gasoline usage for 2006. It was assumed that 100 percent of the diesel consumed was in the CACP category of heavy trucks and the 100 percent of the natural gas consumed was applied to the CACP vehicle passenger vehicle category. In 2006, the total GHG emissions for the County's fleet was estimated at 22,071 metric tons CO_2e.

Fuel consumption data for 1990 by the County's fleet is estimated to be 1,976,629 gallons of gasoline and 281,690 gallons of diesel. No natural gas vehicles were included in the County's fleet in 1990. Information regarding the 1990 County fleet mix is unavailable, so the 2006 fleet mix proportions were applied to the 1990 fuel consumption total. Using these assumptions, the total CO_2e for the County's fleet in 1990 was estimated at 22,071 metric tons.

The projections for 2020 GHG emissions from operation of the County's vehicle fleet under the BAU scenario is estimated to increase to 29,696 metric tons of CO_2e.

Employee Commute

Generation of GHG from County employee commuter trips was estimated using VMT data for fuel types. According to SANDAG, the region-wide daily average one-way work commute distance in 2006 was 13.3 miles. This was then multiplied by 2 for the round trip then by the number of County employees (17,573) for that year to get a daily amount of 467,442 VMT and an annual amount of 121,534,868 VMT from the employee commute.[6] Average vehicle mix and fuel types were then assumed and the emissions from employee commuter trips in 2006 was estimated at 72,797 metric tons CO_2e.

[6] This is a conservative estimate that includes 5 commuting days/week and 52 weeks/year and does not account for employee holidays, sick days, or vacations.

According to SANDAG, the region-wide daily average one-way work commute distance in 1990 was 10.27 miles. Using the same approach in calculating total annual VMT (89,991,080) and using the same percentages of vehicle mix for the employee commute as the existing (2006) condition, the total CO_2e in 1990 was estimated at 63,255 metric tons.

The projection of GHG emissions from employee commutes in 2020 is estimated to be 70,201 metric tons of CO_2e. This projection is the output from the CACP model, which is based on previous assumptions for the 1990 levels and the base year of 2006.

Water

In 2006, the County used approximately 703 million gallons of water as a part of its government operations. According to the Demand Response Research Center, Water Supply Related Electricity Demand in California 2006, the embodied energy in water is equivalent to 0.0085 kWh/gal. This number multiplied by the total 2006 County water usage is 5.97 million kWh. According to the CACP model, that translates to 2,080 metric tons of CO_2e.

Total water consumption data by the County for 1990 was not readily available. Using the 2006 data, a per employee annual water consumption kWh rate was calculated by dividing the total kWh from water consumption by the number of employees. This number was then multiplied by the number of 1990 employees (16,851 employees) for a total 5.73 million kWh from water usage. Using this number the CACP model calculated a total of 1,799 metric tons of CO_2e.

The CACP model bases 2020 projections on previous water consumption assumptions for the 1990 levels and the base year of 2006. The CACP model estimates the 2020 County's operational water usage will result in the GHG emission rate of 2,939 metric tons of CO_2e.

Waste

Estimations of GHG emissions from the generation of waste products were also estimated for County operations. The following categories of waste are included in the CACP model: paper products; food waste; plant debris; wood/textiles; and other waste. Most of the waste generated by the County is paper products from office work and packaging products. Waste amounts per category were based on default California waste characterization for "public administration" from the California Integrated Waste Management Board. The same percentages were used for the 2006, 1990, and 2020 totals.

Records on the amount waste generated by the County and its operations were not readily available. To calculate waste totals in tonnage, the waste generation rate provided by the Office of Federal Environmental Executive of 1.6 pounds per employee per day was used. In 2006, there were 17,573 County employees, totaling 3,515 tons of waste per year. Using "Managed Landfill" as the waste disposal technology used, the 2006 total CO_2e from waste was calculated to be 1,751 metric tons.

In 1990, there were 16,851 County employees, which amounts to 3,370 tons of waste per year. This amount generates a total of 1,680 of CO_2e from waste from County operations.

Assuming no net increase in the number of County employees in 2020, the CACP model, bases its 2020 projections on the previous waste assumptions used for the 1990 levels and the base year of 2006. Based on this usage, the projection of GHG emissions for 2020 from employee

waste is estimated to be 1,751 metric tons of CO_2e, which is equivalent to the base year of 2006.

Community Analysis

A specific regional GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center (EPIC)[7]. The EPIC study is a detailed inventory that takes into account the unique characteristics of the region in calculating emissions. The GHG inventory calculated GHG emissions for 1990, 2006 and projected out emissions for 2020. To the extent possible the EPIC inventory followed the same calculation methodology used by the CARB to develop the State-wide GHG inventory. However, in some instances when doing so would yield more accurate data, the EPIC inventory modified the CARB method.

The County has chosen to use the EPIC study as the basis of the Community Analysis GHG Inventory. Totals for the various categories were calculated using either a per capita or per VMT approach. The per capita methodology uses SANDAG population numbers for the 1990, 2006 and 2020 estimates. Table 2.17-5 includes the population numbers for both the entire region and the unincorporated area of San Diego County for the years 1990, 2006 and 2020. Table 2.17-6 summarizes the results of the emissions estimates provided for each community sector.

The Community Analysis inventory focused on GHG emissions that result from the following categories:

1. Electricity;
2. Waste;
3. On-road Transportation;
4. Off-Road Equipment and Vehicles;
5. Natural Gas;
6. Other Fuels;
7. Wildfires; and
8. Agriculture (Livestock).

Electricity

According to the EPIC inventory, the GHG emissions from the electricity sector for the entire region in 2006 were 9 MMT CO_2e. The electricity sector included all of the following uses when calculating total electricity consumption: residential; commercial; industrial; mining; agriculture; transportation, communication and utilities (TCU); and street lighting. The 2006 population for the entire County (both incorporated and unincorporated areas) was 3,065,077. This equates to a per capita CO_2e of 2.9 metric tons. This per capita equivalent was then multiplied by the population of the unincorporated area in 2006 (439,374) to get a total of 1,391,224 metric tons of CO_2e for the electricity sector of the unincorporated area.

The 1990 levels were calculated in the same manner. According to the EPIC inventory, the total CO_2e for the entire region in 1990 was 6.5 MMT. In 1990 the population for the entire County, including all jurisdictions, was 2,498,016. This equates to a per capita CO_2e of 2.6 metric tons.

[7] The document is titled, "San Diego County Greenhouse Gas Inventory: An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets" and is available online at http://www.sandiego.edu/epic/ghginventory/.

When multiplied by the 1990 population of the unincorporated area (397,763) the result is a total of 1,035,005 metric tons of CO_2e for the electricity sector of the unincorporated area.

Similarly, the 2020 forecasts for the unincorporated area were calculated on a per capita approach based on the EPIC inventory's 2020 numbers. The total GHG emissions forecast for the region were divided by SANDAG's projected regional population (3,635,855), and then multiplied by SANDAG's projected population for the unincorporated area (627,142) for a total of 1,897,370 MMT CO_2e.

The EPIC inventory considered all electricity consumed in the San Diego region, which includes electricity used by commercial (the greatest consumer of electricity), industrial and residential uses. Since most of the commercial uses are found in the incorporated jurisdictions of the County, the per capita approach is a very conservative approach and probably overestimates the CO_2e for the unincorporated area of the County.

Waste

Emissions from landfills and wastewater treatment constitute about 2 percent of GHG in the region. Biodegradable, carbon-bearing wastes decompose under largely anaerobic conditions to produce landfill gas composed of approximately 50 percent CH_4 and 50 percent CO_2. CH_4 is a more powerful GHG by a factor of 21 than CO_2 and degradable wastes in landfill continue to degrade for several decades. The treatment of domestic wastewater also results in the release of CH_4 as well as NO_x.

The GHG emission total for the San Diego region in 2006 from landfill and wastewater treatment was 700,000 metric tons CO_2e. This equates to a per capita annual rate of 0.23 metric tons of CO_2e. When multiplied by the population of the unincorporated area for the year 2006, the total for waste was 100,287 metric tons CO_2e.

According to the EPIC inventory, the total waste emissions in 1990 were actually higher than the 2006 levels at 900,000 metric tons CO_2e. Since at least 1997, both biogas and landfill gas have been captured for combustion and electricity production. This resulted in a nearly 30 percent reduction in GHG emissions. Using the per capita approach, the average person generated 0.36 metric tons of CO_2e per year. When multiplied by the population of the unincorporated area for the year 1990, the total for waste was 143,308 metric tons CO_2e.

The same approach was used to generate 2020 forecasts for the unincorporated area based on the EPIC inventory's 2020 numbers. The total GHG emissions forecasted for the region (900,000 metric tons) were divided by SANDAG's projected regional population (3,635,855), and then multiplied by SANDAG's projected population for the unincorporated area (627,142) for a total of 155,239 metric tons of CO_2e.

On-Road Transportation

On-road transportation is the single largest contributor of GHG emissions in the San Diego region. According to the SDCGHCI, the total CO_2e emissions related to transportation for the entire region was 16 MMT in 2006, which accounted for 46 percent of the total GHG inventory. On-road transportation sources include the following vehicles traveling on roadways in the San Diego region: passenger cars; light-, medium-, and heavy-duty trucks; buses; motor homes; and motorcycles. The SDCGHCI report followed the same calculation methodology used by the

CARB, modified as applicable to yield more precise results. The analysis considered CO_2, N_2O and CH_4.

In the on-road transportation category, the methodology uses a percentage of the total VMT as a more accurate predictor of GHG emissions than the per capita method. The total daily VMT for the unincorporated area was divided by the total daily VMT for the entire region (provided by SANDAG based on its regional traffic models) to determine the percentage of trips in the unincorporated area of the County. This percentage (18.27) was then multiplied by the 16 MMT CO_2e calculated for 2006 to get a total of 2.92 MMT CO_2e emissions associated with on-road transportation.

The 1990 CO_2e total for the transportation sector was calculated in the same manner. The SDCGHCI report estimates the total 1990 emissions from on-road transportation as 14.3 MMT CO_2e. The total daily VMT for the unincorporated area was divided by the total daily VMT for the entire region to determine the percentage of trips in the unincorporated area of the County. This percentage (19.16) was then multiplied by the 14.3 MMT CO_2e for 1990 to get a total of 2.74 MMT CO_2e emissions associated with on-road transportation.

2020 VMT totals for the unincorporated area were not readily available from SANDAG so the 2006 percentage (18.27) was applied to the estimated 2020 GHG totals from the on-road transportation sector as reported in the EPIC inventory to get a total of 3.5 MMT CO_2e for the unincorporated 2020 total.

Off-Road Equipment and Vehicles

In addition to emissions from on-road vehicles such as cars and trucks, off-road equipment and vehicles emit GHG. The four largest sources of GHG in this category are: construction and mining, industrial, pleasure craft (boats), and agriculture. These four categories account for about 80 percent of off-road emissions in 2006[8]. This category was responsible for 1.3 MMT CO_2e for the entire region in 2006. A per capita approach (0.42 metric tons) was used to calculate the total CO_2e emissions for the unincorporated area for this category, which was estimated at 186,247 metric tons of CO_2e in 2006.

The 1990 levels for this category were estimated in the same manner. The 1990 CO_2e total for the entire region was 1 million metric tons. The GHG emissions for the unincorporated area were estimated using the per capita (0.40 metric tons) approach and totaled 175,889 metric tons of CO_2e.

The same approach was used to calculate the 2020 GHG emissions. The total GHG emissions forecast for the region (1.8 MMT CO_2e) was divided by SANDAG's projected regional population (3,635,855), and then multiplied by SANDAG's projected population for the unincorporated area (627,142) to get a total of 275,981 metric tons of CO_2e in 2020.

Natural Gas

Natural gas consumption (including commercial, industrial, and residential use) other than that used for electricity production is a substantial source of GHG emissions. In San Diego County, emissions from natural gas consumption, such as space and water heating, account for about 9

[8] It should be noted that this category does not include GHG emissions from civil aviation, water-borne navigation, or rail, which are accounted for separately in the SDCGHGI report.

percent of regional GHG emissions. According to the EPIC inventory, the 2006 total CO_2e emissions were 3 MMT resulting from commercial, industrial and residential use of natural gas. This results in a per capita CO_2e emission of 0.98 metric tons. When multiplied by the population of the unincorporated area in 2006, the total CO_2e emissions related to natural gas was 429,801 metric tons.

Surprisingly, the total CO_2e emissions related to natural gas consumption in 1990 were essentially the same as 2006. This is due in part from a decrease in industrial consumption of natural gas since 1990 and greater efficiencies within the residential sector. Using the unincorporated population in 1990, the per capita CO_2e emissions were estimated at 1.2 metric tons. This approach resulted in a total of 477,695 metric tons CO_2e associated with natural gas combustion for the unincorporated area in 1990.

The same approach was used to calculate the 2020 GHG emissions. The total natural gas GHG emissions forecast for the unincorporated County in 2020 is estimated to be 620,957 metric tons CO_2e.

Other Fuels

Other fuels include distillate (other than in power production), coal (other than in power production), kerosene, gasoline (other than in transportation), liquefied petroleum gas (LPG), residual fuel oil (other than in power production), and wood. According to the EPIC inventory, there was no primary data available for this sector at the County level. Subsequently, Statewide averages were used and scaled down to the San Diego County level using appropriate economic or population data.

For 2006, the other fuels category was estimated to generate 1.1 MMT CO_2e. Multiplying the per capita equivalent (0.36 metric ton) by the population of the unincorporated area in 2006 provides an estimated total of 157,594 metric tons CO_2e.

Estimates of the region-wide 1990 emissions of GHG from other fuels were higher than 2006 levels at 1.4 million metric tons of CO_2e. The cause for this trend is not known, but it may be due to a decrease in overall manufacturing operations since 1990. Multiplying the per capita equivalent for 1990 (0.64 metric ton) by the population of the unincorporated area in 1990 provides an estimated total of 222,924 metric tons CO_2e.

The SDCGHCI report indicates an overall decreasing trend for this sector from 1990 levels to a level of 1.3 MMT CO2e, or approximately 16 percent more than 2006 levels, but 13 percent less than 1990 levels. The total GHG emissions from other fuels forecast for the unincorporated County in 2020 is estimated to be 224,235 metric tons CO_2e, using the per capita method.

Wildfires

When natural vegetation burns it releases the carbon that is inherently stored in vegetation. Wildfires are a common occurrence in Southern California. Historical records show that two to five firestorms per century have occurred since 1425 in the Southern California region. Firestorms have affected Southern California twice in the last decade. The EPIC inventory has used GIS burn data combined with vegetation data to estimate land cover burned each year. The burn areas in San Diego County during the 2003 and 2007 Firestorms were each about 10 times larger than the annual totals seen during the non-firestorm years 1990-2001. The large fires in 2003 and 2007 together released an estimated 14 MMT CO_2e. In 1990, emissions from

wildfires resulted in 200,000 metric tons CO_2e. Data for 2006 is not yet available, but the EPIC inventory based the 2006 estimate on the average from 1990-2001, which is 300,000 metric tons CO_2e. This average was also used to predict GHG emissions in 2020. As the majority of the wildfires often occur in the unincorporated area, the entire totals are assumed to be in the County's jurisdiction.

During non-firestorm years, emissions from wildfires are typically offset by carbon sequestration from vegetation. However, if the local climate should change and become either hotter, drier, or both, the severity of fires could be expected to increase, making long-term carbon sequestration through plant growth in undeveloped areas difficult.

Agriculture (Livestock)

Agricultural operations generate GHG from livestock emissions, land emissions from forest land, and emissions from aggregate sources such as biomass burning, liming, managed soils, and rice cultivation. In addition, operational emissions are also associated with electricity, natural gas, and fuel consumption from off-road equipment. Land use and operational emissions have been accounted for in other sections of the EPIC inventory, and data from biomass burning, fertilizer rates, and soils are not readily available. Therefore, the discussion of GHG emissions from agriculture in this section focuses on livestock emissions. Livestock emissions are divided into two categories: enteric fermentation and manure management. Enteric fermentation is defined as a fermentation process that takes place in the stomach of ruminant animals, such as cattle. This process produces methane that is released through belching and flatulence. Manure management is the process of gathering and disposing of manure from livestock. As the manure breaks down, methane is released. In 2006, manure management accounted for 65 percent of the GHG emissions in this category while enteric fermentation accounted for 35 percent.

Agricultural emissions make up only a small portion of the GHG inventory for San Diego. Emissions from livestock are less than one percent of the total regional GHG levels. Livestock emissions have consistently been decreasing each year during the period of 1990-2006. The decrease is due to the displacement of farms by urban growth extending into rural areas of the County. The EPIC inventory used data from the San Diego County 2006 Crop Statistics and Annual Report and the U.S. Department of Agriculture National Agricultural Statistics (USDA 2008). Some interpolation and extrapolation was necessary to complete the data sets, which were then combined. Emission estimates for 2020 were projected using a logarithmic decay model.

For manure management, chickens, dairy cows, beef cows, other cows, breeding sheep and hogs were all included for calculations of GHGs. Emissions from enteric fermentation resulted primarily (over 99 percent) from cattle (beef, dairy, and other cows). The estimated GHG emissions from livestock in 1990 were approximately 145,000 metric tons CO_2e. In 2006, the GHG emissions were reduced to approximately 65,000 metric tons CO_2e and forecasts for 2020 further reduce the total to 30,000 metric tons CO_2e. There is no primary data that separates location of livestock according to jurisdiction. Since maintaining livestock requires larger land tracts and appropriate zoning, it is assumed that the entirety of these emissions fall in the County's jurisdiction.

Federal, State and Local Regulations and Existing Regulatory Processes

Multiple federal, State and local regulations exist to reduce GHG emissions throughout the unincorporated County. The proposed General Plan Update is required to comply with AB 32, which is the State regulation requiring GHG emissions be reduced to 1990 levels by 2020. The proposed General Plan Update is also required to comply with CARB rules and regulations that would achieve the GHG reductions stated in AB 32. Any future development, consistent with land uses proposed under the General Plan Update, would be required to comply with Title 24 energy efficiency standards, which would help reduce proposed project GHG emissions. Additionally, all future projects would be required to comply with SB 97, which requires CEQA analysis of GHG emissions and the effects of GHG emissions. Required compliance with air quality standards, such as those of the APCD, CARB, and CAA, would reduce criteria GHG emissions throughout the unincorporated County.

Currently, the County has a number of aggressive outreach and small business assistance programs that promote ways to reduce air and water pollution. This includes a Green Building Program which is designed to educate builders and provide incentives for the incorporation of green building standards (http://www.sdcounty.ca.gov/dplu/greenbuildings.html). Additionally, outreach programs are in place that focus on the importance of reducing air quality impacts (lawn mower trade-in program) and reducing solid waste by recycling (compost bin giveaways and transfer station events). The County is also actively engaged in regional efforts to address climate change such as preparation of plans to address SB 375 and coordination on green building approaches, GHG inventories, and CEQA mitigation strategies.

The County is also making its own effort to reduce its GHG emissions. The County has various internal policies in place to reduce GHG emissions from County operations. County Board Policy B-67 requires that preference be given to products which conform to the Minimum Recycled Content Standards. This includes purchases and is used by the County of San Diego, its contractors, and its grantees in its procurement practices. Similarly, the County has established design standards (Board Policy G-15) for County facilities that set forth appropriate techniques, materials, and technology to improve public accessibility, energy performance, resource utilization, and the work environment. In the recent past, several County facilities have either been built to LEED standards or have incorporated renewable energy resources such as photovoltaic technology.

Proposed General Plan Update Goals and Policies

The proposed General Plan Update includes goals and policies within the Land Use and Conservation Element and Open Space Element that were developed to reduce GHG emissions throughout the unincorporated County. Within the Land Use Element, Goal LU-5 addresses climate change and land use by creating a land use plan and associated development techniques and patterns that reduce emissions of local GHG in accordance with State initiatives, while promoting public health. Goal LU-5.3 would support this goal by preserving existing undeveloped and rural areas (e.g., forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, and groundwater recharge areas) to provide carbon sequestration benefits.

Within the Conservation and Open Space Element, Goal COS-15 promotes sustainable architecture and building techniques that reduce emissions of criteria pollutants and GHGs, while protecting public health and contributing to a more sustainable environment. Policies,

COS-15.1, COS-15.2, and COS-15.3 would support this goal by encouraging design and construction of new buildings and upgrades of existing buildings to maximize energy efficiency and reduce GHG. Goal COS-17 promotes sustainable solid waste management. Policies COS-17.1 and COS-17.5 would support this goal by reducing GHG emissions through waste reduction techniques and methane recapture. Goal COS-18 promotes energy systems that reduce consumption of non-renewable resources and GHG. Policy LU-18.2 would support this goal by encouraging methane sequestration and other sustainable strategies to reduce GHG emissions from waste disposal sites. Goal COS-20 promotes GHG reduction through governance and administration. Policies COS-20.1, COS-20.2, and COS-20.4 would support this goal by requiring the preparation of a Climate Change Action Plan, establishing a program to monitor GHG emissions, and promoting public education on GHG emission reduction techniques.

In addition to the goals and policies identified above, Table I-1 in the proposed General Plan document identifies policies that carry out the primary objectives of AB 32. Please refer to this table for General Plan policies that propose strategies to reduce GHG and adapt to affects of climate change.

Summary

Table 2.17-7 summarizes the combined GHG emissions in the unincorporated County from government operations and community sources. By the year 2020, GHG emissions are projected to increase to 7.1 MMT CO_2e (from 5.3 MMT CO_2e in 1990) without incorporation of any GHG-reducing policies or mitigation measures. This amount represents an increase of 24 percent over 2006 levels, and a 36 percent increase from estimated 1990 levels. This is considered a potentially significant impact.

By the year 2020, the GHG emissions associated with the County's governmental operations is projected to increase by an approximate total of 0.038 MMT over 1990 levels, from 0.137 MMT in 1990 to 0.176 MMT in 2020. To reduce the County's operational GHG emissions back to the levels estimated in 1990, the County will have to reduce its operational emissions by approximately 33 percent below 2020 levels to comply with the goals of AB 32.

Meanwhile the GHG community emissions from the entire unincorporated area are expected to increase from 5.1 MMT in 1990 to about 7.0 MMT in 2020. To achieve 1990 GHG levels by 2020, the unincorporated area community emissions would have to be reduced by approximately 36 percent below 2020 levels.

Overall, the GHG emissions from the community sector of the County represent the overwhelming source of GHG for the County, comprising 98 percent of the overall total. Therefore, measures incorporated at the community level would result in the most substantial reductions in GHG emissions.

2.17.3.2 Issue 2: Potential Effects of Global Climate Change on the General Plan Update

Guidelines for Determination of Significance

Currently, no thresholds or guidelines exist for the determination of significance of the effects of global climate change on a project. Therefore, in the absence of published thresholds, global climate change would be considered to have a significant effect if it would subject development associated with the General Plan Update to substantial climate-related risks to public health or safety.

Impact Analysis

The San Diego Foundation's Regional Focus 2050 Working Paper and Technical Assessment explored what the San Diego region would be like in the year 2050 if current climate change trends continue. The range of impacts presented in the Focus 2050 Working Paper and Technical Assessment are based on projections of climate change on the San Diego region using three climate models and two emissions scenarios drawn from those used by the IPCC. A summary of the potential adverse effects of Climate Change on the County of San Diego, as projected in the Focus 2050 Working Paper and Technical Assessment, is provided below.

Climate

From observations and model historical simulations, it appears that temperatures began to warm more substantially in the 1970s. Some scientists attribute the change to the response to the effects of GHG accumulation, which began to increase substantially during this time. All of the climate model simulations exhibit warming across San Diego County, ranging from about 1.5 °F to 4.5 °F, with some differences in the timing and geographic distribution of the changes. The models predict greater warming in the summer than in winter, with surface air temperatures warming from 0.7 °F to more than 2 °F over that found in winter. Temperature changes for areas along the coast would be moderated by the influence of the Pacific Ocean, but interior areas, where the greatest population growth would occur, would experience the greatest temperature increase.

The months when San Diego County experiences the most extreme warm temperatures, currently mostly in July and August, will likely begin in June and extend until September. It is estimated that the inland portion of the County may have more than a threefold increase in hot days in 2050. Experts generally conclude that rainfall will continue to vary widely from year to year, leaving San Diego County highly vulnerable to drought.

Sea Level

If current climate change trends continue, rising sea levels will have a major impact on the San Diego region's environment and economy, particularly in coastal areas. When high tide occurs during a large storm, particularly in El Niño winters, flooding will threaten homes, businesses, and hotels in low-lying coastal communities such as Imperial Beach, Coronado, Mission Beach, La Jolla Shores, Del Mar, and Oceanside. Flooding may also impact military, port and airport operations. High surf events will last for more hours, with waves causing even greater coastal erosion and related damage. Rising sea levels will wear away the foundations of sea bluffs,

such as those found in Solana Beach or Torrey Pines and significantly change the County coastline. Sandy beaches and nearby wetlands serve as a barrier to protect coastline developments from high surf. As these areas shrink from more intense wave activity, there may be a greater need for beach sand replenishment. More seawalls and breakwaters may need to be built to defend homes and businesses from coastal flooding. In addition to being extremely costly, these structures will destroy beaches and wetlands that do not have space to shift inland. Wetlands and estuaries could be devastated, leaving beaches exposed to more pollutants that endanger human and marine life.

Water Supply

The County Water Authority predicts an increase in water demand for San Diego County of around 24 percent, from 668,000 acre-feet/year (the 2001-2005 average) to about 830,000 acre-feet/year in 2030. About 70 percent of this demand is expected to come from imported sources. By 2050, the expected demand will increase to 915,000 acre-feet/year, which is an increase of 37 percent over the 2001-2005 period. By 2050, about 80 percent of the water supply is expected to be imported.

Drought years, which have historically increased water demand by another seven percent, might occur as much as 50 percent as often and be considerably drier. In drought years, parched soil soaks up more surface water and groundwater, increasing the need for imported and other water supplies. At the same time that the County demand for water would increase, climate change could shrink the Colorado River flow (a major source of imported water for the County) by 20 percent or more. A decline in the Sierra Nevada snowpack, aggravated by increased temperatures, could impact the water flow of many Northern California Rivers which serve as primary sources of water to the California Aqueduct, a major source of imported water for the County. San Diego's water supply plans are likely to be severely challenged by climate change. Even with plans in place to conserve, recycle, and augment our available water, it is estimated San Diego County could face an 18 percent shortfall in water supply by 2050 (San Diego Foundation 2008).

Wildfires

Fire occurrence has steadily increased in Southern California, in direct proportion to human population growth as most ignitions are caused by human activities. Most fires start during the summer, when coastal sage and chaparral vegetation have dried to a highly flammable state. Fires that start during the fall, however, burn many more acres because flames are intensified and spread by hot, dry Santa Ana winds. It is not entirely clear from climate change models how Santa Ana conditions will affect San Diego regional fire regimes in the future. Some models predict a decrease in the frequency and intensity of Santa Ana conditions while others predict an increase, particularly during the fire season. If Santa Ana conditions increase significantly earlier in the fire season, this shift could increase the incidence of massive Santa Ana fires, because the winds will begin gusting during the time of year when most fires start. More frequent fires would threaten native plant species by not allowing sufficient recovery time before they burn again. This would allow weedy, non-native species, which thrive in post-fire conditions, to multiply. Weedy invaders dry out earlier in the year, catch fire more easily, and burn faster than native plants.

Additionally, if current trends continue, the San Diego region will experience a population increase, with more development and human activities in backcountry areas over the coming

decades. As a result of climate change, we can expect higher spring temperatures, scorching summers, drier vegetation, and longer fire seasons. A simultaneous occurrence of all of these factors will increase the likelihood of more devastating firestorms similar to those that destroyed many homes and lives in the unincorporated County during 2003 and 2007.

Ecosystems

San Diego County beaches, canyons, mountains and deserts support a vast variety of plants and animals, some of which are found nowhere else on the planet. This biodiversity is already under stress from human population growth and land use changes that have broken up and reduced species habitat into fragmented areas. The impacts of climate change will add to the pressures on habitats and the species that live in the County. As a result, the locations where the temperature, moisture, and other environmental conditions are suitable for a particular species will shift. Plant and animal species are generally able to adapt to shifting habitats, but under existing trends, climate change would occur so rapidly that ecological conditions may shift faster than species are able to follow. To survive, some animals and plants will have to move up to 95 miles over the next century to find new habitat or they will face extinction. Drought and unusually warm years have already led to growing insect populations, such as bark beetles, which have attacked and killed drought-stressed trees in San Diego County. With warmer weather, the County's forests will lose even more trees. Ecological changes will cascade, as the loss of one species will challenge the ability of other species up and down the same food chain to survive. Top predators like coyotes may be lost if habitat patches become too small or isolated, and that can lead to an increase in smaller predators that prey on native songbirds.

Public Health

Increased heat, air pollution, wildfires, and infectious disease will cause illness and death in San Diego County, especially among the elderly, children, and the chronically ill. Californians experience the worst air quality in the nation, and San Diego is currently out of compliance with the federal ozone standard. By 2050, more hot sunny days will increase ozone air pollution levels, which can exacerbate asthma and other respiratory and cardiovascular diseases. Fire-related injuries and death are likely to increase as intense wildfires occur more frequently. Wildfires can also be a significant contributor to air pollution. Wildfire smoke contains numerous toxic and hazardous pollutants that are dangerous to breathe and can worsen lung disease and other respiratory conditions.

Warmer temperatures year-round could lead to growing mosquito populations, increasing the occurrence of West Nile Virus in the San Diego region. Hot weather could also bring tropical diseases such as malaria and dengue fever to the region for the first time. In coastal waters, conditions are likely to favor more frequent "red tides" or harmful algal blooms, which can harbor toxic bacteria and other diseases. In 2050, with an aging population and more residents living in areas with extreme-heat conditions and poor air quality, the San Diego region will face intensified public health concerns.

Energy Needs

If current climate change trends continue, warmer temperatures and a growing population will translate into big challenges for the San Diego region's energy supply by 2050. The main impact will be higher demand for electricity as a result of the greater need for summer cooling, especially in inland areas where both regional population growth and temperature increases will

be highest. Hotter summers and more frequent, longer and intense heat waves will increase peak demand for electricity, which could result in blackouts and power outages without adequate planning.

Federal, State and Local Regulations and Existing Regulatory Processes

Compliance with CEQA would require all future discretionary development projects. Depending on the type and size, the individual project may be required to assess and mitigate the potential adverse effects associated with climate change. Additionally, multiple federal, State and local regulations exist to reduce GHG emissions throughout the unincorporated County, and such reductions would also reduce the adverse effects associated with climate change. The proposed General Plan Update would be required to comply with AB 32, which is the State regulation requiring GHG emissions to be reduced to 1990 levels by 2020. The proposed General Plan Update would also be required to comply with CARB rules and regulations that would achieve the GHG reductions stated in AB 32. Future development consistent with land uses proposed under the General Plan Update would be required to comply with Title 24 energy efficiency standards, which would help reduce GHG emissions. Required compliance with air quality standards, such as those of the APCD, CARB, and CAA, would reduce criteria GHG emissions throughout the unincorporated County. In addition, multiple County policies, such as BOS Policies B-67 and G-15, exist to assist in the reduction of GHG emissions and adverse effects associated with climate change.

Proposed General Plan Update Goals and Policies

There are multiple goals and policies within the proposed General Plan Update that would reduce the adverse effects of climate change. Table I-1 in the proposed General Plan document identifies multiple policies in the San Diego County General Plan that would reduce adverse impacts associated with climate change. Please refer to this table in the General Plan to see the full inventory of policies that propose strategies to reduce GHG and adapt to effects of climate change.

Summary

Climate change impacts that would be most relevant to the unincorporated County are the effects on water supply, wildfires, energy needs, and impacts to public health. The climate change scenarios described above project impacts to the year 2050, which is further in the future than the scope of the General Plan Update, which plans for development to the year 2030. Also, the climate system is inherently complex and predictions of effects are likely to be refined as information becomes more readily available. Regardless, impacts that may affect the County as a result of climate change impacts are considered potentially significant.

2.17.4 Cumulative Impacts

2.17.4.1 Issue 1: Compliance with AB 32

Climate change is a global phenomenon which is cumulative by nature, as it is the result of combined worldwide contributions of GHG to the atmosphere over many years. Therefore, impacts associated with the proposed General Plan Update discussed above also serve as the proposed project's cumulative impact.

2.17.4.2 Issue 2: Effects of Global Climate Change on the General Plan Update

Climate change is a global phenomenon which is cumulative by nature, as it is the result of combined worldwide contributions of GHG to the atmosphere over many years. Therefore, significant direct impacts associated with the proposed General Plan Update discussed above also serve as the proposed project's cumulative impact.

2.17.5 Significance of Impact Prior to Mitigation

Prior to mitigation, the proposed General Plan Update would have a potentially significant impact associated with compliance with AB 32. Additionally, future development consistent with the land uses proposed under the General Plan Update would be significantly impacted by the adverse effects of climate change. The direct impacts discussed in Section 2.17.3.1, Issue 1: Compliance with AB 32 and Section 2.17.3.2, Issue 2: Effects of Global Climate Change on the General Plan Update, also serve as the cumulative impacts for climate change. Therefore, the proposed project would have a potentially significant cumulative impact.

2.17.6 Mitigation

2.17.6.1 Issue 1: Compliance with AB 32

To achieve 1990 levels of GHG for both the County's operations and for the community emissions, mitigation measures would be necessary. The goal of AB 32 is to reduce 2020 emissions to 1990 levels. The proposed General Plan Update would allow for additional growth in the County that would contribute to additional GHG emissions. General Plan Update policies and mitigation measures (described below), have been identified that would minimize the potentially significant impact to AB 32. However, as detailed in the State's Scoping Plan, in order to achieve AB 32 levels, action will be required at all levels of government. Several federal and State programs will have a significant role in reducing programs. Many of these programs are already underway; however, some are in their infancy and full implementation has not yet been realized and others are merely anticipated. While the State's commitment to AB 32 provides some assurances that these efforts will come to complete fruition, they are beyond the authority of the County. Without them, the County will not be able to independently achieve the AB 32 targets. Therefore, impacts are considered significant and unavoidable.

General Plan Update Policies

Implementation of the following General Plan Update policies, in combination with those listed in Table I-1 of the proposed General Plan Update, and mitigation measures listed below would reduce proposed project impacts related to compliance with AB 32, but not to below a level of significance.

COS-15.1: Design and Construction of New Buildings. Require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants.

COS-15.2: Upgrade of Existing Buildings. Promote and, as appropriate, develop standards for the retrofit of existing buildings to incorporate architectural features, heating and cooling, water, energy, and other design elements that improve their environmental sustainability and reduce GHG.

COS-15.3: Green Building Programs. Require all new County facilities and the renovation and expansion of existing County buildings to meet identified "green building" programs that demonstrate energy efficiency, energy conservation, and renewable technologies.

COS-17.1: Reduction of Solid Waste Materials. Reduce greenhouse gas emissions and future landfill capacity needs through reduction, reuse, or recycling of all types of solid waste that is generated. Divert solid waste from landfills in compliance with the California *Integrated Waste Management Act* (AB 939) that requires each local jurisdiction in the state to divert at least 50 percent of its solid waste from being placed into landfills.

COS-17.5: Methane Recapture. Promote efficient methods for methane recapture in landfills and the use of composting facilities and anaerobic digesters and other sustainable strategies to reduce the release of GHG emissions from waste disposal or management sites and to generate additional energy such as electricity.

COS-18.2: Energy Generation from Waste. Encourage use of methane sequestration and other sustainable strategies to produce energy and/or reduce GHG emissions from waste disposal or management sites.

COS-20.1: Climate Change Action Plan. Prepare, maintain, and implement a climate change action plan with a baseline inventory of GHG emissions from all sources; GHG emissions reduction targets and deadlines, and enforceable GHG emissions reduction measures.

COS-20.2: GHG Monitoring and Implementation. Establish and maintain a program to monitor GHG emissions attributable to development, transportation, infrastructure, and municipal operations and periodically review the effectiveness of and revise existing programs as necessary to achieve GHG emission reduction objectives.

COS-20.4: Public Education. Continue to provide materials and programs that educate and provide technical assistance to the public, development professionals, schools, and other parties regarding the importance and approaches for sustainable development and reduction of GHG emissions.

Mitigation Measures

The County's governmental operational emissions for 2020, assuming a BAU scenario, would total approximately 175,609 MT of CO_2e. This is approximately 38,405 MT of CO_2e more than the 1990 level of 137,204 MT of CO_2e. The mitigation measures discussed below are projected to reduce the County governmental operational GHG emissions to a level below the 1990 levels. Table 2.17-8, shows the projected emission reductions associated with each category. Reductions identified in Table 2.17-8 are based on the 2020 BAU projection. The GHG Reduction Climate Change Action Plan, which would be prepared as a mitigation measure, would further detail the County's GHG emissions and where the reductions will occur.

The Community emissions for 2020, assuming no mitigation, would total approximately 6,975,287 MT of CO_2e. This is 1,835,466 MT of CO_2e more than the 1990 level of 5,139,821 MT of CO_2e. The mitigation measures discussed below are projected to reduce the Community GHG emissions to 1990 levels when combined with federal, State, and regional programs. Table 2.17-9, shows the projected emission reductions associated with each section in the Community category. Reductions identified in Table 2.17-9 are based on the 2020 BAU projection. The GHG Reduction Climate Change Action Plan, which would be prepared as a mitigation measure, would further detail the community GHG emissions, and describe where and how the reductions would occur.

CC-1.1 Update the County Green Building Program to increase effectiveness of encouraging incentives for development that is energy efficient and conserves resources through incentives and education.

CC-1.2 Prepare a County Climate Change Action Plan with an update baseline inventory of greenhouse gas emissions from all sources, more detailed greenhouse gas emissions reduction targets and deadlines; and a comprehensive and enforceable GHG emissions reduction measures that will achieve a 17% reduction in emissions from County operations from 2006 by 2020 and a 9% reduction in community emissions between 2006 and 2020. Once prepared, implementation of the plan will be monitored and progress reported on a regular basis.

CC-1.3 Work with SANDAG to achieve regional goals in reducing GHG emissions associated with land use and transportation.

CC-1.4 Review traffic operations to implement measures that improve flow and reduce idling such as improving traffic signal synchronization and decreasing stop rate and time.

CC-1.5 Coordinate with the San Diego County Water Authority and other water agencies to better link land use planning with water supply planning with specific regard to potential impacts from climate change and continued implementation and enhancement of water conservation programs to reduce demand. Also support water conservation pricing (e.g., tiered rate structures) to encourage efficient water use.

CC-1.6 Implement and expand County-wide recycling and composting programs for residents and businesses. Require commercial and industrial recycling.

CC-1.7 Incorporate the California ARB's recommendations for a climate change CEQA threshold into the County Guidelines for Determining Significance for Climate Change. These recommendations will include energy, waste, water, and transportation performance measures for new discretionary projects in order to reduce GHG emissions. Should the recommendation not be released in a timely manner, the County will prepare its own threshold.

CC-1.8 Revise County Guidelines for Determining Significance based on the Climate Change Action Plan. The revisions will include guidance for proposed

discretionary projects to achieve greater energy, water, waste, and transportation efficiency.

CC-1.9 Coordinate with APCD, SDG&E, and the California Center for Sustainable Energy to research and possibly develop a mitigation credit program. Under this program, mitigation funds will be used to retrofit existing buildings for energy efficiency to reduce GHG emissions.

CC-1.10 Continue to implement the County Groundwater Ordinance, Watershed Protection Ordinance (WPO), Resource Protection Ordinance (RPO), MSCP and prepare MSCP Plans for North and East County in order to further preserve wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas and other open space that provide carbon sequestration benefits and to restrict the use of water for cleaning outdoor surfaces and vehicles. The WPO also implements low-impact development practices that maintain the existing hydrologic character of the site to manage storm water and protect the environment. (Retaining storm water runoff on-site can drastically reduce the need for energy-intensive imported water at the site.)

CC-1.11 Revise the Ordinance Relating to Water Conservation for Landscaping to further water conservation to:

- Create water-efficient landscapes and use water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls.
- Use reclaimed water for landscape irrigation.
- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.
- Provide education about water conservation and available programs and incentives.

CC-1.12 Continue to coordinate with resource agencies, CALFIRE, and fire districts to minimize potential wildfire risks in the County and to plan for the potential increase in future risk that may result from Climate Change.

CC-1.13 Continue to implement and revise as necessary the Regional Trails Plan as well as the Community Trails Master Plan to connect parks and publicly accessible open space through shared pedestrian/bike paths and trails to encourage walking and bicycling.

CC-1.14 Provide public education and information about options for reducing greenhouse gas emissions. In addition to addressing land development, education should also address purchasing, conservation, and recycling.

CC-1.15 Reduce VMT and encourage alternative modes of transportation by implementing the following measures:

- During Community Plan updates, establish policies and design guidelines that: encourage commercial centers in compact walkable configurations and discourage "strip" commercial development
- Expand community bicycle infrastructure.
- Revise the Off-Street Parking Design Manual to include parking placement concepts that encourage pedestrian activity and concepts for providing shared parking facilities.
- Establish comprehensive planning principles for transit nodes such as the Sprinter Station located in North County Metro.
- Continue to locate County facilities near transit facilities whenever feasible.
- Coordinate with SANDAG, Caltrans, and tribal governments to maximize opportunities to locate park and ride facilities.
- Continue to coordinate with SANDAG, Caltrans, and transit agencies to expand the mass transit opportunities in the unincorporated county and to review the location and design of transit stops. Establish a DPLU transit coordinator to ensure land use issues are being addressed.
- Update the Zoning Ordinance to require commercial, office, and industrial development to provide preferred parking for carpools, vanpools, electric vehicles, and flex cars.

CC-1.16 Develop and implement a Strategic Energy Plan to increase energy efficiency in existing County buildings and set standards for any new County facilities that will ultimately reduce GHG emissions. This will include implementation of the following measures as will be detailed within the Plan:

- Improve energy efficiency within existing operations through retrofit projects, updated purchasing policies, updated maintenance/operations standards, and education.
- Improve energy efficiency of new construction and major renovations by applying design criteria and participating in incentive programs.
- Provide energy in a reliable and cost-effective manner and utilize renewable energy systems where feasible.
- Monitor and reduce energy demand through metering, building controls, and energy monitoring systems.
- Increase County fleet fuel efficiency by acquiring more hybrid vehicles, using alternative fuels, and by maintaining performance standards for all fleet vehicles.

CC-1.17 Develop and implement a County Operations Recycling Program. This will include implementation of the following measures as will be detailed within the Program:

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

- Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.
- Recover by-product methane to generate electricity.
- Provide education and publicity about reducing waste and available recycling services.

CC-1.18 Develop and implement a County Operations Water Conservation Program.

2.17.6.2 Issue 2: Effects of Global Climate Change on the General Plan Update

The proposed General Plan Update policies and corresponding mitigation measures identified above in Section 2.17.6.1, Issue 1: Compliance with AB 32, in combination with applicable regulations including the CAA, Lieberman-Warner Climate Security Act, CARB standards, Title 24 standards, Executive Order S-3-05, AB 32, Executive Order S-01-07, SB 97, SB 1368, SB 1078, APCD standards and existing County programs and policies, would mitigate direct and cumulative impacts to development from adverse effects of climate change. .However, as with Issue 1, addressing the adverse effects of climate change requires action at all levels of government. Because the County must depend on action taken by these other entities, this is considered a significant and unavoidable impact.

2.17.7 Conclusion

The discussion below provides a synopsis of the conclusion reached in each of the above impact analyses, and the level of impact that would occur after mitigation measures are implemented.

2.17.7.1 Issue 1: Compliance with AB 32

By the year 2020, GHG emissions are projected to increase to 7.1 MMT CO_2e (from 5.3 MMT CO_2e in 1990) without incorporation of any GHG-reducing policies or mitigation measures. This amount represents an increase of 24 percent over 2006 levels, and a 36 percent increase from estimated 1990 levels. Therefore, the proposed project would result in a potentially significant impact related to compliance with AB 32. Additionally, the proposed project would result in a potentially significant cumulative impact. The proposed General Plan Update policies and mitigation measures would reduce direct and cumulative impacts related to compliance with AB 32. However, as detailed in the State's Scoping Plan, in order to achieve AB 32 levels, action will be required at all levels of government. While the State's commitment to AB 32 provides some assurances that such efforts will come to complete fruition at all levels, they are beyond the authority of the County. Without them, the County will not be able to independently achieve the AB 32 targets. Impacts would remain significant and unavoidable, and the project's contribution would be cumulatively considerable.

2.17.7.2 Issue 2: Effects of Global Climate Change on the General Plan Update

Climate change impacts that would be most relevant to the unincorporated County, and the proposed General Plan Update, include effects on water supply, wildfires, energy needs, and impacts to public health. The proposed General Plan policies and mitigation measures discussed above, in addition to compliance with applicable regulations such as the CAA, Lieberman-Warner Climate Security Act, CARB standards, Title 24 standards, Executive Order S-3-05, AB 32, Executive Order S-01-07, SB 97, SB 1368, SB 1078, APCD standards and existing County programs and policies, would mitigate the potential direct and cumulative impacts of global climate change. However, as with Issue 1, addressing the adverse effects of climate change requires action at all levels of government. Because the County must depend on action taken by these other entities, impacts would remain significant and unavoidable, and the project's contribution would be cumulatively considerable.

Table 2.17-1. Global Warming Potentials and Atmospheric Lifetimes of Basic GHGs

GHG	Formula	100-year global warming potential[(1)]	Atmospheric lifetime (yrs)
Carbon dioxide	CO_2	1	Variable
Methane	CH_4	21	12 (± 3)
Nitrous oxide	N_2O	310	120
Sulphur hexafluoride	SF_6	23,900	3,200

(1) The warming effects over a 100-year time frame relative to other GHGs.
Source: EPA 2006

Table 2.17-2. State of California GHG Emissions by Sectors in 2004

Sector	Total Emissions (MMT CO_2e)	Percent of Total Emissions
Agriculture	27.9	6
Commercial	12.8	3
Electricity Generation	119.8	25
Forestry (excluding sinks)	0.2	<1
Industrial	96.2	20
Residential	29.1	6
Transportation	182.4	38
Misc*	16.0	--
Total (Gross) Emissions	484.4	N/A
Forestry Sinks	-4.7	--
Net Emissions	479.7	N/A

* Unspecified fuel combustion which could not be attributed to an individual sector.
Percents may not total 100 due to rounding.
Source: CARB 2007

Table 2.17-3. County of San Diego GHG Emissions by Category (2006)

Sector	Total Emissions (MMT CO_2e)	Percent of Total Emissions
On-Road Transportation	15.6	46
Electricity	8.5	25
Natural Gas Consumption	3	9
Civil Aviation	1.7	5
Industrial Processes & Products	1.6	5
Other Fuels / Other	1.1	4
Off-Road Equipment & Vehicles	1.3	4
Waste	0.7	2
Agriculture/Forestry/Land Use	0.4	2
Rail	0.3	1
Water-Borne Navigation	0.1	0.4
Total	34.4	100

Note: Numbers may not total to 100 percent due to rounding
Source: Energy Policy Initiative Center, University of San Diego School of Law, 2008

Table 2.17-4. County of San Diego Government Operational GHG Emissions (metric tons CO_2e)

Category	1990 Totals	2006 Totals	2020 Projections[(1)]
Buildings	48,399	54,429	71,022
Vehicle Fleet	22,071	29,719	29,696
Employee Commute	63,255	72,797	70,201
Water	1,799	2,080	2,939
Waste	1,680	1,751	1,751
Total	**137,204**	**160,776**	**175,609**

(1) Assumes a Business as Usual scenario, i.e., development of the General Plan without incorporation of GHG reduction measures.
Source: DPLU 2009g

Table 2.17-5. San Diego County Population Estimates

Year	San Diego County (entire region)	Unincorporated Area
1990	2,498,016	397,763
2006	3,065,077	473,801
2020	3,635,855	627,142

Source: SANDAG 2008

Table 2.17-6. Community GHG Emissions for Unincorporated County (metric tons CO_2e)

Category	1990 Totals	2006 Totals	2020 Projections
Electricity (includes water usage)	1,035,005	1,391,224	1,897,370
Solid Waste	143,308	108,206	155,239
On-Road Vehicles	2,740,000	2,923,373	3,471,505
Off-Road Vehicles & Equipment	175,889	200,955	275,981
Other Fuels	222,924	170,039	224,235
Natural Gas	477,695	463,741	620,957
Wildfire	200,000	300,000	300,000
Agriculture (Livestock)	145,000	62,000	30,000
Total	**5,139,821**	**5,619,538**	**6,975,287**

Source: DPLU 2009g

Table 2.17-7. Combined Operation and Community GHG Emissions for Unincorporated County (metric tons CO_2e)

Category	1990 Totals	2006 Totals	2020 Totals[(1)]
Government Operations	137,204	160,776	175,609
Community	5,139,821	5,619,538	6,975,287
Total	**5,227,025**	**5,780,314**	**7,150,896**

[(1)] Assumes a Business as Usual scenario
Source: DPLU 2009g

Table 2.17-8. County Operation Estimated GHG Emissions Reductions (metric tons CO_2e)

Category	2020 Projections[(1)]	Projected GHG Reductions	2020 Projections	1990 Estimates
Buildings	71,022	-29,199	41,823	48,399
Vehicle Fleet	29,696	-7,424	22,272	22,071
Employee Commute	70,201	-15,444	54,757	63,255
Water	2,939	-1,000	1,939	1,799
Waste	1,751	-500	1,251	1,680
Total	**175,609**	**-53,567**	**122,042**	**137,204**

[(1)] Assumes a Business as Usual scenario
Source: DPLU 2009g

Table 2.17-9. Community Projected GHG Emissions Reductions for Unincorporated County (metric tons CO_2e)

Category	2020 Projections[(1)]	Projected GHG Reductions	2020 Projections	1990 Estimates
Electricity (includes water usage)	1,897,370	-702,026	1,195,344	1,035,005
Natural Gas	620,957	-49,676	571,281	477,695
On-Road Vehicles	3,471,505	-902,591	2,568,914	2,740,000
Off-Road Vehicles & Equipment	275,981	-103,493	172,488	175,889
Solid Waste	155,239	-51,229	104,010	222,924
Other Fuels	224,235	-56,059	168,176	143,308
Wildfire	300,000	--	300,000	200,000
Agriculture (Livestock)	30,000	--	30,000	145,000
1990 Total	**--**			**5,139,821**
Total	**6,975,287**	**-1,865,074**	**5,110,213**	1,035,005

(1) Assumes a Business as Usual scenario

Source: DPLU 2009g

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