F. GLOBAL CLIMATE CHANGE

Increasing public awareness and general scientific consensus that global climate change is occurring have placed a new focus on the California Environmental Quality Act (CEQA) as a potential means to address a project's greenhouse gas (GHG) emissions. CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects considered for approval. Global climate change can be considered an "effect on the environment" and an individual project or plan's incremental contribution to global climate change can have a cumulatively significant impact.

Cumulative impacts are the collective impacts of one or more past, present, or future projects, that when combined, result in adverse changes to the environment. Climate change is a global environmental problem in which: (a) any given development project contributes only a small portion of any net increase in GHGs and (b) global growth is continuing to contribute large amounts of GHGs across the world. No individual project would result in a measurable impact on global climate change, or an environmental impact resulting from global climate change. Therefore, this section addresses climate change primarily as a cumulative impact.

This section begins by providing general background information on climate change and meteorology. It then discusses the regulatory framework for global climate change, provides data on the existing global climate setting, and evaluates potential global greenhouse gas emissions associated with the proposed project. Modeled project emissions are estimated based on the land uses proposed as part of the Draft General Plan, vehicle data, and project trip generation, among other variables. This section also discusses and evaluates the potential impacts of climate change on Yolo County. The information and analysis provided in this report rely primarily on the Climate Action Team 2006 Final Report, Intergovernmental Panel on Climate Change (IPCC) Assessment Reports, various California Air Resources Board (CARB) staff reports, and other related global climate change documents that provide background information on the impacts of greenhouse gas emissions.

1. Setting

The following discussion provides an overview of the geographical and climate setting of Yolo County; and global climate change, its causes, and its potential effects; emission sources and inventories. The regulatory framework relating to global climate change is also summarized.

a. Geographic and Climate Setting. Yolo County is located in the Sacramento Valley Air Basin (SVAB). The SVAB is bounded by the North Coast Ranges on the west and Northern Sierra Nevada Mountains on the east. The intervening terrain is relatively flat. Hot dry summers and mild rainy winters characterize the Mediterranean climate of the SVAB. During the year, the temperature may range from 20 to 115 degrees Fahrenheit with summer highs usually in the 90s and winter lows occasionally below freezing. Average annual rainfall is about 20 inches, with about 75 percent of the rain occurring during the rainy season generally from November through March. The prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. In general, the prevailing wind in the Sacramento Valley is from the southwest due to marine breezes flowing through the Carquinez Strait. The Carquinez Strait is the major corridor for air moving into the Sacramento Valley from the west. Incoming airflow strength varies daily with a pronounced diurnal cycle. Influx strength is weakest in the morning and increases in the afternoon and evening hours (Delta breeze).

b. Global Climate Change Background. A description of global climate change and its sources are provided below.

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. Global surface temperatures have risen by 0.74°C ± 0.18°C over the last 100 years (1906 to 2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[1] The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect.[2]

(1) Greenhouse Gases. GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:[3]

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While manmade GHGs include naturally-occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain other gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its

[1] Intergovernmental Panel on Climate Change (IPCC), 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.*

[2] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the amount of heat that escapes, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

[3] The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this EIR, the term "GHGs" will refer collectively to the gases listed above only.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to carbon dioxide, the most abundant GHG. The definition of GWP for a particular greenhouse gas is the ratio of heat trapped by one unit mass of the greenhouse gas to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2eq). Table IV.F-1 shows the GWPs for each type of GHG. For example, sulfur hexaflouride is 22,800 times more potent at contributing to global warming than carbon dioxide. The following discussion summarizes the characteristics of the six primary GHGs.

Table IV.F-1: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoromethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and evaporation from the oceans. Human-caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance and when concentrations of CO_2 are upset, the system gradually returns to its natural state through the natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO_2 to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and consequently, the gas is building up in the atmosphere. The concentration of CO_2 in the atmosphere has risen about 30 percent since the late 1800s.[4]

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of man-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2eq). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline

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

consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

Methane (CH_4). Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).[5] Agricultural processes such as manure management and rice cultivation are also significant sources of manmade CH_4 in California. Methane accounted for approximately 6 percent of gross climate change emissions (CO_2eq) in California in 2002.[6]

It is estimated that over 60 percent of global methane emissions are related to human-related activities.[7] As with CO_2, the major removal process of atmospheric methane – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

Nitrous Oxide (N_2O). Nitrous oxide is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management (e.g., use of fertilizers, production of nitrogen-fixing crops, etc.) and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. Nitrous oxide emissions accounted for nearly 7 percent of man-made GHG emissions (CO_2eq) in California in 2002.

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[8] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of man-made GHG emissions (CO_2eq) in California in 2002.[9]

[5] California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

[6] Ibid.

[7] IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

[8] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

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

(2) Temperature Increase. The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3 to 10.5°F by the end of the century.[10] Because GHGs persist for a long time in the atmosphere (see Table IV.F-1), accumulate over time, and are generally well-mixed, their impact on the atmosphere cannot be tied to a specific point of emission.

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation and reduction in sunlight from the addition of GHGs and other gases to the atmosphere from volcanic eruptions)
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., from deforestation, reforestation, urbanization, and desertification)

The primary effect of global climate change has been a rise in the average global tropospheric[11] temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include, but are not limited to:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;
- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets;
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;
- Decline of the Sierra Nevada snowpack, which accounts for a significant amount of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;
- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century; and
- High potential for erosion of California's coastlines and seawater intrusion into the Delta and levee systems due to the rise in sea level.

A more detailed description of these and other climate change impacts is provided below.

[10] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

[11] The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

(3) Precipitation and Water Supply. Global average precipitation is expected to increase overall during the 21st century as the result of climate change, but will vary in different parts of the world. However, global climate models are generally not well suited for predicting regional changes in precipitation because of the scale of regionally important factors, such as the effects of mountain ranges, that affect precipitation.[12]

Most of California's precipitation falls in the northern part of the State during the winter. A vast network of man-made reservoirs and aqueducts capture and transport water throughout the State from northern California rivers, as the greatest demand for water comes from users in the southern part of the State during the spring and summer.[13] The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

Some models predict drier conditions and decreased water flows, while others predict wetter conditions in various parts of the world. If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent.

Decreasing snowmelt and spring stream flows coupled with increasing demand for water resulting from both a growing population and hotter climate could lead to increasing water shortages. By the end of the century, late spring stream flow could decline by up to 30 percent. Agricultural areas that rely on surface water could lose as much as 25 percent of the water supply they need.[14] Groundwater comprises approximately 34 percent[15] (311,000 acre-feet) of the total water supply in the County in non-drought years.[16] Most domestic water users in unincorporated Yolo County rely on groundwater for potable water, while nearly all of the surface water is used for agricultural purposes.

The extent to which various meteorological conditions will impact groundwater supply is unknown. Warmer temperatures could increase the period when water is on the ground by reducing soil freeze. However, warmer temperatures could also lead to higher evaporation or shorter rainfall seasons, shortening the recharge season. Warmer winters could increase the amount of runoff available for groundwater recharge. However, the additional runoff could occur at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity.

Where precipitation is projected to increase in California, the increases are focused in Northern California. However, various California climate models provide mixed results regarding changes in total annual precipitation in the State through the end of this century; therefore, no conclusion on an increase or decrease can be made. Considerable uncertainties about the precise effects of climate

[12] IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

[13] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

[14] Ibid.

[15] Ibid.

[16] In drought years, the County relies more heavily on groundwater, which supplies 44 percent of demand in drought years. Water Resources Association of Yolo County, 2007. op cit.

change on California hydrology and water resources will remain until there is more precise and consistent information about how precipitation patterns, timing, and intensity will change.[17]

(4) Sea Level Rise. Rising sea level is one of the major areas of concern related to global climate change. Two of the primary causes for a sea level rise are the thermal expansion of ocean waters (water expanding as it heats up) and the addition of water to ocean basins by the melting of land-based ice. From 1961 to 2003, global average sea level rose at an average rate of 0.07 inches per year, and at an accelerated average rate of about 0.12 inches per year during the last decade of this period (1993 to 2003).[18] Over the past 100 years, sea levels along California's coasts and estuaries have risen about seven inches.[19]

Sea levels could rise an additional 22 to 35 inches by the end of the century as global climate change continues, while experts predict even higher rises.[20] Although these projections are on a global scale, the rate of sea level rise along California's coast is relatively consistent with the worldwide average rate observed over the past century. Therefore, it is reasonable to assume that projected changes in worldwide sea level rise will continue to be experienced along California's coast.[21]

Sea level rise of this magnitude would increasingly threaten California's coastal regions with more intense coastal storms, accelerated coastal erosion, threats to vital levees, and disruption of inland water systems, wetlands and natural habitats. Rising sea levels and more intense storm surges could increase the risk for coastal flooding. The frequency of high sea level extremes may be further increased if storms become more frequent or severe as a result of climate change. The increasing duration of high storm-forced sea levels increases the likelihood that they will occur during high tides. The location (more than 50 miles from the mouth of the Golden Gate) and elevation (lowest elevation in the County is approximately 5 feet above sea level) of the County precludes significant impact due to coastal hazards, such as extreme high tides. However, rising sea levels may worsen flooding in Yolo County and expand the County's floodplains. It is also possible that sea level rise could reduce the effectiveness of levees within the County (reducing the levee height by raising the base level of the adjacent water body).

(5) Water Quality. Water quality depends on a wide range of variables such as water temperature, flow, runoff rates and timing, waste discharge loads, and the ability of watersheds to assimilate wastes and pollutants. Climate change could alter water quality in a variety of ways, including higher winter flows that reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers. Water temperature increases and decreased water flows can result in increasing concentrations of pollutants and salinity. Increases in water temperature alone can likely to lead to adverse changes in water quality, even in the absence of changes in precipitation.

[17] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

[18] California, State of. California Energy Commission's Public Interest Energy Research Program, 2008. *The Future is Now: An Update on Climate Change Science, Impacts, and Response Options for California*. September.

[19] Ibid.

[20] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

[21] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

However, land and resource use changes can have impacts on water quality comparable to or even greater than those from global climate change. The net effect on water quality for rivers, lakes, and groundwater in the future is dependent not just on climate conditions, but also on a wide range of other human actions and management decisions.

(6) Agriculture. California has one of the largest and most diverse agriculture industries in the nation, producing more than 300 commodities, including half the country's fruits and vegetables. Numerous studies indicate that climate change may have a significant effect on agriculture in California. The degree to which climate change will affect agriculture depends on a variety of factors. Potential effects include reductions in water supply and water supply reliability, increased evapotranspiration, changes in growing season, and altered crop choices.[22] Productivity and profitability may be negatively or positively affected by changes to the growing season and altered crop choices depending on choices made by farmers.

Plant growth tends to increase with rising temperatures. However, faster growth can also result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products.[23] Crops that are likely to be hard hit include wine grapes and fruit and nut trees. Yolo County's fruit and nut orchards covered approximately 20,960 acres in 2007, and grew a wide variety of crops including almonds, apples, apricots, blackberries, blueberries, cherries, chestnuts, citrus fruit, figs, kiwis, nectarines, olives, peaches, pears, pecans, persimmons, pistachios, pomegranates, prunes, strawberries, table grapes, and walnuts. Vineyards (wine grapes) are the largest single agricultural use in the fruit and nut category, both in terms of harvested acreage (11,898 acres in 2007) and total commodity value ($46,513,316 in 2007).[24]

Although the individual effects (e.g., temperature increase) of climate change on specific crops are becoming better understood, trying to quantify interactions among these environmental factors is difficult. Rising temperatures will likely aggravate ozone pollution and make plants more susceptible to disease and pests. To prepare and adapt to the effects of global climate change, major efforts will be needed to determine appropriate crop locations and develop new agricultural technologies. With adequate research and advance preparation, some of the consequences of global climate change can be reduced.

(7) Increasing Wildfires. Fire is an important process to maintaining ecosystems, as it promotes vegetation and wildlife diversity, releases nutrients into the soil, and eliminates heavy accumulation of underbrush that can fuel catastrophic fires. Fire can also have severe consequences and damage community assets, such as homes, businesses, and agricultural crops, worsen air quality, and increase health and safety risk for people living in and near natural landscapes. Wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions. However, if temperatures continue to rise, the risk of large wildfires in California could increase by as much as 55 percent.[25] A hotter, drier climate could promote up to 90

[22] Ibid.

[23] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

[24] See Section IV.B. Agricultural Resources for additional information.

[25] Ibid.

percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation. In many regions, wildfire activity will depend critically on future precipitation patterns.

c. Emissions Sources and Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, California, and local GHG emission inventories.

(1) Global Emissions. Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO_2eq per year.[26] Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

(2) U.S. Emissions. In 2004, the United States emitted about 7.3 billion metric tons of CO_2eq or about 25 tons/year/person. Of the four major sectors nationwide – residential, commercial, industrial and transportation – transportation accounts for the highest amount of GHG emissions (approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion. Between 1990 and 2006, total U.S. GHG emissions rose approximately 14.7 percent.[27]

(3) State of California Emissions. According to CARB emission inventory estimates, California emitted approximately 480 million metric tons[28] of CO_2eq emissions in 2004.[29] This large number is due primarily to the sheer size of California compared to other States. By contrast, California has the fourth lowest per-capita carbon dioxide emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[30]

The California EPA Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2eq) was as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;
- Nitrous oxide (N_2O) accounted for 6.8 percent; and

[26] Combined total of Annex I and Non-Annex I Country CO_2eq emissions. United Nations Framework Convention on Climate Change (UNFCCC), 2007. *Greenhouse Gas Inventory Data*. Information available at http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php and http://maindb.unfccc.int/library/view_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf.

[27] U.S. Environmental Protection Agency (EPA). 2008. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. http://www.epa.gov/climatechange/emissions/downloads/2008_GHG_Fast_Facts.pdf.

[28] A metric ton is equivalent to approximately 1.1 tons.

[29] California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

[30] California Energy Commission (CEC), 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report.

- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent.[31]

The CARB estimates that transportation is the source of approximately 38 percent of the State's GHG emissions in 2004, followed by electricity generation (both in-State and out-of-State) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at 9 percent, agriculture at 6 percent, high global warming potential gases accounting for 3 percent, and recycling and waste at 1 percent.[32]

CARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. CARB's current GHG emission inventory covers the years 1990-2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands, etc.). The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

CARB staff has projected 2020 unregulated GHG emissions, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions. CARB staff estimates the State-wide 2020 unregulated GHG emissions will be 596 million metric tons (MMT) of CO_2eq. GHG emissions in 2020 from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total CO_2eq emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_2eq emissions. The remaining sources of GHG emissions in 202 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.[33]

(4) Yolo County Emissions. In July 2007, the County joined the California Climate Action Registry (CCAR). The CCAR serves as a voluntary greenhouse gas (GHG) registry to protect and promote early actions to reduce GHG emissions by organizations, including the Yolo County government. California Registry members voluntarily measure, verify, and publicly report their GHG emissions, are leaders in their respective industry sectors, and are actively participating in solving the challenge of climate change. Yolo County has conducted an inventory for municipal government operations, and for the 2006 baseline year, the County government reported approximately 8,200 metric tons of CO_2eq emissions for municipal government operations only. While there is currently no GHG emissions inventory for Yolo County community-wide activities (i.e., those emissions related to all land uses that occur within the Yolo County geographic boundary), the Draft General Plan includes Action CO-A115 to develop a Greenhouse Gas (GHG) Emissions Reduction Plan, including conducting a baseline inventory emissions of community-wide (not only municipal government operations) for 1990. The timeframe for completion of the Emissions Reduction Plan is 2009/2011.

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

[32] California Air Resources Board (CARB), 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

[33] California Air Resources Board (CARB), 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

Some of the incorporated areas of Yolo County have developed emissions inventories for community and/or municipal operations related to their individual city emissions within the County. The City of Davis has conducted an emissions inventory to quantify existing emissions from municipal operations and community-wide actions using software from ICLEI – Local Governments for Sustainability (formerly the International Council for Local Environmental Initiatives). ICLEI works with local governments to help them reduce their greenhouse gas emissions and therefore their impact on global climate change. In 2005, community-wide GHG emissions in the City of Davis totaled over 300,000 metric tons of CO_2eq. The majority of emissions (approximately 53 percent) in the city were related to transportation. The City of West Sacramento joined ICLEI in 2007 and developed emissions estimates for municipal operations in 2008. The baseline emissions for West Sacramento were approximately 19,000 metric tons of CO_2eq with the majority of emissions related to water and sewer operations. Winters and Woodland do not have emissions inventories available at the time of the writing of this report.

UC Davis also participates in CCAR and completed an emissions inventory for campus operations for the year 2007. Total direct (mobile sources, combustion, etc.) and indirect (electricity) emissions were approximately 242,640 tons of CO_2eq per year. Over 50 percent of the emissions are related to stationary source combustion, followed by electricity generation at approximately 39 percent of the total emissions. The Rumsey Band of Winton Indians is the other major entity in the region. No inventory of tribal emissions is known to be available.

d. Regulatory Framework. The regulatory framework and other governmental activities addressing GHG emissions and global climate change are discussed in this section.

(1) Federal Regulations. There are no adopted federal regulations for GHG emissions. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity[34] of the American economy by 18 percent over the 10-year period from 2002 to 2012. This strategy has three basic components: (1) slowing the growth of emissions, (2) strengthening science, technology and institutions, and (3) enhancing international cooperation.[35]

To meet this goal, the federal multiagency Climate Change Science Program (CCSP) was established to investigate natural and human-induced changes in the Earth's global environmental system; to monitor, understand, and predict global change; and to provide a sound scientific basis for national and international decision-making. The federal government established the multi-agency Climate Change Technology Program (CCTP) to accelerate the development and deployment of key technologies which offer great promise to reduce GHG emissions. The CCTP works closely with CCSP to make further progress in understanding and addressing global climate change. The United States Environmental Protection Agency's (U.S. EPA's) primary role in CCSP is evaluating the potential consequences of climate variability and the effects on air quality, water quality, ecosystems, and human health in the United States.

[34] GHG intensity measures the ratio of GHG emissions to economic output.

[35] Environmental Protection Agency. 2008. Climate Change: Basic Information. www.epa.gov/climatechange/basicinfo.html.

Recent court cases may change the voluntary approach to address global climate change and greenhouse gas emissions. On April 2, 2007, the United States Supreme Court ruled that the U.S. EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA).

Over a decade ago, most countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to begin to consider what can be done to reduce global warming and to cope with the physical and socioeconomic effects of climate change. More recently, a number of nations have ratified an amendment to the treaty: the Kyoto Protocol, which has a more powerful effect on its signatories. Because the Kyoto Protocol will affect virtually all major sectors of the economy, it is considered to be the most far-reaching agreement on the environment and sustainable development ever adopted. Most of the world's countries eventually agreed to the Protocol, but some nations (including the United States) chose not to ratify it.

As of July 2008, 182 countries have ratified the Kyoto Protocol. Participating nations are separated into Annex 1 countries (i.e., industrialized nations) and Non-Annex 1 countries (i.e., developing nations) that have different requirements for GHG reductions. The goal of the Protocol is to achieve overall emissions reduction targets for six GHGs by 2012. The six GHGs regulated under the Protocol are CO_2, CH_4, N_2O, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. Each nation must reduce GHG emissions by a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately 5 percent below 1990 levels.

(2) State Regulations. In 1967, the California Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus, the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board, to establish the CARB. Since its formation, the CARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems.

In a response to the transportation sector's significant contribution to California's CO_2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires CARB to set GHG emission standards for passenger vehicles and light duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. In setting these standards, the CARB considered cost effectiveness, technological feasibility, and economic impacts. CARB adopted the standards in September 2004. When fully phased-in, the near-term (2009 to 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the mid-term (2013 to 2016) standards would result in a reduction of approximately 30 percent. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the U.S. EPA. However, in December 2007, the U.S. EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the U.S. EPA's decision in the Ninth Circuit Court of Appeals; however, no decision on that petition has been published as of January 2009. On January 26, 2009, the President issued an Executive Memorandum directing the U.S. EPA to reassess its decision to deny the waiver and to initiate any appropriate action.[36]

[36] Obama, President Barack. 2009. Memorandum for the Administrator of the Environmental Protection Agency. State of California Request for Waiver Under 42 U.S.C. 7543(b), the Clean Air Act. January 26.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals for the State of California: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The CARB has established the level of GHG emissions in 1990 at 427 million metric tons (MMT) of CO_2eq. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires CARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by CARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[37] Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 MMT of CO_2eq, which would allow California to attain the emissions goal of 427 MMT of CO_2eq by 2020. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The CARB rulemaking process includes preparation and release of each of the draft measures, public input through workshops and a public comment period, followed by a CARB Board hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed CARB and the newly created Climate Action Team (CAT) [38] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed Executive Order S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. The Executive Order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs CARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007 CARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). [39] Discrete early action measures are measures that are required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The CARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry,

[37] California Air Resources Board. 2008. *Climate Change Proposed Scoping Plan: a framework for change.* October.

[38] CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of CARB's jurisdiction.

[39] California Air Resources Board. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

reduction of propellants in consumer products, proper tire inflation, and sulfur hexafluoride (SF_6) reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[40]

To assist public agencies in the mitigation of GHG emissions or analyzing the effects of GHGs under CEQA, including the effects associated with transportation and energy consumption, Senate Bill 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. OPR is required to prepare, develop, and transmit these guidelines on or before July 1, 2009 and the Resources Agency is required to certify and adopt them by January 1, 2010. Preliminary guidance released by OPR in June 2008 suggests that global climate change analyses in CEQA documents should be conducted for all projects that release GHGs, and that mitigation measures to reduce emissions should be incorporated into projects, to the extent feasible. On January 8, 2009, OPR released preliminary draft CEQA guideline amendments, which may be refined through a public process currently underway at the time this document was drafted. The preliminary amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations.

SB 375, signed into law on October 1, 2008, is intended to enhance CARB's ability to reach AB 32 goals by directing CARB to develop regional GHG emissions reduction targets to be achieved within the automobile and light truck sectors for 2020 and 2035. CARB will work with California's 18 metropolitan planning organizations (MPOs) to align their regional transportation, housing, and land use plans and prepare a "Sustainable Communities Strategy" (SCS) to reduce the number of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its greenhouse gas reduction targets.

Additionally, SB 375 provides incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The bill exempts home builders from certain CEQA requirements if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options, to promote healthy lifestyles and reduce traffic congestion.

(3) Yolo-Solano Air Quality Management District. The Handbook for Assessing and Mitigating Air Quality Impacts of the Yolo-Solano Air Quality Management District (YSAQMD) contains recommendations for evaluation of greenhouse gas emissions.[41] Residents of the District will be affected by many of these climate change effects, particularly given the importance to both Yolo and Solano Counties of their agricultural economy, economic dependence on tourism, recreational fishing, and recreational boating. Yolo and Solano Counties may also experience economic and public health damages related to changes in vegetation and crop patterns, lower summer reservoirs, and increased potential for flooding and air pollution that hotter temperatures can produce. While there are no specific thresholds associated with greenhouse gases, the Handbook still recommends including at least a qualitative discussion of greenhouse gases in air quality analyses for

[40] California Air Resources Board. 2007. "CARB approves tripling of early action measures required under AB 32". News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

[41] Yolo-Solano Air Quality Management District, 2007. *Handbook for Assessing and Mitigating Air Quality Impacts.* July 11.

sizable projects. In order to pro-actively address this issue, Lead Agencies should consider preparing such an analysis for larger projects as part of their full analysis.

According to YSAQMD, the Lead Agency can require mitigation measures through alterations of its building codes or permit requirements; e.g., it might require solar heating capabilities for all new development, or require that carbon sequestration credits be purchased for developments exceeding a certain size. The Lead Agency could take direct action to offset its own carbon emissions, or those of its residents, by providing for increased public transportation service, increased support of alternative fuels and technologies, or other measures to reduce the impacts of CO_2.

(4) Yolo County. On September 11, 2007, the Yolo County Board of Supervisors adopted a resolution declaring that Yolo County was participating in the Cool Counties Climate Stabilization. This resolution commits Yolo County to working with regional jurisdictions and entities to strive to achieve a fair-share reduction in regional greenhouse gas emissions of 80 percent by the year 2050. The resolution makes Yolo County one of only 13 counties in the country making this commitment and indicates that Yolo County will take the following actions:

- Create an inventory of county government GHG emissions and implement policies, programs and operations to achieve significant, measurable and sustainable reduction of those operational GHG emissions to help contribute to the regional reduction targets;
- Work closely with local, State, and federal governments and other leaders to reduce County geographical GHG emissions to 80 percent below current levels by 2050, by developing a GHG emissions inventory and regional plan that establishes short-, mid-, and long-term GHG reduction targets, with recommended goals to stop increasing emissions by 2010, and to achieve a 10 percent reduction every five years thereafter through to 2050[42];
- Urge Congress and the Administration to enact a multi-sector national program of requirements, market-based limits, and incentives for reducing GHG emissions to 80 percent below current levels by 2050. Urge Congress and the Administration to strengthen standards by enacting legislation such as a Corporate Average Fuel Economy ("CAFE") standard that achieves at least 35 miles per gallon (mpg) within 10 years for cars and light trucks.

Yolo County has also adopted Leadership in Energy and Environmental Design standards (LEED) for new county government buildings. The LEED standards set benchmarks for achievement of more efficient levels of energy, resource, and water use in new construction.

SACOG is the agency responsible for regional transportation planning in Yolo County. As mentioned earlier, SB 375 directs SACOG and each of the state's 18 MPOs to prepare a "Sustainable Communities Strategy" that contains a growth strategy to meet GHG emission reduction targets. When developing the next Metropolitan Transportation Plan (MTP), SACOG will be responsible for including an SCS that will attempt to meet the GHG targets set by CARB. If the SCS cannot achieve the GHG target set by CARB, SACOG will need to prepare an Alternative Planning Strategy (APS) showing how the GHG emissions target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

[42] This is addressed through proposed Action CO-A123 in the Draft General Plan.

2. Draft 2030 Countywide General Plan for Yolo County

The following is a list of relevant Draft General Plan goals, policies and actions related to global climate change. The following list includes only policies explicitly included in the Climate Change section of the Draft General Plan. Appendix D contains a complete list of over 300 policies that are part of the Draft General Plan that would have a beneficial effect on greenhouse gas emissions.

Conservation and Open Space Element

- Policy CO-8.1: Assess current greenhouse gas emission levels and adopt strategies based on scientific analysis to reduce global climate change impacts.
- Policy CO-8.2: Use the development review process to achieve measurable reductions in greenhouse gas emissions.
- Policy CO-8.3: Prepare appropriate strategies to adapt to climate change based on sound scientific understanding of the potential impacts.
- Policy CO-8.4: Encourage all businesses to take the following actions, where feasible: replace high mileage fleet vehicles with hybrid and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.
- Policy CO-8.5: Promote GHG emission reductions by supporting carbon efficient farming methods (e.g. methane capture systems, no-till farming, crop rotation, cover cropping); installation of renewable energy technologies; protection of grasslands, open space, oak woodlands, riparian forest and farmlands from conversion to other uses; and development of energy-efficient structures.
- Policy CO-8.6: Undertake an integrated and comprehensive approach to planning for climate change by collaborating with international, national, State, regional, and local organizations and entities.
- Policy CO-8.7: Integrate climate change planning and program implementation into County decision making.
- Policy CO-8.8: Increase public awareness about climate change and encourage county residents and businesses to become involved in activities and lifestyle changes that will aid in reduction of greenhouse gas emissions.
- Policy CO-8.9: Work with local, regional, State, and Federal jurisdictions, as well as private and non-profit organizations, to develop a regional greenhouse gas emissions inventory and emissions reduction plan.
- Action CO-A115: Develop a Greenhouse Gas (GHG) Emissions Reduction Plan and/or Climate Action Plan (CAP) for the County, to control and reduce net GHG emissions, and to address economic and social adaptation to the effects of climate change. Development of this plan(s) shall include the following steps: 1) conduct a baseline analysis (GHG emissions inventory) for 1990; 2) adopt an emissions reduction target; 3) develop strategies and actions for reducing emissions including direct offsets and fees to purchase offsets; 4) develop strategies and actions for adaptation to climate change; 5) implement strategies and actions; and 6) monitor emissions and verify results a minimum of every five years starting in 2010. Encourage collaboration with the cities to include the incorporated areas in the plan(s). Require County operations and actions, as well as land use approvals to be consistent with this plan(s). Utilize the 1982 Energy Plan as a starting point for this effort. (Policy CO-8.1) Timeframe: 2009/2011.
- Action CO-A116: Monitor State progress in the development of GHG quantification protocol and guidance for local governments that allows for statewide uniform measurement and estimation of expected jurisdiction-wide GHG emissions. (Policy CO-8.1)
- Action CO-A117: Require the implementation of cost-effective and innovative GHG emission reduction technologies in building components and design. (Policy CO-8.2, Policy CO-8.4)

- Action CO-A118: Adopt urban forestry practices that encourage forestation as a means of storing carbon dioxide, with the goal of doubling the tree canopy in unincorporated communities by 2030. Use appropriate protocols to assess owner eligibility to sell carbon credits. (Policy CO-8.1). Timeframe: 2012/2013.
- Action CO-A119: Require new development to incorporate designs and/or programs to reduce travel demand and vehicle emissions. (Policy CO-8.2, Policy CO-8.4)
- Action CO-A120: Require that new development incorporate alternative modes of transportation, including transit, bicycling and walking, in order to reduce vehicle emissions. (Policy CO-8.2, Policy CO-8.4)
- Action CO-A121: Consider the provision of local housing for County employees to reduce commute travel time. (Policy CO-8.2)
- Action CO-A122: In conjunction with, or immediately following, preparation of the Greenhouse Gas Emissions Reduction/Climate Action Plan(s) for the County, require countywide departmental analysis of how predicted effects of climate change will affect responsibilities and resources of each department. Develop strategies and actions to addresses outcomes. (Policy CO-8.3, Policy CO-8.7). Timeframe: 2011/2012.
- Action CO-A123: Encourage incorporation of the County's Greenhouse Gas Emissions Plan/Climate Action Plan into a regional climate action plan. The regional plan should strive to achieve its fair-share contribution towards a minimum 80 percent reduction in regional greenhouse gas emissions by 2050. (Policy CO-8.9). Timeframe: 2011/2012.

3. Impacts and Mitigation Measures

This section evaluates significant impacts to global climate change that could result from implementation of the proposed Draft General Plan. Mitigation measures are identified as appropriate.

a. Significance Criteria. The recommended approach for GHG analysis included in OPR's June 2008 release is to (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below significance.[43] Neither the CEQA statute nor Guidelines prescribe thresholds of significance or a particular methodology for performing an impact analysis; as with most environmental topics, significance criteria are left to the judgment and discretion of the lead agency.

The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for greenhouse gas emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce greenhouse gas emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation…. For local government lead agencies, adoption of general plan policies and certification of general plan EIRs that analyze broad jurisdiction-wide impacts of greenhouse gas emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

Pursuant to SB 97, OPR is in the process of developing guidelines for analysis of the effects of greenhouse gas emissions. As part of this process, OPR has asked CARB technical staff to recommend Statewide interim thresholds of significance for greenhouse gases. CARB released a

[43] California, State of, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*. June 19.

preliminary draft staff proposal in October 2008 that included initial suggestions for significance criteria related to industrial, commercial and residential projects. The CARB anticipates adopting the proposal in March 2009 to allow coordination with OPR's efforts on global climate change.

In April 2009, proposed CEQA Guideline amendments released by OPR included the following direction regarding determination of significant impacts from GHG emissions (Section 15064.4):

(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

> (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; or
>
> (2) Rely on a qualitative analysis or performance based standards.

(b) A lead agency may consider the following when assessing the significance of impacts from greenhouse gas emissions on the environment:

> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
>
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
>
> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Some policy makers and regulators suggest that a zero emissions threshold would be appropriate when evaluating GHGs and their potential effect on climate change. Such a rule appears inconsistent with the State's approach to mitigation of climate change impacts. AB 32 does not prohibit all new GHG emissions; rather, it requires a reduction in State-wide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur; increases will result from certain activities, but reductions must occur elsewhere.

While individual projects in Yolo County are unlikely to measurably affect global climate change, each of these projects incrementally contribute toward the potential for global climate change on a cumulative basis, in concert with all other past, present, and probable future projects. This EIR analyzes whether the Draft General Plan's emissions should be considered cumulatively significant.

At this time, as a matter of policy and for the purposes of environmental analysis of the proposed General Plan, Yolo County is treating GHG emissions associated with new growth as a significant impact. Accordingly, for purposes of this analysis, the Draft General Plan would result in significant adverse impacts on global climate change if it would:

- Result in significant adverse physical impacts as a result of increases in greenhouse gases (GHGs);
- Result in significant adverse physical impacts from the effects of global climate change on existing and future planned land uses in the County;
- Substantially conflict with applicable plans, policies and regulations of other agencies adopted for the purpose of avoiding or mitigating an environmental effect, and;
- Result in new policies that would result in significant adverse physical impacts as compared to the 1983 General Plan policies.

b. Impacts Analysis. The following section provides an evaluation and analysis for the potential impacts of the Draft General Plan for each of the criteria of significance listed above.

(1) Increase in GHG Emissions. Emissions estimates for the proposed Draft General Plan are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is not yet an established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the County at the time this EIR was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance and represent a scenario that is believed to be worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and the County's decision makers in understanding the Draft General Plan's potential contribution to global climate change impacts, the information available to the County is not sufficiently detailed to allow a direct comparison between particular Plan characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any resulting reduction in climate change impacts.

Development associated with the Draft General Plan would generate GHG emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during the project's operation (as opposed to its construction). For urban development, typically more than 80 percent of the total energy consumption takes place during the use of buildings and other facilities, and less than 20 percent is consumed during construction.[44]

[44] United Nations Environment Programme (UNEP), 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

GHG emissions associated with the project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with project-related vehicular trips and stationary source emissions, such as natural gas used for heating. Recognizing that the filed of global climate change analysis is rapidly evolving, the approaches advocated most recently indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, construction activities, and any other significant source of emissions within the Draft General Plan area. Approximately 88 percent of unincorporated Yolo County is designated for agricultural uses, and as such, GHG emissions associated with agricultural activities are also included in this section.

GHG emissions generated by the Draft General Plan would predominantly consist of CO_2. In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a substantially longer period of time. While emissions of other GHGs, such as CH_4, are important with respect to global climate change, emission levels of other GHGs are less dependent on the land use and circulation patterns associated with the proposed land use development project than are levels of CO_2. The potential effects related to growth occurring at build-out of the Draft General Plan were compared to environmental baseline conditions (i.e., existing conditions) to determine global climate change impacts.

Greenhouse Gas Emissions and Methodology. The GHG emissions methodology presented below includes construction emissions in terms of CO_2, and annual CO_2eq GHG emissions from increased energy consumption, water usage, solid waste disposal, as well as estimated GHG emissions from vehicular traffic that would result from implementation of the Draft General Plan. Overall, the following activities associated with the Draft General Plan could directly or indirectly contribute to the generation of GHG emissions:

Construction Activities. Construction activities, such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew, of individual projects related to the Draft General Plan will produce combustion emissions from various sources. During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

Using the URBEMIS 2007 model, it is estimated that the average daily CO_2 emissions associated with construction equipment exhaust for the proposed project would be approximately 6,865 metric tons for each year within the timeframe of the Draft General Plan. The estimates are based on residential, commercial and industrial growth and assumes an even distribution of General Plan development over 20 years (i.e., $1/20^{th}$ of the total development occurs in each year with equal construction phasing in each year). Commercial and industrial square footage was estimated using the additional acreage and maximum floor-area ratio (FAR) for each land use type. Model output sheets are included in Appendix D.

The project would be required to implement the construction exhaust control measures listed in Mitigation Measure AIR-1 of Section IV.D, Air Quality. This measure would reduce GHG emissions during the construction period.

Motor Vehicle Use. Transportation associated with the Draft General Plan would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips. Mobile sources (vehicle trips and associated miles traveled) would be the largest emission source of GHGs associated with the proposed project. Transportation is also the largest source of GHG emissions in California and represents approximately 38 percent of annual CO_2 emissions generated in the State. For land use development projects, vehicle miles traveled (VMT) and vehicle trips are the most direct indicators of GHG emissions associated with the Draft General Plan. CO_2 and CH_4 emissions were estimated using VMT data developed by Fehr & Peers and EMFAC 2007; estimates of N_2O were based on EPA emission factors.

Energy Use. Buildings represent 39 percent of U.S. primary energy use and 70 percent of electricity consumption.[45] The Draft General Plan would increase the demand for electricity and natural gas due to the increased commercial and industrial square footage, number of employees and number of single- and multi-family residences allowed under the Plan. Natural gas use results in the emissions of two GHGs: CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year.[46]

Greenhouse gas emissions related to electricity consumption were calculated based on data provided by the Energy Information Administration. Propane is also used for home and water heating in areas of the County without access to natural gas. However, propane is largely an unregulated fuel and the State does not collect data on sales or usage.[47] Propane is supplied to the County by various propane suppliers, including Viking Propane, Suburban Propane, Amerigas, Sheldon Gas, Allied Propane, and Capitol City Propane. For many of the propane suppliers, data regarding amount of propane sold to users in Yolo County is not readily available. Viking Propane estimates that they sold 930,000 gallons of propane in 2008, and Suburban Propane estimates they sold approximately 700,000 gallons of propane in 2008. These rough estimates indicate that more than 1,630,000 gallons of propane were sold to residential, commercial, industrial, agricultural, and recreational users in the County.

Water Use. Water-related energy use consumes 19 percent of California's electricity every year.[48] Energy use and related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. Water use estimates were based on usage

[45] United States Department of Energy. 2003. *Buildings Energy Data Book.*

[46] California Energy Commission (CEC), 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24. Website: energy.ca.gov/pier/iaw/industry/water.html. Accessed July 24, 2007.

[47] California Energy Commission, 2009. Energy Almanac. Propane or Liquefied Petroleum Gas (LPG). http://www.energyalmanac.ca.gov/propane/index.html.

[48] California, State of, 2005. California Energy Commission. California's Water-Energy Relationship. November.

factors provided by the other studies in the Bay Area and the Pacific Institute.[49] Water use related to agricultural use is included in the estimates for agricultural GHG emissions, while the remaining municipal water use emissions are included under electricity production.

Solid Waste Disposal. Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Average waste generation rates from a variety of sources are available from the California Integrated Waste Management Board.[50] Landfilling and other methods of disposal use energy for transporting and managing the waste and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent a GHG than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere. To determine the net GHG emissions from landfilling, the CO_2eq emissions from CH_4 generation, carbon storage (treated as negative emissions), and transportation CO_2 emissions were considered. Approximately 88 percent of solid waste generated within Yolo County is disposed of at landfills within Yolo County and is taken to the Yolo County Central Landfill or the Esparto Convenience Center.[51] The Yolo County Central Landfill is demonstrating an innovative landfill management strategy called "enhanced or controlled" landfilling to manage solid waste. Controlled landfilling accelerates the decomposition process of the waste and can provide reliable energy generation, as well as significant environmental benefits. The Yolo County Integrated Waste Management (IWM) Division is working with the state on a pilot program for an anaerobic “green waste” digester, which will also generate methane. Yolo County captures methane gas from the waste digestion at the landfill and uses it to generate approximately 2.5 megawatts of electricity.[52] The gas collection system routes the gas to the plant where it is then burned in internal combustion engines or a flare. Greenhouse gas emissions are reduced by recovering landfill gas and offsetting fossil fuel use.

Agricultural Activities. Agriculture accounts for 88 percent of the unincorporated County land area and therefore agricultural activities and operations may be a significant contributor to greenhouse gas emissions. Agricultural activities contribute to emissions of greenhouse gases through a variety of processes, including direct emissions from the field (e.g., manure and soil management) in the form of nitrous oxide and methane, and carbon emissions from agricultural equipment and water-pumping systems. The estimates of greenhouse gas emissions related to agricultural activities are based on emissions from equipment exhaust, including harvesting equipment, emissions from fertilizer application and water use. Rice is produced in the northeast part of the county and in portions of the Yolo Bypass Wildlife Area; methane is produced during flooded rice cultivation by the anaerobic (lacking oxygen) decomposition of organic matter in the soil.[53]

[49] Pacific Institute, 2003. Waste Not, Want Not: The Potential for Urban Water Conservation in California. November.

[50] California Integrated Waste Management Board, 2009. *Estimated Solid Waste Generation Rates.* http://www.ciwmb.ca.gov/wastechar/wastegenrates/.

[51] California Integrated Waste Management Board , 2009. *Yolo County: Waste Outflows to Landfills in 2004.* Available at http://www.ciwmb.ca.gov/LGCentral/Summaries/57/2004/Outflow.htm.

[52] Yolo, County of, 2009. *Climate Change.* Available at http://www.yolocounty.org/Index.aspx?page=878#County%20Landfill

[53] U.S. Environmental Protection Agency, 2006. *Methane Sources and Emissions.* October 19. http://www.epa.gov/methane/sources.html

Since above-ground vegetation in most agricultural systems is annual crops or does not accumulate large standing stocks (e.g., grazed pastures), soil carbon stock changes are the primary focus for agricultural land. Over the past decade, agricultural soils in the United States have acted as a small net sink of approximately 12 million metric tons of carbon per year, mainly due to improved soil management practices.[54] Concerns over rapidly increasing atmospheric CO_2 levels have prompted interest in soil carbon sequestration. However, the ability of conservation tillage systems to sequester carbon is still being debated.[55] Agricultural sinks are difficult to account and measure due to spatial variability, variation over time, the slow rate at which carbon might be sequestered and issues of how permanently carbon can be stored.

Natural Areas. Vegetation is important to global climate change, as it absorbs CO_2 from the atmosphere as part of the growing process. Forests and woodlands build up a carbon store in their trees, shrubs and soil, creating carbon "sinks". When cleared, much of the stored carbon is rapidly converted back into CO_2 and released to the atmosphere. Development of urbanized land allowed by the Draft General Plan would result in the changes to natural areas and agricultural lands that could change natural emissions sources and sinks.

While human-related CH_4 emissions are estimated to be 60 percent of the global total methane emissions, natural sources, such as wetlands, freshwater bodies, non-wetland soils, and wildfires, are also significant contributors. Wetlands have evolved as dynamic ecosystems, constantly changing due to the physical and chemical processes associated with floods, drought, and fire. Globally, wetlands cover only a small portion of the world's land surface, yet they are significant carbon stores.[56] Since wetlands, in particular peatlands, are significant carbon stores, conservation of wetlands needs to be considered in the development of climate change mitigation strategies.[57] Conversion and degradation of wetlands releases carbon and methane into the atmosphere in large quantities.

The California Department of Fish and Game (CDFG) manages approximately 16,770 total acres within the Yolo Bypass Wildlife Area. The Vic Fazio Yolo Bypass Wildlife Area is a public and private restoration project managed by the CDFG in consultation with the Yolo Basin Foundation. Managed wetlands in the Yolo Bypass Wildlife Area are now enclosed by levees and berms, and flooded with water from irrigation systems.[58] The Yolo Bypass provides flood conveyance for the high flows from several northern California waterways to the Sacramento-San Joaquin River Delta. Whereas natural wetland hydrology was very dynamic, flooding cycles for wetlands can be made predictable through strategic and innovative management. Permanent wetlands are flooded year round; seasonal wetlands are drained April 1st and flooded September 1st of each year.[59] The management of productive wetland habitat requires not only water management, but also periodic soil

[54] Pew Center on Global Climate Change, 2006. *Agriculture's Role in Greenhouse Gas Mitigation.* September.

[55] Dolliver, Holly A.S., 2008. *Effect of Tillage and Nutrient Sources on Soil Organic Carbon Fluxes and Storage*. Paper 70-3 at 2008 Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM. October.

[56] Bergkamp, Ger and Brett Orlando, 1999. *Wetlands and Climate Change*. October.

[57] Ibid.

[58] California, State of. Department of Fish and Game, 2007. *Yolo Bypass Wildlife Area - Land Management Plan.*

[59] Ibid.

and vegetation disturbances. In addition to seasonal and permanent wetlands, the Yolo Bypass Wildlife Area includes annual grasslands, riparian scrub and woodlands, vernal pools, and row crop-seasonal wetlands. The primary row crop is rice, but other crops, including grains, are also produced across the northern and central portions of the Yolo Bypass Wildlife Area.[60]

There are approximately 14,855 acres of wetlands in Yolo County. Significant areas of seasonal wetland and marsh communities are found in the Yolo Basin, including the Yolo Bypass Wildlife Area, private lands in the southern panhandle, the Conaway Ranch north of Interstate 80, and the City of Davis Wetlands. Additional wetland habitats are found at the recently restored Roosevelt Ranch Preserve east of Zamora and in several other isolated locations throughout the central and eastern portions of the County. The Bay Delta Conservation Plan has a number of policies and actions that will affect the amount of wetlands in the region, including restoration of freshwater tidal wetlands in the Cache Slough complex and tidal marsh habitat in the west Delta.

This flooding of land will increase CO_2 storage as organic matter, but it may also increase CH_4 emissions, depending on how close the water table is to the soil surface.[61] While few estimates are available, carbon storage rates will initially be rapid after inundation with water, then slow over time. The CO_2 sink that is created by establishing a wetland may be offset by increased methane emissions because inundation will cause some of the decomposed carbon to be released as methane. The actual amount of emitted methane will depend on the degree of inundation and on whether other oxidants are present. Given the uncertainties that exist about carbon storage rates and methane emission changes related to regional wetlands, GHG emissions were not estimated for these natural sources, but would nevertheless be a factor in overall GHG emissions along with other sources.

Greenhouse Gas Emissions. Using the methodologies described above, in this section GHG emissions estimates are provided for the existing conditions and the buildout of the Draft General Plan.

Existing Conditions. Under CEQA, the significance determination must focus on changes to the existing physical environment.[62] The analysis must consider the existing physical environment and measure the impacts of its project against the current conditions. Table IV.F-2 provides an estimate of current GHG emissions within unincorporated Yolo County.

Agricultural activities, including fertilizer application, off-road equipment, and irrigation activities, account for the largest source of GHG emissions under existing conditions and account for 40 percent of the total inventory. Estimates are based on enteric fermentation and manure management of livestock, nitrogen fertilizer application, rice harvesting, water and off-road equipment usage. There are additional emissions that could occur from soil management or burning of agricultural biomass, but information related to these activities is not readily available or easily quantified. Estimates do not assume any carbon sequestration that would occur from plants and trees on agricultural lands. Carbon storage would reduce the overall agricultural emissions, but there are questions about how permanent carbon storage would be in agricultural crop (i.e., harvesting of annual crops could release stored carbon).

[60] Ibid.

[61] Intergovernmental Panel on Climate Change (IPCC), 2001. *Special Reports on Climate Change. Fact Sheet 4.18. Restoration of Former Wetlands.*

[62] See, e.g., Pub. Res. Code, § 21060.5; 14 Cal.Code Regs. §§ 15002 (g); 15125 (e), 15126.2 (a), 15360.

Table IV.F-2: Yolo County - Existing Greenhouse Gas Emissions

Emission Source	Emissions (Metric Tons Per Year)				
	CO_2	CH_4	N_2O	CO_2eq	Percent of Total
Agriculture	--	--	--	879,977	47.8%
Vehicles	119,184	13.24	13	123,390	6.7%
Electricity Production	500,000	6	3	501,030	27.2%
Natural Gas Combustion	320,000	6	6	320,000	17.4%
Propane	--	--	--	9,444	0.5%
Solid Waste	--	--	--	2,400	0.1%
Wastewater	--	--	--	11	0.0%
Other Area Sources	6,231	--	--	6,231	0.3%
Total Annual Emissions	945,420	25	22	1,842,480	100.0%

Note: Numbers in table may not appear to add up correctly due to rounding.
-- Estimates not available for this pollutant and/or category.
Source: LSA Associates, Inc., February 2009.

Energy use, including electricity and natural gas, is a significant source of emissions (22 percent) and was calculated with data available through the California Energy Commission.[63] In 2007, Yolo County used approximately 1.744 million kWh of electricity and 59.84 million therms of natural gas countywide (cities and unincorporated area).[64] As mentioned above, water use results in the use of electricity; Yolo County uses approximately 915,000 acre-feet of water annually for agricultural and municipal purposes.[65] Based on DWR data, the unincorporated County uses approximately 790,000 acre-feet of water annually for agricultural uses.

Motor vehicle emissions are based on trip generation estimates and vehicle miles traveled (VMT). Vehicle-related emissions are approximately 7 percent of the unincorporated county-wide emissions and represent the second largest GHG emissions source; consistent with statewide estimates of transportation-related emissions. Vehicle emissions are based on estimates in the unincorporated portion of the county only. The rural and agricultural nature of the unincorporated area in Yolo County explains why transportation-related emissions are so much lower than the state percentage (38 percent) of total emissions.

Draft General Plan. The Draft General Plan would generate up to 300,910 metric tons of CO_2eq per year of new emissions over existing conditions, as shown in Table IV.F-3. Agricultural activities, including fertilizer application, off-road equipment, and irrigation activities, account for the largest source of GHG emissions under existing conditions and in the future with the Draft General Plan. Energy use, including electricity and natural gas, is the second most significant source of emissions and was estimated based on per capita usage rates.

[63] California Energy Commission, 2009. *Electricity Consumption by County*. http://www.ecdms.energy.ca.gov/elecbycounty.asp. *Natural Gas Consumption by County.* http://ecdms.energy.ca.gov/gasbycounty.asp.

[64] Ibid.

[65] Water Resources Association of Yolo County, 2007. *Integrated Regional Water Management Plan.* April.

Table IV.F-3: Yolo County – 2030 Draft General Plan Greenhouse Gas Emissions

	Emissions (Metric Tons Per Year)					
Emission Source	**CO_2**	**CH_4**	**N_2O**	**CO_2eq**	**Percent of Total**	**Net Change**
Construction	--	--	--	6,865	0.3%	6,865
Agriculture	--	--	--	885,432	41.3%	5,456
Vehicles	248,299	6.6	33	258,300	12.1%	134,910
Electricity Production	580,000	6.4	3.5	581,200	27.1%	80,170
Natural Gas Combustion	380,000	7.3	7	380,000	17.7%	60,000
Propane	--	--	--	9,444	0.4%	0
Solid Waste	--	--	--	3,200	0.1%	800
Wastewater	--	--	--	24	0.0%	13
Other Area Sources	18,928	--	--	18,928	0.9%	12,696
Total Annual Emissions	1,227,200	20	44	2,143,390	100.0%	300,910

Note: Numbers in table may not appear to add up correctly due to rounding.
-- Estimates not available for this pollutant and/or category.
Source: LSA Associates, Inc., February 2009.

It is interesting to note that agriculture in the County comprises 88 percent of the unincorporated land but is projected to generate only 41 percent of the total future (2030) GHGs, whereas at build-out urban and other land uses will occupy 12 percent of the land and generate 59 percent of the GHGs. On a per acre basis agriculture in Yolo County is projected to generate 1.6 CO_2eq per acre[66], and all other uses are projected to generate 16.4 CO_2eq per acre[67].

Emissions from agricultural and other off-road equipment are controlled by the federal and state government. While they do not mandate implementation, Policy CO-8.5 and Actions AG-A4 and G-A10 in the Draft General Plan could reduce GHG emissions related to agricultural production by supporting carbon efficient farming methods and other climate change strategies. Environmental problems from agricultural activities can be related to inefficient use of resources. For example, more efficient nitrogen fertilizer use can reduce emissions and impacts on global climate change.

The Draft General Plan includes a number of goals, policies, and actions that address energy efficiency, including measures to encourage energy conservation, efficiency, and green design in new construction and existing buildings CC-4.4, CC-4.7, CC-4.8, CC-4.11, CC-4.13, CC-4.14, CO-7.3, CO-7.4, CO-7.6, CO-7.9, and CO-7.10, use of alternative energy sources (CC-4.5, CC-4.6, and CO-7.3), and reduction of energy consumption: CC-2.3; CC-2.5; CC-2.6; CC-2.7; CC-2.16; CC-4.1; CC-4.4; CC-4.5; CC-4.6; CC-4.7; CC-4.8; CC-4.9; CC-4.10; CC-4.11; CC-4.12; CC-4.13; CC-14; CI-1.3; CI-2.1; CI-2.2; CI-2.3; CI-5.1; CI-5.5; CI-5.6; CI-5.8; CI-5.9; CI-5.12; CI-5.15; CI-6.4; CI-6.5; CI-6.6; CI-6.11; ED-5.1; PF-9.4; PF-10.1; PF-10.2; PF-10.3; CO-5.2; CO-7.1; CO-7.2; CO-7.3; CO-7.4; CO-7.5; CO-7.6; CO-7.7; CO-7.8; CO-7.9; and CO-7.10.

In order to reduce emissions from area sources, the Draft General Plan includes Action CO-A108, which would prohibit wood-burning fireplaces in new residential developments. At present, there is a

[66] Agriculture: 885,432 CO_2eq ÷ 544,723 acres = 1.6

[67] All other land uses: 2,143,390 CO_2eq – 885,432 CO_2eq = 1,257,961; 621,224 acres – 544,723 acres = 76,501 acres; 1,257,958 CO_2eq ÷ 76,501 acres = 16.44

federal ban on CFCs; therefore, it is assumed the project would not generate emissions of CFCs. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used within the County are unknown at this time.

Motor vehicle emissions increase in 2030 over existing conditions. The greenhouse gas emissions from vehicle exhaust are controlled by the State and federal governments and are outside the control of Yolo County. Future emissions could be reduced beyond the levels presented in Table IV.F-3 taking into account AB 1493 standards (commonly called Pavley I) for GHG emissions and implementation of other vehicle exhaust controls proposed in the AB 32 Scoping Plan. There could be a reduction of 14 percent in the CO_2 emissions related light-duty vehicles (based on total statewide reductions of 31.7 million metric tons of the approximate 227 tons from the transportation sector) from Pavley II. In addition, the Scoping Plan includes the implementation of a Low Carbon Fuel Standard that will reduce GHG emissions from passenger vehicles by 10 percent.

The Yolo County Transportation District (YCTD) operates YOLOBUS, which serves the residents of Yolo County and provides regional, intercity, and local fixed-route services throughout the County. The Yolo Transportation Management Association (TMA) sponsors carpools and vanpools that operate within Yolo County and to/from surrounding areas. Yolo County has four park-and-ride facilities to provide a place for commuters in single-occupant vehicles to transfer to public transit or carpools.

Emissions from project-related vehicles would be reduced by implementation of the Draft General Plan goals, policies, and actions. Policy CC-3.3 will help to reduce some long distance travel. In addition, the Draft General Plan specifies basic local services in each planned development area to support the anticipated population, which would also reduce longer distance travel and encourage non-automotive travel. The Draft General Plan includes the following policies and actions designed to reduce vehicle miles traveled and vehicle-related greenhouse gas emissions: CI-1.3, CI-2.2, CI-2.3, CI-3.1, CI-3.6, CI-3.8, CI-4.1, CI-4.2, CI-4.3, CI-4.4, CI-5.1, CI-5.2, CI-5.4, CI-5.5, CI-5.6, CI-5.8, CI-5.9, CI-5.11, CI-5.12, CI-5.13, CI-5.14, CI-5.15, CI-5.16, CI-6.1, CI-6.2, CI-6.3, CI-6.4, CI-6.5, CI-6.6, CI-6.7, CI-6.8, CI-6.9, CI-6.10, CI-6.11, CI-6.12, CO-6.3, and CO-A101.

The VMT for the unincorporated area of Yolo County is estimated to be 83 miles generated per household per weekday under 2005 conditions. The unincorporated areas of Yolo County are rural and have limited services and employment for residents in each town and community. Given these conditions in the unincorporated areas, residents need to travel to the cities for work, shopping, recreation, and other services or activities. Assuming Yolo County continues to develop in a manner similar to current patterns, it is estimated that the weekday VMT generated per household in unincorporated Yolo County would continue to be 83 miles under business-as-usual conditions.

To minimize the regional emissions associated with the effects of the new traffic growth in the Draft General Plan, a new policy has been recommended to require a maximum threshold of 44 VMT generated per household per weekday in Dunnigan and strive to achieve this threshold in the other Specific Plan areas. Section IV.C, Transportation and Circulation contains an analysis and discussion of the measures identified to reduce VMT. The specific plan areas are designed to have a land use pattern and transportation system representative of a mature and sustainable community similar to that of Davis. The Draft General Plan provides policies to ensure that in these communities, residents

will have multiple choices for travel, such as transit, bicycling, and walking, which is important to note since the VMT threshold is not intended to reduce personal mobility, but instead increase travel choices through both land use and transportation actions. Implementation of Mitigation Measure CI-1 that recommends a new policy to establish a maximum VMT threshold in Dunnigan and a maximum VMT goal in the other specific plan areas would also reduce the consumption of energy and greenhouse gas emissions leading to global climate change.

The Draft 2030 General Plan includes policies that are intended to create sustainable towns and communities with a balance, match, and phasing of jobs and housing similar to other mature communities in the County. By creating full-service communities with the appropriate balance of jobs and housing designed around sustainable principles, the Draft General Plan will help reduce VMT and greenhouse gas emissions, not just for new growth but for existing development as well. Implementation of Policy CC-3.3 as revised by Mitigation Measure LU-4 would ensure that jobs are created concurrent with housing during the phases of development through a monitoring program would also reduce the estimated VMT. Instead of the estimated VMT of 83 miles generated per household per day for the unincorporated County under a business-as-usual scenario by Year 2035, planned for growth under the Draft General Plan is expected to result in communities that can achieve much lower levels of VMT.

Impact GCC-1: Build-out of the Draft General Plan would result in greenhouse gas emissions that would have a significant physical adverse impact and cumulatively contribute to global climate change. (S)

Mitigation Measure GCC-1a: Implement Mitigation Measures LU-4c and CI-1a and CI-1b.

While implementation of the policies and actions included in the Draft General Plan would reduce the severity of the impact on global climate change, no additional mitigation measures are available to reduce this impact to a less-than-significant level. This impact is considered significant and unavoidable. (SU)

(2) Impacts to the Proposed Project from Global Climate Change. Local temperatures could increase in time as a result of global climate change, with or without development as envisioned by the Draft General Plan. This increase in temperature could lead to other climate effects including, but not limited to, increased flooding due to increased precipitation and runoff, drought conditions, a reduction in the Sierra snowpack, and a reduction in agricultural productivity.

The California Legislature has declared the Sacramento-San Joaquin Delta, consisting of approximately 738,000 acres, as a natural resource of statewide, national, and international significance. The Delta Protection Act was signed into law in 1992 and directs the Delta Protection Commission to prepare a comprehensive resource management plan for land uses within the Primary Zone of the Delta. The Primary Zone of the Delta includes approximately 500,000 acres of waterways, levees and farmed lands extending over portions of Solano, Yolo, Sacramento, San Joaquin and Contra Costa counties.[68]

[68] Delta Protection Commission, 2002. *Land Use and Resource Management Plan for the Primary Zone of the Delta.* May. Available at http://www.delta.ca.gov.

The goals of the Delta Plan as set out in the Act are to "protect, maintain, and where possible, enhance and restore the overall quality of the Delta environment, including but not limited to agriculture, wildlife habitat, and recreational activities; assure orderly, balanced conservation and development of Delta land resources and improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety."

The location of the Delta along the southern border of Yolo County could expose some areas within the County to coastal hazards arising from global climate change, such as sea level rise. While estimates vary, sea level is expected to rise an additional 22 to 35 inches by the 2100.[69] As with other topics related to global climate change, the actual physical impact of sea level rise has many uncertainties. A report by the Pacific Institute and the Stockholm Environment Institute showed that the area of Draft General Plan in Yolo County would not be affected by a 1-meter (approximately 39 inch) rise in sea level.[70] Additional mapping resources related to sea level rise were reviewed, and the conclusions were not consistent. As shown in Figure IV.F-1, the USGS projected sea level rise by 2100 would impact areas in the southeastern portion of Yolo County.

Implementation of Draft General Plan Action HS-A17 would require the County to "coordinate with local, State and federal agencies to define existing and potential flood problem areas, including the possible impacts associated with global climate change, and to maintain and improve levees and other flood control features." With implementation of this Action, potential impacts related sea level rise may be partially addressed, but complete mitigation cannot be assured. As discussed in Section IV.K Hydrology and Water Quality, sea level rise is not enough to compromise existing levees; however it may lead to additional backwater flooding in the event of storm-induced flooding in the southern portion of the county. New development under the Draft General Plan would allow new construction in flood zones, including within the100-year flood hazard boundary, and would increase the number of people and structures subject to flood risks. Without work to improve existing levees, construction standards will be required in order to mitigate the risk of flood hazards for new development in Yolo County's floodplain.

Water supplies are also at risk from rising sea levels. Saltwater intrusion would threaten the quality of estuaries, wetlands, and fresh water supplies in the Delta. There are currently no reliable estimates of the possible impacts of saltwater intrusion into freshwater areas of California. Continued global warming will increase pressure on California's water resources. The 2007 Integrated Regional Water Management Plan (IRWMP) serves as an update to the County's 1992 water management plan, addressing major topics such as water supply, water quality, flood management, enhancement of aquatic and riparian habitat, and improvement of the County's recreational opportunities.

Hydrology throughout Yolo County is dependent on the interaction between the snowpack, runoff, and management of reservoirs. Detailed estimates of changes in runoff as a result of climate change have been produced for California using regional hydrologic models.[71] Runoff is directly affected by

[69] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* CEC-500-2006-077. July.

[70] Gleick, P.H. and E.P. Maurer. *Assessing the Costs of Adapting to Sea-Level Rise: A Case Study of San Francisco Bay.* Originally Published on April 18, 1990. Reformatted on February 17, 2004. Sea level rise map available at http://www.pacinst.org/reports/sea_level_rise/Fig8-13_lg.pdf.

[71] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources.* July

changes in precipitation and snowpack. Studies indicate that increased temperatures could result in a greater portion of peak streamflows occurring earlier in the spring with decreases in late spring and early summer.[72] Data over the past 100 years indicate that annual runoff amounts have not changed for Sacramento Valley rivers; however, runoff volume for late spring and early summer has declined by approximately 9 percent.[73] While overall precipitation volumes and runoff amount showed no change, more runoff occurred as a result of rain during the winter months, and less runoff from melting of the snowpack occurred during the spring and early summer. At the current time, the extent of climate change impacts is uncertain, and more extensive monitoring is necessary for greater understanding of changes in hydrologic patterns. These changes could have implications for water supply, flood management, and ecosystem health. Coping with the consequences of global warming could require major changes in water management. Policy CO-5.28 encourages implementation and regular update on the IRWMP. As more strategies and information emerge regarding water management in light of global warming, this will ensure that they are captured in the update of the IRWMP.

Expected changes in temperature and precipitation due to climate change could alter wetland hydrology, plant species composition, and biomass accumulation. Small changes in the balance between precipitation and evapotranspiration can alter groundwater level by a few centimeters, which can significantly reduce the size of wetlands and shift wetland types. Some management measures can be applied to specific locations to increase the resilience of the local ecosystem or to partially compensate for negative impacts. Development setbacks for wetlands, using water-control structures to enhance ecosystem function, and protection and allocation of water needed for ecosystem health are potential management measures.

Levees along the Sacramento River, Yolo Bypass, and Cache Creek are currently being evaluated to determine whether they meet either the 100-year or 200-year flood standard. Several policies and actions of the Draft General Plan, including LU-3.8, HS-2.5, CO-2.29, HS-A4, HS-A7, HS-A10, HS-A13 would minimize direct flood-related impacts associated with new development. By 2012, the California Department of Water Resources will develop a Central Valley Flood Protection Plan that includes actions to improve integrated flood management and considers the expected impacts of climate change.[74]

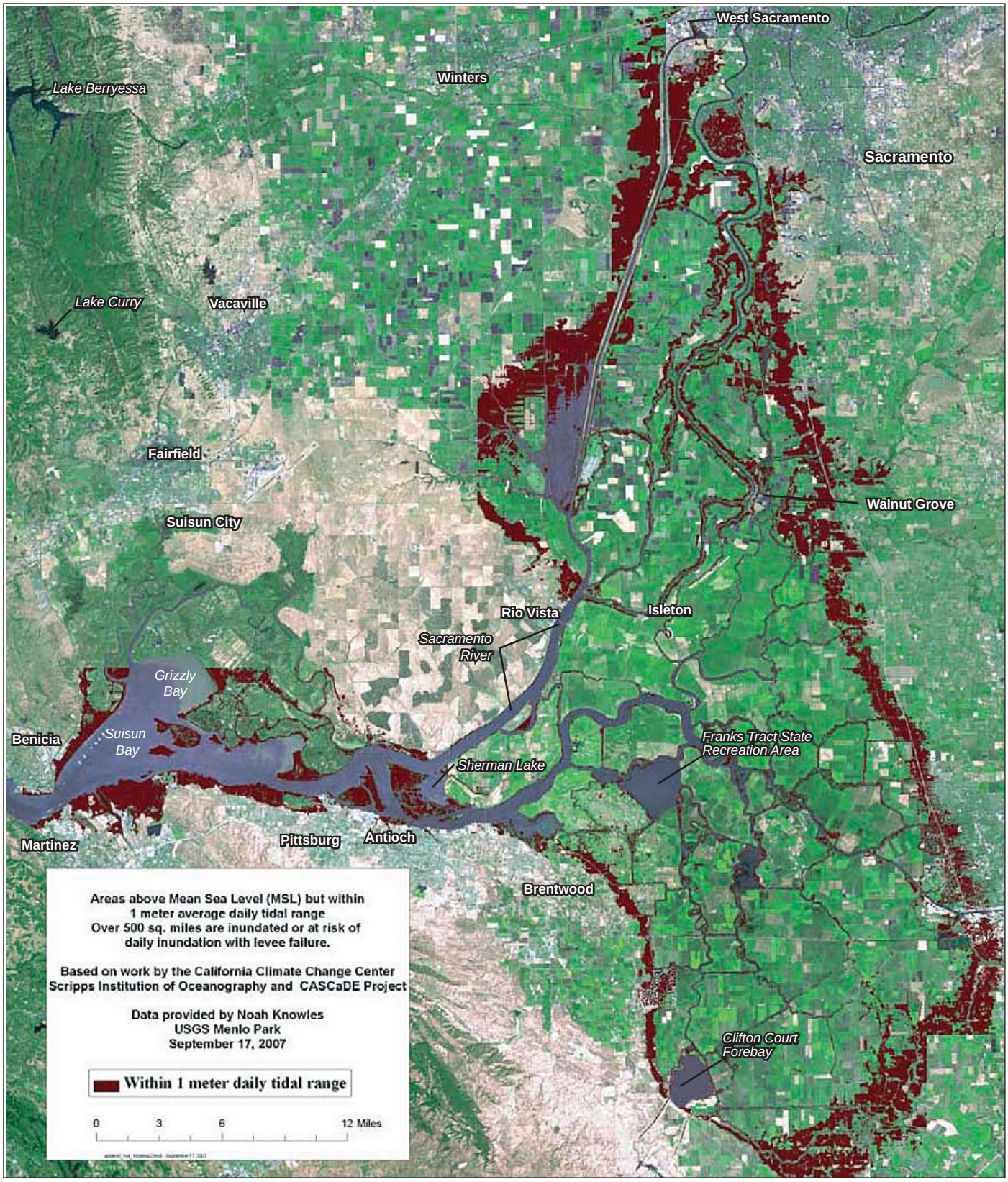
Climate change will also affect water demand. Warmer temperatures, combined with changes in rainfall and runoff patterns will worsen frequency and intensity of droughts. The majority of domestic water supply in the County is obtained from groundwater resources. While groundwater is used as the domestic water supply in unincorporated Yolo County, nearly all of the surface water is used for agricultural irrigation. Farmers rely on surface water for approximately 60 percent of their supply in a normal year, but rely more heavily on groundwater during drought years.[75] Regions that rely upon surface water (rivers, streams, and lakes) could be particularly affected as runoff becomes more variable and more demand is placed on groundwater. See Section IV.H, Utilities and Energy for a discussion of water capacity and demand associated with build-out of the Draft General Plan.

[72] US Global Change Research Program. 2001. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change.*

[73] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July

[74] California, State of. Department of Water Resources, 2008. *Managing an Uncertain Future. Climate Change Adaptation Strategies for California's Water*. October.

[75] Water Resources Association of Yolo County, 2007. *Integrated Regional Water Management Plan.* April.



LSA

FIGURE IV.F-1

Yolo County 2030 Countywide General Plan EIR

USGS Projected 2100 Sea Level Rise

SOURCE: U.S. GEOLOGICAL SURVEY, 2007; LSA ASSOCIATES, INC., 2009.

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California's water supply system is capable of adapting to significant changes in climate and population, though it may occur with a significant cost. Adoption of new technology, coordinated operation of reservoirs, improved weather, runoff and flow forecasting, and intergovernmental cooperation can help California and Yolo County adapt to global climate change and continue to supply water.

The long-term performance and management of California's water system and impacts of climate change can also significantly alter agricultural production in Yolo County. The County has approximately 544,723 acres of agricultural land Under the driest climate warming scenarios, agricultural users could be vulnerable to climate change, including increased water demand due to higher temperatures, extended growing seasons, and increased evapotranspiration. Under the wetter scenarios, flooding and timing of runoff can also create significant impacts. Global climate change could create production losses for some of the most important crops in Yolo County including tomatoes, hay (alfalfa), grapes (wine), rice, seed crops, almonds, organic production, walnuts, cattle and calves, and wheat. This EIR assumes a loss of over 9,072 acres of agricultural land as a result of conversion to non-agricultural uses, including urban and roadway uses, open space, and trails. Additional changes in crop type and location may be required to adapt to global climate change. UC Davis is currently completing an analysis of agricultural adaptation to climate change in the Central Valley with a specific focus on Yolo County.[76] The report, when completed, will address mitigation and adaptation issues for crop production, water resources, agricultural economics, land use change, and biodiversity. Initial information indicates that some of the primary warm-season horticultural crops (e.g., tomatoes) will be less viable in Yolo County by 2050. Higher temperatures will likely decrease yields of walnuts and table grapes. These impacts may prompt a shift to hot-season crops, such as melon and sweet potato, and other crops that are less sensitive to higher temperatures, such as almonds. Elevated CO_2 levels may have a very slight benefit on grain growth, but wheat, barley, corn, and rice will be vulnerable to heat waves during their reproductive phase, resulting in lower yields.

The Draft General Plan includes the policies listed in Appendix D to minimize the impact of global climate change. However, the impacts of global climate change (water supply, effects of flooding, etc.) will be statewide in scope and cannot be fully mitigated by policies and actions included in the Draft General Plan.

Impact GCC-2: While uncertainty exists in the degree to which the effects of climate change will occur, it is likely that significant adverse physical impacts from the effects of global climate change will occur on existing and future planned land uses in the County by 2030. (S)

Mitigation Measure GCC-2: None Available.

While implementation of the policies and actions included in the Draft General Plan would reduce the severity of the impacts on the County related to global climate change, no additional feasible mitigation measures are available to reduce this impact to a less-than-significant level. This impact is considered significant and unavoidable.

[76] Jackson et al., Agricultural Sustainability Institute. UC Davis, 2008. *Potential for Adaptation to Climate Change in an Agricultural Landscape in the Central Valley of California.* December.

(3) Conflict with Plans and Policies of Other Agencies. The California Environmental Protection Agency Climate Action Team (CAT) and the CARB have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and State incentive and regulatory programs. These include the CAT's 2006 "*Report to Governor Schwarzenegger and the Legislature*," CARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*," and CARB's "*Climate Change Proposed Scoping Plan: a Framework for Change."*

The reports identify strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05 and AB 32. Table IV.F-4 summarizes those strategies that may be applicable to the Draft General Plan and assesses how the Draft General Plan or other County efforts comply with those strategies.

The Draft General Plan would implement appropriate GHG reduction strategies and would not conflict with or impede implementation of reduction goals identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the State.

(4) Result in Adverse Impacts from Draft General Plan Policies Compared to 1983 General Plan Policies. The 1983 General Plan does not contain any policies or programs that explicitly address greenhouse gas emissions or global climate change. Based on a review of the 1983 General Plan policies in the Agriculture, Open Space and Recreation, and Housing elements, it is determined that the new policies that would have a beneficial effect on global climate change are considerably more rigorous than those in effect under the 1983 General Plan. In general, the goals, policies and actions in the Draft General Plan would provide more stringent environmental protection and greater accountability in the regulation of activities that cause greenhouse gas emissions than the policies of the 1983 General Plan. Implementation of the policies in the Draft General Plan in place of the 1983 General Plan would result in a beneficial impact related to global climate change as compared to the 1983 General Plan.

Table IV.F-4: Draft General Plan Compliance with GHG Emission Reduction Strategies

Scoping Plan Strategy	Draft General Plan Compliance
Energy Efficiency Measures	
Energy Efficiency Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities). **Renewables Portfolio Standard** Achieve a 33 percent renewable energy mix statewide. **Green Building Strategy** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. **Million Solar Roofs Program** Install 3,000 MW of solar-electric capacity under California's existing solar programs.	**Compliant.** The Draft General Plan includes a number of goals, policies, and actions that address energy efficiency, including measures to encourage energy conservation, efficiency, and green design in new construction and existing buildings CC-4.4, CC-4.7, CC-4.8, CC-4.11, CC-4.13, CC-4.14, CO-7.3, CO-7.4, CO-7.6, CO-7.9, and CO-7.10, use of alternative energy sources (CC-4.5, CC-4.6, and CO-7.3), and reduction of energy consumption: CC-2.3; CC-2.5; CC-2.6; CC-2.7; CC-2.16; CC-4.1; CC-4.4; CC-4.5; CC-4.6; CC-4.7; CC-4.8; CC-4.9; CC-4.10; CC-4.11; CC-4.12; CC-4.13; CC-14; CI-1.3; CI-2.1; CI-2.2; CI-2.3; CI-5.1; CI-5.5; CI-5.6; CI-5.8; CI-5.9; CI-5.12; CI-5.15; CI-6.4; CI-6.5; CI-6.6; CI-6.11; ED-5.1; PF-9.4; PF-10.1; PF-10.2; PF-10.3; CO-5.2; CO-7.1; CO-7.2; CO-7.3; CO-7.4; CO-7.5; CO-7.6; CO-7.7; CO-7.8; CO-7.9; and CO-7.10. Solar power is utilized throughout the County. Since 2006, there have been more than 100 permits for residential solar installation.
Water Conservation and Efficiency Measures	
Water Use Efficiency Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions.	**Compliant.** Policies in the Draft General Plan would reduce impacts associated with increased water demand by requiring new development to demonstrate adequate long-term water supplies (Policy CO-5.16), to use higher water efficiency (Policy CO-5.18), to use reclaimed wastewater, where feasible, to augment water supplies and to conserve potable water for domestic purposes (Policy CO-5.15), and to strive for water-neutral development (Policy CO-5.19). In addition, implementation of the Draft General Plan policies listed above would reduce impacts associated with the increased demand for water by encouraging a reduction of water use through water conservation techniques, educational programs, and conservation pricing strategies (Policies CO-5.5, CO-5.4, and CO-5.20), developing new reliable future sources of supply (Policies CO-5.2 and CO-5.11), using reclaimed wastewater to augment water supplies (Policy CO-5.15), striving to maintain the County's groundwater resources on a sustainable yield basis (Policy CO-5.3), and by developing plans for responding to droughts (Policy CO-5.10).
Industrial Sources	
Industrial Emissions Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.	**Compliant.** The Draft General Plan includes a policy to use the development review process to achieve measurable reductions in greenhouse gas emissions (Policy CO-8.2). In addition, Yolo County will work with YSAQMD and CARB to encourage assessment of greenhouse gas emissions for any new or expanded industrial sources within the approval authority of CARB, YSAQMD, and the Yolo County government.

Table IV.F-4 *Continued*

Scoping Plan Strategy	Draft General Plan Compliance
Open Space and Agriculture	
Sustainable Forests Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	**Compliant.** The Draft General Plan includes policies and actions designed to preserve forest resources, including promotion of the use of oak woodlands conservation banks (CO-2.13), ensuring no net loss of oak woodlands, alkali sinks, rare soils, vernal pools or geological substrates that support rare endemic species (CO-2.14), promote GHG emission reductions by supporting carbon efficient farming methods (e.g. methane capture systems, no-till farming, crop rotation, cover cropping); installation of renewable energy technologies; protection of grasslands, open space, oak woodlands, riparian forest and farmlands from conversion to other uses; and development of energy-efficient structures (CO-8.5), and adopt urban forestry practices that encourage forestation as a means of storing carbon dioxide, with the goal of doubling the tree canopy in unincorporated communities by 2030. Use appropriate protocols to assess owner eligibility to sell carbon credits (Action CO-A118).
Agriculture In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020. There may be significant potential for additional voluntary reductions in the agricultural sector through strategies, such as increases in fuel efficiency of on-farm equipment, water use efficiency, and biomass utilization for fuels and power production. Increasing carbon sequestration, including on working rangelands, hardwood and riparian woodland reforestation, also hold potential as a greenhouse gas strategies.	**Compliant.** The Draft General Plan includes policies that will help to reduce overall GHG emissions related to agricultural production, including development of a local and/or regional conservation bank to provide credits associated with crops and/or land uses that sequester carbon or (Action AG-A4), working with the UC Cooperative Extension to develop technical assistance programs that may include: monitoring of changes in natural cycles; discouraging methane producing practices where feasible alternatives exist; encouraging methane recovery; and promoting farming practices that capture and store more carbon in the soil. (Action AG-A10, Policy AG-2.7, Policy AG-2.16), and reducing development restrictions for new and/or expanded agricultural processing, on-site agricultural sales, and bioenergy production (Action AG-A13).
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant.** Preliminary data available from the California Integrated Waste Management Board (CIWMB) indicates the unincorporated areas of Yolo County have met the 50 percent diversion rate since 2001. The most recent year of available data (2006) indicates that Yolo County has achieved a 74 percent diversion rate. In addition to achieving the diversion rate, the County recovers methane gas from the Central Landfill to generate electricity, thereby reducing overall GHG emissions

Table IV.F-4 *Continued*

Scoping Plan Strategy	Draft General Plan Compliance
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards. AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light duty trucks. Regulations were adopted by the CARB in September 2004. **Light-Duty Vehicle Efficiency Measures.** Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency. **Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures**. Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles. **Low Carbon Fuel Standard.** CARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10% by 2020.	**Compliant.** The Draft General Plan does not involve the manufacture, sale, or purchase of vehicles. However, vehicles operating within the County would comply with any vehicle and fuel standards that the CARB adopts.
Goods Movement Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	**Compliant.** Yolo County is committed to improving efficiency of goods movement, particularly related to agricultural resources. The Agriculture Department in Yolo County has initiated an agricultural marketing program to reduce "food miles," and associated GHG emissions. The Draft General Plan includes the policies to achieve this goal, including supporting the development of local suppliers for agricultural goods and services, including small-scale and/or mobile processing facilities and distribution centers for locally produced foods. (AG-3.7), encouraging neighborhood grocery stores, farmers markets, community gardens and food assistance programs to increase their use of locally grown/prepared goods (AG-5.4), and promoting Yolo County businesses by encouraging residents and government agencies to obtain their goods and services locally (ED-5.5).

Table IV.F-4 *Continued*

Scoping Plan Strategy	Draft General Plan Compliance
Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle greenhouse gas emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces greenhouse gases associated with vehicle travel.	**Compliant.** Yolo County currently coordinates planning efforts with SACOG and other regional agencies. CARB has not yet established regional transportation emission reduction targets per SB 375. The Draft General Plan includes policies and actions designed to reduce vehicle miles traveled, encourage and provide alternative modes of transportation, design complete streets, and reduce regional emissions (CI-1.3, CI-2.2, CI-2.3, CI-2.4, CI-3.1, CI-3.6, CI-3.8, CI-4.1, CI-4.2, CI-4.3, CI-5, CI-5.1, CI-5.2, CI-5.4, CI-5.5, CI-5.6, CI-5.8, CI-5.9, CI-5.11, CI-5.12, CI-5.13, CI-5.14, CI-5.15, CI-5.16, CI-6, CI-6.1, CI-6.2, CI-6.3, CI-6.4, CI-6.5, CI-6.6, CI-6.7, CI-6.8, CI-6.9, CI-6.10, CI-6.11, CI-6.12, CO-6.3, CO-6.4, CO-6.5, CO-A101). In addition, Mitigation Measures CI-1, CI-2. CI-3, and CI-4 are proposed to limit VMT growth in the specific plan areas of Yolo County.
Other	
Local Government Local governments are essential partners in achieving California's goals to reduce greenhouse gas emissions. Local governments have broad influence and authority over activities that contribute to significant direct and indirect greenhouse gas emissions through planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the CARB proposed measures to reduce greenhouse gas emissions rely on local government actions.	**Compliant.** Yolo County has adopted a strong commitment to the reduction of greenhouse gas (GHG) emissions. The County was an early advocate of responsible growth with its long-time commitment to agricultural preservation and its adoption in 1982 of a countywide Energy Plan. The Yolo County government has taken a number of actions to take an active role in global climate change, including participation in CCAR, adopting a Cool Counties resolution, and including a commitment in the Draft General Plan to develop a Greenhouse Gas (GHG) Emissions Reduction Plan and/or climate action plan for the County (Action CO-A105). The County's policy commitment to the goals of protecting agricultural land and directing the majority of future growth to the existing cities discourages sprawl and encourages density, infill, compact community design, and development along transportation corridors, plus allows for local food production and recreational opportunities.
Measures to Reduce High Global Warming Potential (GWP) Gases. CARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. CARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak**.**	**Compliant.** New products used, sold, or serviced in the County (after implementation of the reduction of GWP gases) would comply with future CARB rules and regulations.

Source: LSA Associates, Inc., 2009.