

## E. GREENHOUSE GAS EMISSIONS

Increasing public awareness and general scientific consensus that global climate change is occurring have placed a new focus on CEQA as a potential means to address a project's greenhouse gas (GHG) emissions. This section begins by providing general background information on climate change and meteorology. It then provides data on the existing global climate change setting, discusses the regulatory framework for global climate change, and evaluates potential GHG emissions associated with the proposed project. Modeled project emissions are estimated based on the land uses of the proposed project, project trip generation, energy use, and other variables. Model outputs are included in Appendix E. The section then evaluates whether the project could cause a cumulatively considerable contribution to climate change using methods and assumptions outlined in the Bay Area Air Quality Management District (BAAQMD) *CEQA Air Quality Guidelines*.<sup>1</sup>

### 1. Global Climate Change Setting

The following discussion provides an overview of global climate change, its causes, its potential effects, emission sources, and inventories.

**a. Global Climate Change Background.** A description of global climate change and its sources is provided below.

**(1) Global Climate Change.** Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. Global surface temperatures have risen by  $0.74^{\circ}\text{C} \pm 0.18^{\circ}\text{C}$  ( $1.1^{\circ}\text{F} \pm 0.4^{\circ}\text{F}$ ) between 1906 and 2005. The rate of warming over the last 50 years of this period is almost double that over the last 100 years.<sup>2</sup> 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 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.<sup>3</sup>

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:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)

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<sup>1</sup> Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May, 2011.

<sup>2</sup> Intergovernmental Panel on Climate Change, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

<sup>3</sup> 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 heat escaping, 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 GHG results in global warming, the naturally occurring greenhouse effect is necessary to keep our planet at a comfortable temperature.

- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF<sub>6</sub>)

Over the last 200 years, humans 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 gases such as CO<sub>2</sub>, methane, and N<sub>2</sub>O, some gases, like HFCs, PFCs, and SF<sub>6</sub> are completely new to the atmosphere.

Certain 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 atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP 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 CO<sub>2</sub>, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO<sub>2</sub> over a specified time period. GHG emissions are typically measured in terms of pounds or tons of “CO<sub>2</sub> equivalents” (CO<sub>2</sub>e). Table IV.E-1 shows the GWPs for each type of GHG. For example, SF<sub>6</sub> is 22,800 times more potent at contributing to global warming than CO<sub>2</sub>. The following discussion summarizes the characteristics of the six GHGs.

**Table IV.E-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 <sub>4</sub> )	50,000	7,390
PFC: Hexafluoromethane (C <sub>2</sub> F <sub>6</sub> )	10,000	12,200
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	22,800

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

**Carbon Dioxide.** In the atmosphere, carbon generally exists in its oxidized form, as CO<sub>2</sub>. Natural sources of CO<sub>2</sub> 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<sub>2</sub> include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Natural sources release approximately 150 billion tons of CO<sub>2</sub> each year, far outweighing the 7 billion tons of man-made emissions of CO<sub>2</sub> each year. Natural removal processes,

such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO<sub>2</sub> and consequently the gas is building up in the atmosphere.

**Methane.** CH<sub>4</sub> is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH<sub>4</sub> emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH<sub>4</sub> in California. CH<sub>4</sub> accounted for approximately 6 percent of gross climate change emissions (CO<sub>2</sub>e) in California in 2002.

Total annual emissions of CH<sub>4</sub> are approximately 500 million tons, with manmade emissions accounting for the majority. As with CO<sub>2</sub>, the major removal process of atmospheric CH<sub>4</sub> – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and CH<sub>4</sub> concentrations in the atmosphere are increasing.

**Nitrous Oxide.** N<sub>2</sub>O 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. N<sub>2</sub>O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N<sub>2</sub>O, 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 and fossil fuel combustion are the primary sources of human-generated N<sub>2</sub>O emissions in California. N<sub>2</sub>O emissions accounted for nearly 7 percent of man-made GHG emissions (CO<sub>2</sub>e) in California in 2002.

**Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride.** HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.<sup>4</sup> PFCs and SF<sub>6</sub> 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 leads to greater use of PFCs. HFCs, PFCs, and SF<sub>6</sub> accounted for about 3.5 percent of man-made GHG emissions (CO<sub>2</sub>e) in California in 2002.

**(2) Impacts of Climate Change.** The potential impacts of global climate change are described in the following section.

**Temperature Increase.** The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3°F to 10.5°F by the end of the century.<sup>5</sup> Because GHGs persist for a long time in the atmosphere, 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:

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<sup>4</sup> The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was intended to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

<sup>5</sup> California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California*. July.

- 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); and
- 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 temperature. The impact of human activities on global climate change is readily apparent in the observational record. For example, surface temperature data show that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental record for global surface temperature.<sup>6</sup> 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:

- 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 the 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 tropical cyclones;
- Decline of the Sierra 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 21<sup>st</sup> 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.

**Precipitation and Water Supply.** Global average precipitation is expected to increase overall during the 21<sup>st</sup> 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 proximity of mountain ranges that affect precipitation.<sup>7</sup>

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

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<sup>6</sup> California, State of, 2008. California Energy Commission's Public Interest Energy Research Program. *The Future is Now: An Update on Climate Change Science, Impacts, and Response Options for California*. September.

<sup>7</sup> Intergovernmental Panel on Climate Change, 2007, op. cit.

the State during the spring and summer.<sup>8</sup> 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 over the next 100 years.

The extent to which various meteorological conditions will affect 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 would occur at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity.

**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, the 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).<sup>9</sup> Over the past 100 years, sea levels along California's coasts and estuaries have risen about 7 inches.<sup>10</sup>

Sea levels could rise an additional 22 to 35 inches by the end of the century as global climate change continues.<sup>11</sup> 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 changes in worldwide sea level rise will also be experienced along California's coast.<sup>12</sup> 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. Residents may also be affected if wastewater treatment is compromised by inundation from rising sea levels, given that a number of treatment plants discharge to the Bay.

**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

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<sup>8</sup> California Climate Change Center, 2006, op. cit.

<sup>9</sup> California, State of, 2008, op. cit.

<sup>10</sup> Ibid.

<sup>11</sup> California Climate Change Center, 2006, op. cit.

<sup>12</sup> California, State of, 2006. Department of Water Resources. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

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 lead to adverse changes in water quality, even in the absence of changes in precipitation.

**Public Health.** Global climate change is also anticipated to result in more extreme heat events.<sup>13</sup> These extreme heat events increase the risk of death from dehydration, heart attack, stroke, and respiratory distress, especially with people who are ill, children, the elderly, and the poor, who may lack access to air conditioning and medical assistance. According to the California Climate Change Center, more research is needed to understand the effects of higher temperatures and how adapting to these temperatures can minimize health effects.<sup>14</sup>

**(3) Emissions 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.

**Global Emissions.** Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO<sub>2</sub>e per year.<sup>15</sup> Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

**U.S. Emissions.** In 2010, the United States emitted about 1,633.2 million metric tons (MMT) of CO<sub>2</sub>e, with each individual at home releasing approximately 4 metric tons per year. 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 2009, total U.S. GHG emissions rose by 7.3 percent, but emissions decreased from 2008 to 2009 by 6.1 percent. This decrease was primarily due to: (1) a decrease in economic output resulting in a decrease in energy consumption across all sectors; and (2) a decrease in the carbon intensity of fuels used to generate electricity due to fuel switching as the price of coal increased, and the price of natural gas decreased significantly. Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent.<sup>16</sup>

**State of California Emissions.** According to California Air Resources Board (ARB) emission inventory estimates, California gross emissions of GHG increased 4.3 percent, from 458 MMT<sup>17</sup> of CO<sub>2</sub>e emissions in 2000 to 477.7 million in 2008, with a maximum of 483.9 million in 2004.<sup>18</sup> During

<sup>13</sup> California Climate Change Center, 2006, op. cit.

<sup>14</sup> Ibid.

<sup>15</sup> Combined total of Annex I and Non-Annex I Country CO<sub>2</sub>e emissions. United Nations Framework Convention on Climate Change (UNFCCC), 2007. *GHG Inventory Data*. Websites: [unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/time\\_series\\_annex\\_i/items/3814.php](http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php) and [maindb.unfccc.int/library/view\\_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf](http://maindb.unfccc.int/library/view_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf) (accessed July 7, 2012).

<sup>16</sup> U.S. Environmental Protection Agency, 2011. *The U.S. GHG Emissions and Sinks: Fast Facts*. Website: [www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html) (accessed July 7, 2012).

<sup>17</sup> A metric ton is equivalent to approximately 1.1 tons.

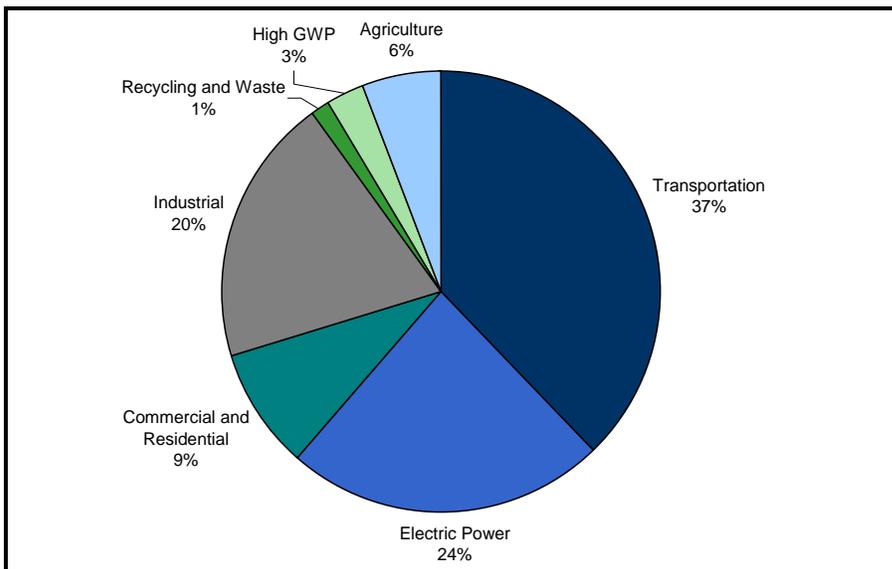
<sup>18</sup> California Air Resources Board, 2010. *Trends in California GHG Emissions for 2000 to 2008 by Category as Defined in the Scoping Plan*. Website: [www.arb.ca.gov/cc/inventory/data/tables/ghg\\_inventory\\_trends\\_00-08\\_2010-05-12.pdf](http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_trends_00-08_2010-05-12.pdf) (accessed November 2011).

the same period, California’s population grew by 11.8 percent, from 34.1 to 38.1 million people and GHG emissions per person decreased from 13.4 to 12.5 metric tons of CO<sub>2</sub>e per person. The year 2008 saw a small decrease in Statewide GHG emissions, driven by a noticeable drop in on-road transportation emissions. The year 2008 also reflects the beginning of the economic recession and fuel price spikes. As the economy recovers, GHG emissions are likely to rise again without other mitigation actions.

California has the fourth lowest per-capita CO<sub>2</sub> 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.<sup>19</sup>

ARB is responsible for developing the California GHG Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State and supports the Assembly Bill (AB) 32 Climate Change Program, discussed below. ARB’s current GHG emission inventory for the years 2000 to 2008 (using categories established by ARB) is shown in Figure IV.E-1. 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.

**Figure IV.E-1: California GHG Emissions by Sector (2000-2008 Average)**



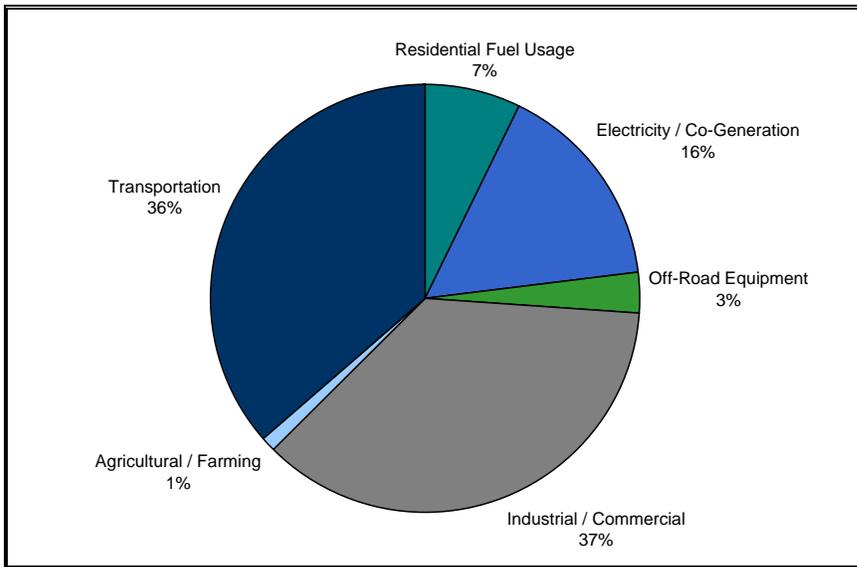
Note: The High GWP (Global Warming Potential) sector encompasses miscellaneous sources.

Source: ARB, 2010. *Trends in California GHG Emissions for 2000 to 2008 – by Category as Defined in the Scoping Plan*. May 28. Website: [www.arb.ca.gov/cc/inventory/data/tables/ghg\\_inventory\\_scopingplan\\_00-08\\_2010-05-12.pdf](http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf) (accessed July 7, 2012).

<sup>19</sup> California Energy Commission, 2007. *Inventory of California GHG Emissions and Sinks: 1990 to 2004 - Final Staff Report*, publication # CEC-600-2006-013-SF, Sacramento, California. December 22, 2006, and January 23, 2007, update to that report.

**Bay Area Emissions Inventory.** The BAAQMD has also prepared an inventory of GHG emissions for the Bay Area. The latest version of the inventory, updated in 2010, provides information on 2007 emissions.<sup>20</sup> Transportation and industrial/commercial uses are the largest sources of GHG emissions, each contributing 36.4 percent of the region’s total CO<sub>2</sub>e emissions in the year 2007. The estimated GHG emissions for the year 2007 for the nine-county Bay Area totaled 95.8 MMT of CO<sub>2</sub>e. The Bay Area GHG emissions by sector for the year 2007 are shown in Figure IV.E-2.

**Figure IV.E-2: Bay Area GHG Emissions by Sector (2007)**



Source: BAAQMD, 2010. Source Inventory of Bay Area GHG Emissions. February.

**Napa County Emissions Inventory.** Whereas federal, State and regional inventories focus exclusively on the sources of GHG emissions (e.g., emissions from power generation), the County of Napa inventory is limited to emissions-generating activities over which they have control.<sup>21</sup> Thus, categories related to the source of emissions, such as vehicle use, are combined with categories related to end-users, such as commercial and residential energy consumption, even though the actual emissions may occur outside of Napa County. The County of Napa’s GHG emission inventory provides information for 2005 emissions, which were 443,670 metric tons of CO<sub>2</sub>e. On-road vehicles are the largest source of GHG emissions, contributing 43 percent of Napa County’s total. Building energy (31 percent) and agriculture (10 percent) are the second and third largest sources, with off-road vehicles, water and waste water, and land use change collectively comprising the remaining 26 percent.

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

<sup>20</sup> Bay Area Air Quality Management District, 2010. *Source Inventory of Bay Area GHG Emissions*. Website: [www.baaqmd.gov/~media/Files/Planning%20and%20Research/Emission%20Inventory/regionalinventory2007\\_2\\_10.ashx](http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/Emission%20Inventory/regionalinventory2007_2_10.ashx). February.

<sup>21</sup> Napa, County of, 2012. *Napa County Climate Action Plan (Final)*. March.

being addressed on an international level, federal, State, regional, and local activities are most applicable to the proposed project and are discussed below.

**(1) Federal Regulations.** The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the Environmental Protection Agency (EPA) has the authority to regulate CO<sub>2</sub> emissions under the federal Clean Air Act (CAA). In response to this decision, the EPA commenced several actions beginning in 2009 to develop a regulatory approach to global climate change, including the ones described below.

On September 22, 2009, the EPA issued a final rule for mandatory reporting of GHGs from large GHG emission sources in the United States. In general, this national reporting requirement will provide the EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO<sub>2</sub> per year. This publicly-available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHGs, along with vehicle and engine manufacturers, will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this rule.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below. EPA received ten petitions challenging this determination. On July 29, 2010, EPA denied these petitions.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the Clean Air Act, and NHTSA is finalizing Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. The EPA GHG standards require light-duty vehicles to meet an estimated combined average emissions level of 250 grams of CO<sub>2</sub> per mile in model year 2016, equivalent to 35.5 miles per gallon.

On August 9, 2011, the EPA and the NHTSA announced the first-ever standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses. The final combined standards of the Heavy-Duty National Program will reduce CO<sub>2</sub> emissions by about 270 MMT and save about 530 million barrels of oil over the life of vehicles built for the 2014 to 2018 model years. The heavy duty sector addressed in the EPA and NHTSA rules (including the largest pickup trucks and vans, semi-trucks, and all types and sizes of work trucks and buses in between) accounts for nearly 6 percent of all U.S. GHG emissions and 20 percent of transportation emissions.

On April 27, 2012, the EPA proposed new limits on the emissions of CO<sub>2</sub>. These standards would apply to new fossil fuel power plants. Power plants were selected because, at nearly 40 percent the United States' GHG emissions, they are the largest stationary source emitters of GHGs. The proposed

requirements, which are strictly limited to new sources, would require new fossil fuel-fired power plants greater than 25 megawatts to meet an output-based standard of 1,000 pounds of CO<sub>2</sub> per megawatt-hour.<sup>22</sup>

**(2) State Regulations.** The ARB is the lead agency for implementing climate change regulations in the State. The following is a summary of State legislation adopted for the purpose of reducing greenhouse gas emissions.

**Assembly Bill 1493 (2002).** In a response to the transportation sector's significant contribution to California's CO<sub>2</sub> emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires the ARB 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. These standards (starting in model years 2009 to 2016) were approved by the ARB in 2004, but the needed waiver of Clean Air Act Preemption was not granted by the U.S. EPA until June 30, 2009. The ARB responded by amending its original regulation, now referred to as Low Emission Vehicle III GHG, to take effect for model years starting in 2017 to 2025<sup>23</sup>.

**Executive Order S-3-05 (2005).** Governor Arnold Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, which proclaimed that California is vulnerable to the impacts of climate change. To combat those concerns, the executive order established California's GHG emissions reduction targets, which established the following goals:

- 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.

The Secretary of the California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various State agencies in order to collectively and efficiently reduce GHGs. A biannual progress report must be submitted to the Governor and State Legislature disclosing the progress made toward GHG emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline, and forestry, and report possible mitigation and adaptation plans to address these impacts.

**Assembly Bill 32 (2006), California Global Warming Solutions Act.** California's major initiative for reducing GHG emissions is AB 32, passed by the State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The ARB has established the level of GHG emissions in 1990 at 427 MMT CO<sub>2</sub>e. 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 the ARB 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 the ARB on December 11, 2008, and includes measures to reduce GHG emissions

<sup>22</sup> U.S. Environmental Protection Agency, 2012. *Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units*. Website: [epa.gov/carbonpollutionstandard/pdfs/20120327proposal.pdf](http://epa.gov/carbonpollutionstandard/pdfs/20120327proposal.pdf) (accessed June 6, 2012). June 27.

<sup>23</sup> California Air Resources Board, 2010. *California Clean Car Standards – Pavely, Assembly Bill 1493*. Website: [arb.ca.gov/cc/ccms/ccms.htm](http://arb.ca.gov/cc/ccms/ccms.htm) (accessed November 2011).

related to energy efficiency, water use, recycling, solid waste, and other sources.<sup>24</sup> 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 ARB 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 ARB rulemaking process includes preparation and release of each of the draft measures, public input through workshops, and a public comment period, followed by an ARB hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed the ARB and the newly created Climate Action Team (CAT) to identify a list of “discrete early action GHG reduction measures” that could 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 the ARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007, the ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on GWP Refrigerants, and Landfill CH<sub>4</sub> Capture).<sup>25</sup> Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code Section 38560.5. The ARB 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 PFCs from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and SF<sub>6</sub> reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.<sup>26</sup>

To assist public agencies in analyzing the effects of GHGs under CEQA, Senate Bill 97 (Chapter 185, 2007) required the Governor’s Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project’s GHG emissions. On December 30, 2009, the Natural Resources Agency adopted amendments to the *CEQA Guidelines* related to climate change. These amendments became effective on March 18, 2010.

In December 2008, ARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 169 MMT of CO<sub>2</sub>e, or approximately 30 percent from the State’s projected 2020 emission level of 596 MMT of CO<sub>2</sub>e under a business-as-usual scenario (this is a reduction of 42 MMT CO<sub>2</sub>e, or almost 10 percent from 2002-2004 average emissions). The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of the State’s GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

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<sup>24</sup> California Air Resources Board, 2008. *Climate Change Scoping Plan: a framework for change*. December.

<sup>25</sup> California Air Resources Board, 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

<sup>26</sup> California Air Resources Board, 2007. “ARB approves tripling of early action measures required under AB 32” News Release 07-46. Website: [www.arb.ca.gov/newsrel/nr102507.htm](http://www.arb.ca.gov/newsrel/nr102507.htm) (accessed July 7, 2012). October 25.

- Improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO<sub>2</sub>e);
- The Low-Carbon Fuel Standard (15.0 MMT CO<sub>2</sub>e);
- Energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO<sub>2</sub>e); and
- A renewable portfolio standard for electricity production (21.3 MMT CO<sub>2</sub>e).

The Scoping Plan identifies 18 emission reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related GHG targets, vehicle efficiency measures, goods movement, solar roof programs, industrial emissions, high speed rail, green building strategies, recycling, sustainable forests, water, and air. The measures would result in a total reduction of 174 MMT CO<sub>2</sub>e by 2020.

On August 24, 2011, the ARB unanimously approved both ARB's new supplemental assessment and re-approved its Scoping Plan, which provides the overall roadmap and rule measures to carry out AB 32. The ARB also approved a more robust CEQA equivalent document supporting the supplemental analysis of the cap-and-trade program. ARB also announced that it would be delaying the date that entities would be required to comply with its cap-and-trade program until 2013.

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan states that land use planning and urban growth decisions will play an important role in the State's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions (meanwhile, ARB is also developing an additional protocol for community emissions). ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined. With regard to land use planning, the Scoping Plan expects an approximately 5.0 MMT CO<sub>2</sub>e reduction due to implementation of SB 375, which is discussed further below.

**Senate Bill 1368 (2006).** SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities and local publicly-owned utilities. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC.

**Executive Order S-1-07.** Executive Order S-1-07 in 2007 indicates that the transportation sector accounts for over 40 percent of Statewide GHG emissions and establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

**Senate Bill 97 (2007).** SB 97, signed by the Governor in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the OPR to

prepare, develop, and transmit to the California Resources Agency guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA.

The California Natural Resources Agency adopted the amendments to the *CEQA Guidelines* in January 2010, which went into effect in March 2010. The amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. The 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 based on substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs when they perform individual project analyses.

**Senate Bill 375 (2008).** Signed into law on October 1, 2008, SB 375 supplements GHG reductions from new vehicle technology and fuel standards with reductions from more efficient land use patterns and improved transportation. Under the law, the ARB approved GHG reduction targets in February 2011 for California's 18 federally designated regional planning bodies, known as Metropolitan Planning Organizations (MPOs). The ARB may update the targets every 4 years and must update them every 8 years. MPOs in turn must demonstrate how their plans, policies and transportation investments meet the targets set by the ARB through Sustainable Community Strategies (SCS). The SCS are included with the Regional Transportation Plan (RTP), a report required by State law. However, if an MPO finds that their SCS will not meet the GHG reduction target, they may prepare an Alternative Planning Strategy (APS). The APS identifies the impediments to achieving the targets.

**Executive Order S-13-08.** Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008, which directs California to develop methods for adapting to climate change through preparation of a Statewide plan. The executive order directed OPR, in cooperation with the California Resources Agency (CRA), to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009.

**Office of Planning and Research.** On December 30, 2009, the California Natural Resources Agency adopted amendments to the *CEQA Guidelines* related to climate change. These amendments became effective on March 18, 2010. Revisions to Appendix G of the *CEQA Guidelines* suggest that development projects be evaluated based on the following thresholds:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and
- Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

**(3) Bay Area Air Quality Management District.** BAAQMD is the regional government agency that regulates sources of air pollution within the nine San Francisco Bay Area counties. The BAAQMD regulates GHG emissions through the following plans, programs, and guidelines.

**Regional Clean Air Plans.** BAAQMD and other air districts prepare clean air plans in accordance with the State and federal Clean Air Acts. The Bay Area 2010 Clean Air Plan (CAP) is a comprehensive plan to improve Bay Area air quality and protect public health through implementation

of a control strategy designed to reduce emissions and ambient concentrations of harmful pollutants. The most recent CAP also includes measures designed to reduce GHG emissions.

**BAAQMD Climate Protection Program.** The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

**BAAQMD CEQA Air Quality Guidelines.** The BAAQMD adopted revised *CEQA Air Quality Guidelines* on June 2, 2010, and then adopted a modified version of the Guidelines in May, 2011. The BAAQMD *CEQA Air Quality Guidelines* include thresholds of significance for GHG emissions.<sup>27</sup> Under the latest *CEQA Air Quality Guidelines*, a local government may prepare a qualified GHG Reduction Strategy that is consistent with AB 32 goals. If a project is consistent with an adopted qualified GHG Reduction Strategy and General Plan that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions under CEQA.<sup>28</sup> The BAAQMD also adopted a quantitative threshold for project level analyses based on estimated GHG emissions as well as per capita metrics.

**(4) Metropolitan Transportation Commission/Association of Bay Area Governments Sustainable Communities Strategy.** The Metropolitan Transportation Commission (MTC) is the federally recognized MPO for the nine county Bay Area, which includes Napa County. In 2009, MTC adopted its current RTP, Transportation 2035: Change in Motion, prior to the 2011 ARB adoption of GHG reduction targets. Both MTC and the Association of Bay Area Governments (ABAG) are in the preliminary stages of developing the region's SCS titled Plan Bay Area. In March 2011, Plan Bay Area released its Initial Vision Scenario, which presents a first draft of targeted growth areas and regional projections. From the Initial Vision Scenario, MTC and ABAG will select alternatives to be evaluated in the Plan Bay Area EIR and release the Draft Plan Bay Area and EIR by December, 2012. Adoption of the Final Plan Bay Area and certification of the accompanying EIR is tentatively scheduled for April 2013.<sup>29</sup>

**(5) County of Napa Plan and Policies.** This section discusses County of Napa plans and policies designed to address global climate change and GHG emissions.

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<sup>27</sup> On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the 2011 BAAQMD CEQA Air Quality Guidelines. In view of the court's order, the BAAQMD is no longer recommending that the thresholds of significance be used as a generally applicable measure of a project's significant air quality impacts.

<sup>28</sup> Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May.

<sup>29</sup> Metropolitan Transportation Commission & Association of Bay Area Governments, 2012. *Plan Bay Area Preferred Land Use Scenario/Transportation Investment Strategy*. Website: [www.onebayarea.org/plan\\_bay\\_area/](http://www.onebayarea.org/plan_bay_area/) (accessed June 11, 2012). May.

**Napa County General Plan.** The County of Napa addresses global climate change GHG emissions through the Conservation Element of the Napa General Plan.<sup>30</sup> Climate protection and sustainable practices for environmental health goals and policies are listed below.

**Goal CON-14.** Promote policies to ensure the long term sustainability of Napa County, including its environment, economy, and social equity.

**Goal CON-15.** Reduce emissions of local greenhouse gases that contribute to climate change.

**Goal CON-16.** Promote the economic and environmental health of Napa County by conserving energy, increasing the efficiency of energy use, and producing renewable energy locally.

- **Policy CON-65:** The County shall support efforts to reduce and offset greenhouse gas (GHG) emissions and strive to maintain and enhance the County's current level of carbon sequestration functions through the following measures:
  - a) Study the County's natural, agricultural, and urban ecosystems to determine their value as carbon sequestrators and how they may potentially increase.
  - b) Preserve and enhance the values of Napa County's plant life as carbon sequestration systems to recycle greenhouse gases.
  - c) Perpetuate policies in support of urban-centered growth and agricultural preservation preventing sprawl.
  - d) Perpetuate policies in support of alternative modes of transportation, including transit, paratransit, walking, and biking.
  - e) Consider GHG emissions in the review of discretionary projects. Consideration may include an inventory of GHG emissions produced by the traffic expected to be generated by the project, any changes in carbon sequestration capacities caused by the project, and anticipated fuel needs generated by building heating, cooling, lighting systems, manufacturing, or commercial activities on the premises. Projects shall consider methods to reduce GHG emissions and incorporate permanent and verifiable emission offsets.
  - f) Establish partnerships with experts, trade associations, non-governmental associations, and community and business leaders to support and participate in programs related to global climate change.
- **Policy CON-66:** The County shall promote the implementation of sustainable practices and green technology in agriculture, commercial, industrial, and residential development through the following actions:
  - a) Project Construction
    - 1) Utilize recycled, low-carbon, and otherwise climate-friendly building materials such as salvaged and recycled content materials for buildings, hard surfaces, and landscaping materials.
    - 2) Minimize, reuse, and recycle construction-related waste.
    - 3) Utilize alternative fuels in construction equipment and require construction equipment to utilize the best available technology to reduce emissions.
  - b) Education and Outreach
    - 1) Assure that County staff is trained to provide guidance, if requested, to residents and agricultural, commercial, and industrial users on sustainable practices and green technology.

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<sup>30</sup> Napa, County of, 2009. *Napa County General Plan (Amended)*. June.

- 2) Cooperate with and develop partnerships with public, private, and non-profit groups to further the knowledge and implementation of sustainable practices.
  - 3) Encourage residential, commercial, industrial, processing, and agricultural projects to develop methods to reduce and capture CO<sub>2</sub> produced and emitted and to sequester that which is captured.
- c) Residential Development
- 1) Increase the supply of affordable and workforce housing to encourage local workers to live in the County, minimize commuting and reduce greenhouse gas emissions.
  - 2) Consistent with policies in the Agriculture Preservation and Land Use Element, residential development shall be focused in urbanized areas.
- Policy CON-67: The County shall promote and encourage “green building” design, development, and construction through the achievement of Leadership in Energy and Environmental Design (LEED) standards set by the U.S. Green Building Council, the Green Point Rated system standards set by Builditgreen.org, or equivalent programs. Actions in support of this policy shall include:
    - a) Audit current County practices to assess opportunities and barriers to implementation of current sustainable practices.
    - b) Amend the County Code as necessary to remove barriers to and encourage “green” construction.
    - c) Develop new County buildings as “green buildings,” utilizing sustainable construction and practices.
    - d) Encourage all new large development projects and major renovation of existing facilities to be based on Green Building Council standards utilizing sustainable construction and practices to achieve a minimum LEED rating of Silver, or comparable level on the Green Point Rated system per standards set by Builditgreen.org or other comparable updated rating systems.
    - e) Support state and federal incentive programs that offer rebates and cost sharing related to the implementation of “green building” standards and LEED certification.
  - Policy CON-68: The County shall promote research and the development and use of advanced and renewable energy technology through the following actions:
    - a) Use expedited permit processing or other incentives as promotion mechanisms.
    - b) Assist in securing grants to support the implementation of photovoltaic, wind, and other renewable energy technologies to provide a portion of the County’s energy needs.
    - c) Encourage the use of renewable energy resources in residential, commercial, industrial, and agricultural projects and uses.
  - Policy CON-69: The County shall provide incentives and opportunities for the use of energy-efficient forms of transportation such as public transit, carpooling, walking, and bicycling. This shall include the provision and/or the extension of transit to urban areas where development densities (residential and nonresidential) would support transit use, as well as bus turnouts/access, bicycle storage, and carpool/vanpool parking where appropriate.
  - Policy CON-70: The County shall seek to increase the amount of energy produced through locally available energy sources, including establishing incentives for, and removing barriers to, renewable and alternative energy resources (solar, wind) where they are compatible with the maintenance and preservation of environmental quality.
  - Policy CON-71: The County shall encourage the use of bio-fuels and geothermal resources where feasible and environmentally sustainable.
  - Policy CON-72: The County shall seek to reduce the energy impacts from new buildings by applying Title 24 energy standards as required by law and providing information to the public and builders on available

energy conservation techniques, products, and methods available to exceed those standards by 15 percent or more.

- **Policy CON-73:** The County shall monitor the ecological effects of climate change in Napa County over time, including sea level rise, effects on water resources, local microclimates, native vegetation, agriculture, and the economy. Consistent with the principle of adaptive management, the County shall adapt policies and operations to address identified effects as feasible.
- **Policy CON-74:** The County shall evaluate new technologies for energy generation and conservation and solid waste disposal as they become available, and shall pursue their implementation as appropriate in a manner consistent with the principle of adaptive management. This evaluation shall include review of promising technological advances which may be useful in decreasing County greenhouse gas (GHG) emissions, increase in renewable energy that is generated locally, and review of the County's success in meeting targets for GHG emission reductions.
- **Policy CON-75:** The County shall work to implement all applicable local, state, and federal air pollution standards, including those related to reductions in GHG emissions.

**Napa County Climate Action Plan and Emissions Reduction Plan.** In March 2012, Napa County released a final Climate Action Plan (CAP) to document the County's baseline emissions and measures necessary for implementation to reduce GHG emissions within the County. The Napa County CAP commits to the reduction of greenhouse gas emissions and describes feasible measures to address the goals of AB 32.<sup>31</sup>

The Napa County CAP identifies project level GHG mitigation for new development and vineyard conversions. The CAP indicates that new development projects should reduce their annual Business As Usual (BAU) emissions by 38 percent. According to the CAP, the planning effort associated with this mitigation will commence following adoption of the CAP. Under the CAP, all project proponents are required to do the following:

- Estimate total emissions of the project under a BAU scenario including emissions due to land use change (i.e., the loss in carbon stock and sequestration);
- Account for the GHG benefits of the State and County level actions; and
- Select additional actions unique to the project that result in an overall reduction of 38 percent taking into account State, local and project-level actions.

Napa County has also committed to a reduction in emissions from County operations through their Emissions Reduction Plan for County Operations.<sup>32</sup> The Plan establishes three goals:

- **Goal #1:** Reduce impact on the environment directly attributable to County Building and facility use by implementing improvements to existing County buildings and facilities that reduce energy demand, incorporate energy reduction standards into all new County facility construction and, where practical, utilize the buildings and structures to host renewable energy production.
- **Goal #2:** Reduce the amount of GHG emissions directly attributable to work related employee travel by increasing the percentage of County Fleet vehicles that are classified as low emission

<sup>31</sup> Napa, County of, 2012, op. cit.

<sup>32</sup> Napa, County of, 2010. *Emissions Reduction Plan for County Operations*. March.

vehicles and by encouraging Departments to use low emission fleet vehicles instead of employees' private automobile on County Business.

- Goal #3: Reduce the amount of GHG emissions directly attributable to Napa County employees' commute by increasing employee transportation alternatives.

Goal #1 is specifically applicable to the proposed project as redevelopment of the Health and Human Services Agency campus is slated for replacement in the Plan.

## 2. Impacts and Mitigation Measures

This section evaluates impacts related to GHG emissions that could result from implementation of the proposed project. An individual development project would not generate a sufficiently large quantity of GHG emissions to affect global climate change; therefore, global climate change impacts of the proposed project are discussed in the context of cumulative impacts. This section begins with the criteria of significance, which establish the thresholds to determine whether an impact is significant. The latter part of this section addresses the project's emission of GHGs, along with appropriate mitigation measures.

**a. Criteria of Significance.** The BAAQMD has set forth suggested GHG Thresholds of Significance in its *CEQA Air Quality Guidelines*.<sup>33</sup> The BAAQMD has not addressed thresholds for construction emissions but recommends quantification and disclosure of these emissions. Local agencies are encouraged to adopt mitigation measures to reduce construction emissions, where feasible.

The project would result in significant adverse impacts on global climate change if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. The project must meet one or more of the following criteria to be considered less-than-significant:
  - Result in operational-related GHG emissions of less than 1,100 metric tons of CO<sub>2</sub>e a year, or
  - Result in operational-related GHG emissions less than 4.6 metric tons of CO<sub>2</sub>e per capita service population (residents plus employees).
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

These significance thresholds were adopted as part of the May 2011 *CEQA Air Quality Guidelines*. It should be noted that on March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD *CEQA Air Quality Guidelines*. The court did not determine whether the thresholds of significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. In May of 2012, the BAAQMD filed an appeal of the court's decision, the results of which are pending as of July 2012.

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<sup>33</sup> Bay Area Air Quality Management District, 2011, op. cit.

Although lead agencies may rely on the 2011 BAAQMD *CEQA Air Quality Guidelines* for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, the BAAQMD has been ordered to set aside the thresholds and is no longer recommending that they be used as a general measure of a project's significant air quality impacts. The BAAQMD also recognizes that lead agencies may rely on the previously recommended Thresholds of Significance contained in its *CEQA Guidelines* adopted in 1999.<sup>34</sup> However, as noted, the 1999 *CEQA Guidelines* did not contain a threshold for greenhouse gas emissions.

The court's invalidation of BAAQMD's thresholds presents uncertainty for current project applicants and local agencies regarding proper evaluation of air quality and GHG emissions in CEQA documents. Although reliance on the thresholds is no longer required, local agencies still have a duty to evaluate impacts related to air quality and GHG emissions. In addition, CEQA grants local agencies broad discretion to develop their own thresholds of significance, or to rely on thresholds previously adopted or recommended by other public agencies or experts so long as they are supported by substantial evidence.<sup>35</sup> Accordingly, Napa County has not adopted its own GHG emission thresholds and is using the BAAQMD's thresholds to evaluate project impacts in order to evaluate the potential effects of the project on global climate change. The County believes that these protective thresholds are appropriate in the context of the size, scale, and location of the project. The BAAQMD's approach to developing a quantitative threshold of significance for GHG emissions was to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation and policy adopted to reduce Statewide GHG emissions. According to the BAAQMD *CEQA Air Quality Guidelines*, if a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. The Alameda County Superior Court did not question the science behind the thresholds or their merit. Therefore, the County finds that, despite the court ruling, the science and reasoning contained in the 2011 BAAQMD *CEQA Air Quality Guidelines* provide the latest state-of-the-art guidance available. For that reason, substantial evidence supports continued use of the 2011 BAAQMD *CEQA Air Quality Guidelines*.

**b. Project Impacts.** This section describes potential air quality impacts which could occur as a result of implementation of the proposed project, identifies which impacts would actually occur, and what measures would be required to reduce significant impacts to a less-than-significant level.

**(1) GHG Emissions.** The following section describes the proposed project's operational and construction related GHG emissions and contribution to global climate change. As stated above, while the BAAQMD has not addressed emission thresholds for construction, the BAAQMD encourages quantification and disclosure. Thus, construction emissions are discussed in this section.

**Construction Activities.** Construction activities, such as site preparation, site grading, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew would produce combustion emissions from various sources. During

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<sup>34</sup> Bay Area Air Quality Management District, 1999. *BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans*. December.

<sup>35</sup> Public Resources Code Section 21082; 14 Cal. Code Regs. Sections 15064.7, 15064.4 (addressing GHG impacts); see also *Citizens for Responsible and Equitable Environmental Development v. City of Chula Vista* (2011) 197 Cal.App.4th 327 (upholding city's GHG emissions threshold based on AB 32 compliance).

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<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Furthermore, CH<sub>4</sub> 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 California Emission Estimator (CalEEMod) model, the project construction would generate a total of 1,292 metric tons of CO<sub>2</sub>e under the Existing Site Option and 1,290 metric tons of CO<sub>2</sub>e under the Expanded Site Option. Model inputs and outputs are included in Appendix E. As noted above, the BAAQMD has not addressed thresholds for construction emissions but recommends quantification and disclosure of these emissions. Therefore, construction of the project under either site option would have a less than significant impact related to construction emissions.

**Operational Emissions.** Long-term operation of the proposed project would generate GHG emissions from area and mobile sources, and indirect emissions from sources associated with energy consumption. Mobile-source emitters of GHGs would include project-generated vehicle trips associated with employee and residential trips to the project site. Area-source emissions would be associated with activities such as landscaping and maintenance of proposed land uses, and other sources. The methodology and qualitative description of the sources of GHG emissions related to transportation, electricity, water use, and solid waste disposal are described below.

*Area Sources.* Area sources of GHG emissions represent most direct sources of emissions located at the project site. This includes emissions from consumer products (like cleaners) and landscaping equipment. The combustion of wood and biomass represents the majority of area source emissions and, moreover, area sources constitute a small, but not negligible portion of a project's overall emissions.

*Transportation.* Transportation associated with the project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips. Transportation is the largest source of GHG emissions in California and represents approximately 38 percent of annual CO<sub>2</sub> 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 project. Please refer to Section IV.C, Transportation, Circulation and Parking, for a discussion of the project's effects on the transportation system. The proposed project, under both the Existing Site Option and the Expanded Site Option, is forecast to generate 92 net new AM peak-hour trips, 115 net new PM peak-hour trips and 1,299 net new daily trips.

*Electricity and Natural Gas.* Buildings represent 39 percent of primary energy use and 70 percent of electricity consumption in the U.S.<sup>36</sup> GHGs are released as a result of activities in buildings for which electricity and natural gas is used as energy sources. The primary source for GHG emissions from electricity is the indirect GHG emissions involved in supply power to the project site. However, for larger projects, this may also include on-site generation. Natural gas usage commonly covers space heating, water heating, and stoves, but may include additional equipment, such as a back-up generator, in larger projects. Additionally, energy efficiency influences overall power demand and therefore a projects electricity and natural gas related emissions.

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<sup>36</sup> United States Department of Energy, 2003. *Buildings Energy Data Book*.

*Water Use.* Water- and wastewater-related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. Each element of the water use cycle has unique energy intensities (in units of kWh/million gallons). Recognizing that the actual energy intensity in each component of the water use cycle will vary by utility, the California Energy Commission (CEC) assumes that approximately 3,950 kWh per million gallons are consumed for water that is supplied, treated, consumed, treated again, and disposed of in northern California.

*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 (CIWMB).<sup>37</sup> Land filling and other methods of disposal use energy as part of transporting and managing waste, and these activities produce additional GHGs to varying degrees. Land filling, the most common waste management practice, results in the release of CH<sub>4</sub> from the anaerobic decomposition of organic materials. CH<sub>4</sub> is 25 times more potent a GHG than CO<sub>2</sub>. However, landfill CH<sub>4</sub> 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.

**Existing Site Emissions.** If a proposed project involves the removal of an existing GHG emission source, the BAAQMD recommends subtracting the existing emissions levels from the new development. Thus, CalEEMod, which has been approved for use by the BAAQMD, was used to calculate the long-term GHG emissions for the 11 existing buildings (85,495 gross square feet) that comprise the existing HHS campus. As shown in Table IV.E-2, the existing uses generate approximately 2,096 metric tons per year CO<sub>2</sub>e. Motor vehicle emissions are the largest source of GHG emissions for the project at approximately 71 percent of the total. Energy use is the next largest category at approximately 27 percent of CO<sub>2</sub>e emissions for the project. Waste and water use are slightly over 1 percent of the total emissions for project. Additional calculation details are provided in Appendix E.

**Project Emissions.** The County intends to implement sustainable design strategies as part of the proposed project, as the County's goal for all new buildings is to achieve the equivalent of LEED Gold certification. However, actual design features are yet to be determined. Green features of the project site would include, but are not limited to: drought tolerant landscaping; vegetative swales and permeable paving (to control and treat storm water runoff); alternative energy generation; access to public transit; and improved facilities for bicycle parking. Green features for project buildings would include, but are not limited to: daylighting and shading strategies; natural ventilation; energy efficient mechanical systems; use of recycled and recyclable materials; low-VOC interior finishes; and, water-saving plumbing fixtures. The analysis of GHG emissions shown in Table IV.E-2 includes project specific water usage estimates but only includes energy savings associated with the current Title 24 standards. Additional reductions in energy usage above and beyond Title 24 standards would result in further emissions reductions.

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<sup>37</sup> California Department of Resources Recycling and Recovery (CalRecycle), 2010. Estimated Solid Waste Generation Rates for Commercial Establishments. Website: [www.calrecycle.ca.gov/WasteChar/WasteGen/Rates/Commercial.htm](http://www.calrecycle.ca.gov/WasteChar/WasteGen/Rates/Commercial.htm) (accessed July 7, 2012).

**Table IV.E-2: GHG Emissions in Metric Tons per Year**

Emissions Source	Project Site Existing Operational Emissions				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e	Percent of Total
Area Source	0.00	0.00	0.00	0.00	0.00
Energy Source	568.78	0.02	0.01	572.33	27.30
Mobile Source	1,494.61	0.11	0.00	1,496.92	71.41
Waste	0.00	0.95	0.00	20.03	0.96
Water	4.99	0.07	0.00	6.95	0.33
<b>Total Existing Emissions</b>				<b>2,096.23</b>	100.00
Emissions Source	Existing Site and Expanded Site Options Operational Emissions				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e	Percent of Total
Area Source	0.00	0.00	0.00	0.00	0.00
Energy Source	1,165.43	0.05	0.02	1,172.70	31.10
Mobile Source	2,538.42	0.12	0.00	2,540.91	67.39
Waste	0.00	2.05	0.00	43.04	1.14
Water	9.73	0.13	0.00	13.55	0.36
<b>Total Project Emissions</b>				<b>3,770.20</b>	100.00
<b>Net New Emissions</b>				<b>1,673.97</b>	

Note: Column totals may vary slightly due to independent rounding of input data. Natural gas and electricity reductions calculated from application materials supplied by applicant.

Source: LSA Associates, Inc., 2012.

As noted in Section IV.C, Transportation, Circulation, and Parking, a range of Transportation Demand Management (TDM) measures will be considered by the County for implementation as part of the project. However, convenience and cost are the primary factors that affect a person’s choice of transportation mode. The suburban location of the HHSA campus combined with free, unrestricted parking both encourages and necessitates driving by many HHSA employees and clients. Trip reduction measures that work well for some individuals or types of businesses do not work as well for others, and not all trip reduction measures, such as employee flex time, reduce parking demand. To provide a conservative analysis of potential GHG emissions impacts and due to uncertainty surrounding effectiveness of TDM measures, no trip reduction due to specific TDM measures was assumed in the GHG emission estimation.

Operational GHG emissions are related to the intensity and type of development (e.g., building square footage). The Existing Site Option and Expanded Site Option would both result in the same total building square footage and would result in equivalent trip generation rates; therefore the Existing Site Option and Expanded Site Option would result in the same emission rates. GHG emissions for the project were also estimated using CalEEMod.

As shown in Table IV.E-2, the project would generate approximately 3,770 metric tons of CO<sub>2</sub>e per year for total net new emissions equal to approximately 1,674 metric tons CO<sub>2</sub>e per year. Motor vehicle emissions are the largest source of GHG emissions for the project at approximately 67 percent of the total. Energy use is the next largest category at approximately 31 percent of CO<sub>2</sub>e emissions for the project. Waste and water use combined are approximately 1.5 percent of the total emissions for the project. Additional calculation details are provided in Appendix E.

**Comparison to 1,100 Metric Tons Criterion.** Model results indicate the project would generate approximately 3,770 metric tons of CO<sub>2</sub>e per year. The existing uses on the project site currently

generate 2,096 metric tons of CO<sub>2</sub>e per year. Therefore, the net increase in CO<sub>2</sub>e would be approximately 1,674 metric tons per year, which would exceed the BAAQMD significance criterion of 1,100 metric tons of CO<sub>2</sub>e per year.

**Comparison to 4.6 Metric Tons per Capita Criterion.** Currently, there are 323 employees at the project site (and the facilities do not provide for residential uses). The number of employees is expected to increase by 350 with implementation of the project, resulting in 673 total employees. Therefore, project CO<sub>2</sub>e emissions per service population would be 2.49 metric tons, which is below the threshold of 4.6 metric tons per service population per year.

Under the BAAQMD significance criteria, a project may meet one of the two established criteria to result in a less-than-significant impact. The proposed project, under the Existing Site Option and the Expanded Site Option, would meet the 4.6 metric tons of CO<sub>2</sub>e per service population criterion and would therefore have a less-than-significant impact related to the generation of GHG emissions.

**(2) Conflicts with Applicable Plans, Policies or Regulations Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases.** According to the BAAQMD's *CEQA Guidelines*, a project must not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions. The following section outlines the relevant state and local policy and discusses the project's consistency.

**State and Regional Plans, Policies and Regulations.** The CAT and the ARB have developed several reports to achieve the State'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*," ARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*," and ARB's "*Climate Change 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.

The adopted Scoping Plan includes proposed GHG reductions from direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as cap-and-trade systems.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed ARB to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. In June 2007 ARB 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). 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 ARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures.

ARB's focus in identifying the 44 early action items was to recommend measures that ARB staff concluded were "expected to yield significant GHG emission reductions, are likely to be cost-effective and technologically feasible." The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT. Accordingly, the 44 early action items focus on industrial production processes, agriculture, and transportation sectors. Early action items associated with

industrial production and agriculture do not apply to the proposed project. The transportation sector early action items such as truck efficiency, low carbon fuel standard, proper tire inflation, truck stop electrification and strengthening light duty vehicle standards are either not specifically applicable to the proposed project or would result in a reduction of GHG emissions associated with the project. State measures include emission reductions assumed as part of the Scoping Plan, including light-duty vehicle GHG standards (“Pavley standards”), low carbon fuel standard, and energy efficiency measures. The AB 32 Scoping Plan relates to actions that the State will take, like proposing new regulations, or actions that the State will encourage on a voluntary basis. Thus, the AB 32 Scoping Plan is not directly applicable to the proposed project and the proposed project would not conflict in any way.

Additionally, in developing the thresholds of significance for GHG emissions, the BAAQMD identified the emissions level for which a project would conflict with existing California legislation adopted to reduce Statewide GHG emissions. As indicated in the analysis presented above, the proposed project would not exceed the project level significance criteria established by the BAAQMD and, therefore, the proposed project (both the Existing Site Option and the Expanded Site Option) would not conflict with plans adopted for the purpose of reducing GHG emissions.

**Napa County General Plan.** Napa County has adopted several goals and policies to reduce greenhouse gas emissions, as described below.

Policy CON-65 states that the County shall support efforts to reduce and offset GHG emissions through measures such as review of GHG emissions in discretionary projects and that projects shall consider methods to reduce GHG emissions and incorporate permanent emission offsets. The project would incorporate green measures such as day-lighting and shading strategies, natural ventilation, energy efficient mechanical systems, and water saving plumbing fixtures all of which would be permanent methods to reduce GHG emissions. Therefore, the project would be consistent with this policy.

Through Policy CON-66, the County also promotes the implementation of sustainable practices and green technology in commercial development through project construction by utilizing recycled building materials. The project would use recycled building materials to the extent feasible and would be consistent with this policy.

Policy CON-67 promotes and encourages “green building” design, development and construction through the achievement of Leadership in Energy and Environmental Design (LEED) standards set by the U.S. Green Building Council and the Green Point Rates system standards. This policy states that new County buildings shall be developed as “green buildings,” utilizing sustainable construction and building practices. The project would use recycled materials and would implement green features such as day-lighting and shading strategies, natural ventilation, energy-efficient mechanical systems, and water-saving plumbing fixtures and would thereby be consistent with this County policy.

Policy CON-72 would also be applicable to the proposed project. This policy states that the County shall seek to reduce the energy impacts from new buildings by applying Title 24 energy standards as required by law. The proposed project would replace older buildings on the campus with new buildings that would be built to the current Title 24 CALGreen standards, which would result in much more energy-efficient buildings on the project site.

**Napa County Climate Action Plan.** It is the County's goal, as outlined in the Napa County Draft Climate Action Plan (CAP), that in 2020, the community's GHG emissions level will be 15 percent less than the 2005 level. To achieve this goal, the County has proposed a revised October 31, 2011, Draft CAP which would require discretionary projects to reduce their emissions 38 percent below "business as usual" (BAU) in 2020 by applying a combination of State, local, and project-specific measures. The CAP also assumes that the County will achieve the goals set forth in the Emission Reduction Plan for County operations. Since the CAP has not yet been adopted by County decision-makers, it is not considered a significance threshold for CEQA purposes. Nonetheless, County staff has analyzed the project for conformance with the CAP and determined that the project would generate 2,339 metric tons of CO<sub>2</sub> per year, which would need a reduction of 889 metric tons of CO<sub>2</sub> per year to meet the draft CAP standard. A reduction of 506 metric tons of CO<sub>2</sub> per year can be credited to the project by applying reductions from State and local programs that have been adopted since 2005. The difference would yield a project level requirement to further reduce the project's impact by 380 metric tons of CO<sub>2</sub> per year. This goal could be achieved if the project were to generate alternative energy for its electrical demand, or if it were to incorporate a combination of energy efficiency measures including the already-proposed measures of day-lighting and shading strategies, natural ventilation, energy-efficient mechanical systems, and water-saving plumbing fixtures. As noted earlier, the County's Emission Reduction Plan for County operations sets forth a goal for new facilities to be consistent with LEED Gold standards. HHS project designers will work towards this goal as the design and engineering process continues.

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