11.0
GLOBAL CLIMATE CHANGE

This chapter provides an evaluation of the potential environmental effects of implementing the proposed 2035 San Benito County General Plan (2035 General Plan) on greenhouse (GHG) gas emissions. As established in the Notice of Preparation for the proposed 2035 General Plan (see Appendix A, Notice of Preparation), urban development and other activities resulting from implementation of the updated 2035 General Plan may result in increased GHG emissions within San Benito County (County).

This analysis considers a number of applicable regulations, requirements, plans, and policies from the following sources:

- U.S. Environmental Protection Agency (USEPA) GHG Rules and Standards
- California's Senate and Assembly Bills
- California Air Resources Board (CARB)
- California Attorney General's Office
- California Air Pollution Control Officers Association Guidance (CAPCOA)
- Monterey Bay Unified Air Pollution Control District (MBUAPCD).

Rules and regulations influencing GHG emissions were identified by a review of these regulations.

11.1 SETTING

The County's environmental and regulatory settings with respect to GHG emissions described below are based on the General Plan Background Report (Background Report)(San Benito County 2010b). Pursuant to State CEQA Guidelines §15150, this document is incorporated into the RDEIR by reference as though fully set forth herein. Where necessary, information originating from the Report has been updated with the best available and most current data, as previously discussed in Section 4.3. The Report is available for download at: www.sanbenitogpu.com/docs.html. Copies of the Report may be viewed during standard business hours (8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m.), Monday through Thursday, at the San Benito County Planning and Building Department, 2301 Technology Parkway, Hollister, California 95023. County offices are closed to the public on Fridays.

11.1.1 Environmental Setting

The Greenhouse Effect

The earth's natural warming process is known as the "greenhouse effect." Certain atmospheric gases act as an insulating blanket that traps solar energy to keep the global average temperature in a suitable range. These gases are called GHGs because they trap heat like the glass walls of a greenhouse. The greenhouse effect raises the temperature of the earth's surface by about sixty degrees Fahrenheit. With the natural greenhouse effect, the average temperature of the earth is about 45 degrees Fahrenheit; without it, the average temperature of the earth plummets to approximately minus 15 degrees Fahrenheit. It is normal for the earth's temperature to fluctuate over extended periods of time. Over the past one hundred years the earth's average global temperature has generally increased by one degree Fahrenheit. In some regions of the world, the increase has been as much as four degrees Fahrenheit.

Scientists studying the particularly rapid rise in global temperatures during the late twentieth century have determined that natural variability does not alone account for that rise. Rather, human activity spawned by the industrial revolution has resulted in increased emissions of carbon dioxide and other forms of GHGs, primarily from the burning of fossil fuels (during motorized transport, electricity generation, consumption of natural gas, industrial activity, manufacturing, etc.) and deforestation, as well as agricultural activity and the decomposition of solid waste. Carbon dioxide (CO_2) is the most common GHG and constitutes approximately 84 percent of all GHG emissions in California. The State of California ranks as the 12th to 16th largest emitter of CO_2 (the most prevalent GHG) worldwide, and is responsible for approximately two percent of the world's CO_2 emissions. Scientists refer to the global warming context of the past century as the "enhanced greenhouse effect" to distinguish it from the natural greenhouse effect.

While the increase in temperature is known as "global warming," the resulting change in weather patterns is known as "global climate change." Global climate change is evidenced in changes to wind patterns, storms, precipitation, and air temperature. According to overwhelming scientific consensus, climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TAC), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere for a long enough time to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, as of 2010 it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions remains stored in the atmosphere.

GHG Emission Components and Health Effects

GHGs are produced from: electricity generation, road transportation, and other energy sources; industrial processes; agriculture, forestry, and other land uses; solid waste disposal; and wastewater treatment and discharge. GHGs include water vapor, carbon dioxide, methane, nitrous oxide (N_2O), Chlorofluorocarbons (CFC), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and black carbon. Much of the following discussion is adapted from the EPA's Emission Inventory Improvement Program, Estimating Greenhouse Gas Emissions, and EPA's website on Climate Change.

Water Vapor

Water vapor (H_2O) is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant – in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor, and so on, and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown, as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation thus allowing less energy to reach the Earth's surface and heat it. There are no health effects from water vapor itself. However, when some pollutants come in contact with water vapor they can dissolve, and the water vapor can then act as a pollutant-carrying agent. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include: evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Carbon Dioxide

CO_2 is an odorless and colorless GHG. Outdoor levels of CO_2 are not high enough to result in negative health effects. CO_2 is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out-gassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. CO_2 is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks. Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution.

Data from the past 50 years suggests a corollary increase in global GHG levels and concentrations. As an example, prior to the industrial revolution, CO_2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30 percent. Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources. Short-term exposure to CO_2 at levels below 20,000 ppm does not cause harmful health effects. Higher concentrations can affect respiratory function and cause excitation followed by depression of the central nervous system. High concentrations of CO_2 can displace oxygen in the air, resulting in lower oxygen concentrations for breathing. Therefore, effects of oxygen deficiency may be combined with effects of CO_2 toxicity.

Methane

Methane (CH_4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs. While methane is not toxic, it is highly flammable, and may form explosive mixtures with air. No health effects are known to occur from exposure to methane. Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide

N_2O, also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide can cause dizziness, euphoria, and on some occasions, slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause brain damage. Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb). Microbial processes in soil and water produce nitrous oxide, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, e.g., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in racecars. Nitrous oxide can be transported into the stratosphere, deposited on the earth's surface, and converted to other compounds by chemical reaction.

Chlorofluorocarbons

CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs are no longer being used. It is therefore not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heartbeat frequency too high or too low) or asphyxiation. CFCs have no natural source and were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. With the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken, and has been extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons

Hydrofluorocarbons are synthetic, man-made chemicals that are used as a substitute for CFCs. Of all the GHGs, they are one of three groups with the highest global warming potential (GWP). The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF3), HFC-134a (CF3CH2F), and HFC- 152a (CH3CHF2). Prior to 1990, the only significant emissions were of HFC-23. HFC-134a emissions are increasing due to its use as a refrigerant.

The EPA estimates that concentrations of HFC-23 and HFC- 134a are now about 10 parts per trillion (ppt) each, and concentrations of HFC-152a are about one ppt. No health effects are known to result from exposure to HFCs, which are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons

Perfluorocarbons have stable molecular structures, and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above Earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). The EPA estimates that concentrations of CF_4 in the atmosphere are over 70 ppt. No health effects are known to result from exposure to PFCs. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (23,900). The EPA (2006) indicates that concentrations in the 1990s were about four ppt. In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Black Carbon

Black Carbon (BC) is formed through the incomplete combustion of fossil fuels, biofuel, and biomass (e.g., wood, waste, and alcohol fuels), and is emitted in both anthropogenic and naturally occurring soot. BC warms the planet by absorbing heat in the atmosphere and by reducing the ability to reflect sunlight when deposited on snow and ice. Black carbon is often transported over long distances, mixing with other aerosols along the way. The aerosol mix can form transcontinental plumes of atmospheric brown clouds, with vertical extents of approximately two to three miles (three to five kilometers). BC has emerged as the second largest contributor to global warming after carbon dioxide. Decreasing BC emissions could be a relatively inexpensive way to significantly slow climate change in the short-term. Inhalation of soot is a major public health issue. Between 25 percent and 35 percent of BC in the global atmosphere comes from China and India, emitted from the burning of wood and cow dung in household cooking and through the use of coal to heat homes. Countries in Europe and elsewhere that rely heavily on diesel fuel for transportation also contribute large amounts of BC.

The developed nations have reduced their BC emissions from fossil fuel sources by a factor of five or more since the 1950s. The technology exists for a drastic reduction of fossil fuel related BC.

Global Warming Potential

GWP is one type of simplified index based upon radiative properties that can be used to estimate the potential future impacts of emissions of different gases upon the climate system in a relative sense. GWP is based on a number of factors, including the radiative efficiency (heat-absorbing ability) of each gas relative to that of carbon dioxide, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of carbon dioxide. GWP is the amount of radiative forcing that would result from the emission of one kilogram of a non-CO_2 GHG that is equivalent to that from the emission of one kilogram of carbon dioxide over a fixed period of time. One teragram (one trillion grams or one billion kilograms or one million tonnes) of carbon dioxide equivalent (Tg CO_2e) is essentially the emissions of the gas multiplied by the GWP.

A summary of the atmospheric lifetime and GWP of selected gases is presented in Table 12-1. As indicated, GWP ranges from one to 23,900. GWPs were developed by the Intergovernmental Panel on Climate Change (IPCC) to quantify the globally averaged relative radiative forcing effects of a given GHG, using carbon dioxide as the reference gas. In 1996, the IPCC published a set of GWPs for the most commonly measured greenhouse gases in its Second Assessment Report (SAR). In 2001, the IPCC published its Third Assessment Report (TAR), which adjusted the GWPs to reflect new information on atmospheric lifetimes and an improved calculation of the radiative forcing of carbon dioxide. However, SAR GWPs are still used by international convention and the United States to maintain the value of the carbon dioxide "currency." To maintain consistency with international practice, the California Climate Action Registry requires participants to use GWPs from the SAR for calculating their emissions inventory. For this reason, this GHG inventory uses the SAR GWPs.

Reductions of Greenhouse Gas Emission Sources

Statewide

The GHG emission sectors described below would experience varying degrees of state regulation and would be reduced overall on a statewide level under existing regulations. As discussed below, legislation already in effect is designed to achieve statewide reductions of GHG emissions associated with electricity production, industry, vehicle miles travelled (VMT), and motor vehicles.

Local Government

Projects implemented on a local level would generate GHG emissions associated with each of the emission sectors described above; however, the ability of local governments to reduce those GHG emissions would vary by sector. Certain GHG emission sectors will be regulated by the implementation of statewide emission reduction programs (e.g., vehicle emissions standards and renewable energy portfolios). Local governments, including San Benito County, have the ability to reduce vehicle miles traveled (VMT) to a certain extent through the implementation of sustainable land use regulations, which in turn can help reduce transportation-related GHG emissions. However, local governments do not have control over vehicle emissions technology or fuel economy standards. Both of these parameters are important components for achieving the emission reductions mandates set in AB 32.

Local governments such as San Benito County will play a role in achieving the emission reduction goals mandated in AB 32 and SB 375. The ability to influence land use decisions, provide services to the population (e.g., recycling service, waste management, and wastewater treatment), and provide public education and incentives (e.g., energy conservation, agricultural practices) to citizens are options for local governments to reduce GHG emissions generated within their jurisdictions. As discussed below, for SB 375, CARB assigns each MPO a GHG emissions reduction target for passenger cars and light trucks. The County, in coordination with the Association of Monterey Bay Area Governments, will need to develop a SCS or Alternative Planning Strategy (APS) as required under SB 375 that is designed to achieve the allocated reduction target.

Land use decisions and development projects are not their own GHG emissions sectors. In other words, land use development projects can generate GHG emissions from several sectors (e.g., transportation, electricity, and waste) as described in more detail below. Therefore, land use decisions and development projects can affect the generation of GHG emissions from multiple sectors that result from their implementation. Development projects can result in direct or indirect GHG emissions that would occur on- or off-site. For example, electricity consumed in structures within a project would indirectly cause GHGs to be emitted at a utility provider. The people who reside in and the visitors to a development project would drive vehicles that generate off-site GHG emissions, which are associated with the transportation sector. The following sections describe the major GHG emission sectors that can and cannot be affected by local government actions. In addition, a description of the existing state of climate change science is provided for informational purposes.

Greenhouse Gas Emission Sectors

The Climate Change Scoping Plan, adopted by the California Air Resources Board (CARB) in 2008, and revised in 2014, identifies the main GHG emission sectors that account for the majority of GHG emissions generated within California:

- **Transportation.** This sector represents the GHG emissions associated with on-road motor vehicles, recreational vehicles, aviation, ships, and rail.

- **Electricity.** This sector represents the GHG emissions associated with use and production of electrical energy. Approximately 25 percent of electricity consumed in California is imported, thus, GHG emissions associated with out-of-state electricity production are also included as part of this sector.

- **Industry.** This sector represents the GHG emissions associated with industrial land uses (e.g., manufacturing plants and refineries). Industrial sources are predominately comprised of stationary sources (e.g., boilers and engines) associated with process emissions.

- **Commercial and Residential.** Commercial and residential GHG emission sources include area sources such as landscape maintenance equipment, fireplaces, and natural gas consumption for space and water heating.

- **Agriculture.** This sector represents the GHG emissions associated with agricultural processes. Agricultural sources of GHG emissions include off-road farm equipment, irrigation pumps, residue burning, livestock, and fertilizer volatilization.

- **High Global Warming Potential.** This sector represents the generation of high GWP GHGs. Examples of high GWP GHG sources include refrigerants (e.g., hydrofluorocarbons [HFCs], chlorofluorocarbons [CFCs]) and electrical insulation (e.g., sulfur hexafluoride). Although these GHGs are typically generated in much smaller quantities than CO_2, their high GWP results in considerable CO_2e.

- **Recycling and Waste.** This sector represents the GHG emissions associated with waste management facilities and landfills.

Effects of Climate Change and Adaption

Global average ambient concentrations of CO_2 have increased dramatically since preindustrial times, from approximately 280 parts per million (ppm) to approximately 353 ppm in 1990, and approximately 380 ppm in 2000. Global average temperature has risen approximately 0.76 degree Celsius (°C) since 1850. If global CO_2 emissions were to be eliminated today, global average temperatures would continue to rise an additional 0.5°C by the end of this century. This phenomenon is caused by the inertia of the climate system and time scale of the main sequestration mechanism in the carbon cycle – the ocean. In other words, global temperatures will rise an additional 0.5°C due to human activities that have already occurred. Because GHG emissions associated with fossil fuel combustion, population growth, technological advances, and current standards of living will continue to occur, a more likely range of scenarios for global average temperature rise would be 1.8–4.0°C by the end of the century, depending on the global emissions scenario that ultimately occurs.

Effects associated with the incremental increase in global temperature have already begun to occur. Such effects are projected to occur in numerous forms: sea level rise, reduction in the extent of polar and sea ice, changes to ecosystems, changes in precipitation patterns, reduced snowpack, agricultural disruption, increased intensity and frequency of storms and temperature extremes, increased risk of floods and wildfires, increased frequency and severity of drought, effects on human health from vector borne disease, species extinction, and acidification of the ocean. Climate change has the potential to affect environmental conditions in California through a variety of mechanisms. Resource areas other than air quality and atmospheric temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the State. According to the CEC, the snowpack portion of the water supply could potentially decline by 30-90 percent by the end of the 21st century. A study cited in a report by the California Department of Water Resources (DWR) projects that approximately 50 percent of the statewide snowpack will be lost by the end of the century. Although current forecasts contain varying levels of uncertainty, it is evident that this phenomenon could lead to significant challenges in securing an adequate water supply for a growing population. An increase in precipitation falling as rain rather than snow could also lead to increased potential for floods, because water that would normally be held in the Sierra Nevada snowpack until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system.

Another mechanism for indirect effects on the environment in California is sea level rise. Sea levels rose worldwide approximately seven inches during the last century, and it is predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions. However, the Governor-appointed Delta Vision Blue Ribbon Task Force has recommended that the State plan for a scenario of 16 inches of sea level rise by 2050, and 55 inches by 2100. Resultant effects of sea level rise could include increased coastal flooding, saltwater intrusion, and disruption of wetlands. Water delivery to the County from sources in the Delta could be adversely affected. As California's climate changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the State if suitable conditions are no longer available. An additional concern associated with climate change is an increased risk of wildfire caused by changes in rainfall patterns and plant communities.

Increased Temperature

An increase in average annual temperatures, by itself, would minimally affect San Benito County except for adjustments in operations in response to warmer temperatures, such as increased evapotranspiration rates affecting reservoir levels, agriculture, and landscaped areas, resulting in an increased irrigation demand, and potentially greater overall energy consumption to meet air conditioning demands of a growing population. An increase in annual average temperature is a reasonably foreseeable effect of future climate change. This change (i.e., increase in global average temperature) alone would lead to an increase in ozone formation and an increase in aggravated health conditions for the elderly and those with respiratory disorders.

Status and Trends

The Earth's climate has had numerous periods of cooling and warming in the past. Significant periods of cooling have been marked by massive accumulations of sea- and land-based ice extending from the Earth's poles to as far as the middle latitudes. Periods of cooling have also been marked by lower sea levels because of the accumulation of ice and the cooling and contraction of the oceans. Periods of warming caused recession of the ice toward the poles, warming and thermal expansion of the oceans, and rise in sea levels. Average temperatures in the Northern Hemisphere appear to have been relatively stable from about the year 1000 to the mid-1800s based on temperature proxy records from tree rings, corals, ice cores, and historical observations. However, there is a significant amount of uncertainty related to proxy temperature records, especially those extending far back into the past. IPCC stated that the Earth's climate has warmed since the preindustrial era and that it is very likely that at least some of this change is attributable to the activities of humans. Global average near-surface air temperatures and ocean surface temperatures increased by 0.74°C ± 0.18°C (1.33°F ± 0.32°F) during the 20th century. Temperature measurements, apparent trends in reduced snowpack and earlier runoff, and other evidence such as changes in the timing of blooming plants, indicate that temperatures in California and elsewhere in the western U.S. have increased during the past century.

Projections

Modeling results from general circulation models are consistent in predicting increases in temperatures globally with increasing concentrations of GHGs resulting from human activity. Climate change projections can be developed on a regional basis using techniques to downscale from the results of global models (although increased uncertainty results from the downscaling). In 2005, a relatively large group of model projections for California projected a temperature rise of approximately 2.5°C to 9°C (4.5°F to 16.2°F) for Northern California by 2100. An analysis of the distribution of the projections generally showed a central tendency at about 3°C (5.4°F) of rise for 2050, and about 5°C (9°F) for 2100. Work by Snyder et al. (2002) has produced the finest-scale temperature and precipitation estimates to date. Resulting temperature increases for a scenario of doubled CO_2 concentrations are 1.4°C to 3.8°C (2.5°F to 6.8°F) throughout California. This is consistent with the global increases predicted by the IPCC. In a regional model of the western United States, Kim projected a climate warming of approximately 3°C to 4°C (5.4°F to 7.2°F). Of note in both studies is the projection of uneven distribution of temperature increases. For example, regional climate models show that the warming effects are greatest in the Sierra Nevada, with implications for snowpack and snowmelt.

Effect on the County

Based on the results of a variety of regional climate models, it is reasonably foreseeable that some increase in annual average temperatures will occur in San Benito County during the next 100 years. Although a temperature increase is expected, the amount and timing of the increase is uncertain. In general, predictions put an increase in the range of 2°C to 5°C (3.6 to 9°F) over the next 50–100 years. Increasing temperatures in California would indirectly affect the County through changes in water supply, sea levels, water quality, agriculture, and energy consumption rates. Indirect effects of climate change on the physical conditions in the County are discussed later in this section. Direct effects of increased temperatures in the County would lead to an increase in aggravated health conditions for the elderly and those with respiratory disorders.

Precipitation Volume, Type, and Intensity

Climate change can affect precipitation in a variety of ways, such as by changing the following: overall amount of precipitation, type of precipitation (rain vs. snow),and timing and intensity of precipitation events. Each of these effects on precipitation patterns is discussed in the following paragraphs.

Status and Trends

Worldwide precipitation is reported to have increased about two percent since 1900. Although global average precipitation has been observed to increase, changes in precipitation over the past century vary in different parts of the world. Some areas have experienced increased precipitation while other areas have experienced a decline. An analysis of trends in total annual precipitation in the western U.S. by the National Weather Service's Climate Prediction Center provides evidence that annual precipitation has increased in much of California, the Colorado River Basin, and elsewhere in the West since the mid-1960s. In another study evaluating trends in annual November-through-March precipitation for the western U.S. and southwest Canada, the data indicate that for most of California and the Southwest, there was increasing precipitation during the period of 1930–1997. Former State Climatologist James Goodridge compiled an extensive collection of longer-term precipitation records from throughout California. These data sets were used to evaluate whether there has been a changing trend in precipitation in the State over the past century. Long-term runoff records in selected watersheds in the State were also examined. Based on a linear regression of the data, the long-term historical trend for statewide average annual precipitation appears to be relatively flat (no increase or decrease) over the entire record. However, it appears that there might be an upward trend in precipitation toward the latter portion of the record. When these same precipitation data are sorted into three regions–northern, central, and southern California–trends show that precipitation in the northern part of the State appears to have increased slightly from 1890 to 2002, and precipitation in the central and southern portions of the State show slightly decreasing trends. All changes were in the range of one to three inches annually. Although existing data indicate some level of change in precipitation trends in California, more analysis is needed to determine whether changes in California's regional annual precipitation totals have occurred as the result of climate change or other factors.

Projections

IPCC predicts that increasing global surface temperatures are very likely to result in changes in precipitation. Global average precipitation is expected to increase during the 21st century as the result of climate change, based on global climate models for a wide range of GHG emissions scenarios. However, global climate models are generally not well suited for predicting regional changes in precipitation because of their coarse level of outputs compared to the scale of regionally important factors that affect precipitation (e.g., maritime influences or effects of mountain ranges). Therefore, while increasing precipitation on a global scale is generally an expected effect of climate change, significant regional differences in precipitation trends can be expected. Some recent regional modeling efforts conducted for the western U.S. indicate that overall precipitation will increase, but considerable uncertainty remains because of differences among larger scale global climate models.

In California, precipitation is projected to increase in the northern part of the State and in the winter months. Various California climate models provide mixed results regarding changes in total annual precipitation in the State through the end of this century. Models predicting the greatest amount of warming generally predict moderate decreases in precipitation; on the other hand, models projecting smaller increases in temperature tend to predict moderate increases in precipitation. In addition, an IPCC review of multiple global climate models identifies much of California as an area where less than 66 percent of the models evaluated agree on whether annual precipitation would increase or decrease; therefore, no conclusion on an increase or decrease can be provided, and California climate could be either warmer-wetter or warmer-drier. Considerable uncertainties about the likely effects of climate 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.

Effect on the County

Although global climate change models generally predict an increase in overall precipitation on a worldwide scale, there is no such consistency among the results of regional models applied to California. Based on the model and input assumptions, both increases and decreases in annual precipitation are predicted. There is also variability in the results for different parts of the State. Given the uncertainty associated with projecting the amount of annual precipitation, it would be too speculative to determine the reasonably foreseeable direct effects of climate change on physical conditions, specifically precipitation volumes, in San Benito County.

Snowpack Storage and Water Supply

The County relies primarily on groundwater from local private wells, and on surface water deliveries from the Central Valley Project (CVP) for water supply purchased by the San Benito County Water District (SBCWD). Though little of the County's water supply is derived directly from snowmelt, surface supplies imported into the County do rely on snowmelt sources and the local surface water that does fall within the County is captured and stored in the Hernandez and Paicines reservoirs.

Status and Trends

California's annual snowpack, on average, has the greatest accumulations from November through the end of March. The snowpack typically melts from April through July. Snowmelt provides significant quantities of water to streams and reservoirs for several months after the annual storm season has ended. The length and timing of each year's period of snowpack accumulation and melting varies based on temperature and precipitation conditions. California's snowpack is important to the annual water supply because of its volume and the time of year that it typically melts. Average runoff from melting snowpack is usually about 20 percent of the total annual natural runoff, and roughly 35 percent of the total usable annual surface water supply. The snowpack is estimated to contribute an average of about 15 million acre-feet (MAF) of runoff each year, about 14 MAF of which is estimated to flow into the Central Valley.

In comparison, total reservoir capacity serving the Central Valley is about 24.5 MAF in watersheds with significant annual accumulations of snow. California's reservoir managers (including State Water Project [SWP] and CVP facilities) use snowmelt to help fill reservoirs once the threat of large winter and early spring storms and related flooding risks have passed. These systems include water management infrastructure within watersheds, where additional water is stored in reservoirs and used to help meet downstream water demands after flows from snowmelt begin to recede. Some of the annual runoff collected in California's reservoirs is held from one year to the next because California's annual precipitation and snowpack can vary significantly from year to year.

There may also be decade-scale variation in precipitation over the Sierra Nevada, and possibly other parts of California. Carryover storage can help meet water demand in years when precipitation and runoff is low. Because the importance of the Sierra snowpack is tied to both the volume of water it holds and the timing of water releases (spring and early summer), simply assessing the amount of precipitation that falls as snow does not convey the full value of the snowpack and the potential effects of climate change on water supply. Measurements of the amount of Sierra runoff occurring from April to July are a better indicator of the combined interaction between the volume of the snowpack and the time of year that it melts. Changes in patterns of runoff reveal declining water storage in the form of snowpack. Runoff volumes for April–July have declined when evaluated as "unimpaired" runoff, meaning that the effects of runoff detention in reservoirs are removed. Data indicate that although overall precipitation volumes (represented by runoff amounts) showed no change, more runoff occurred as a result of rain during the winter months, and less runoff could be attributed to the melting of accumulated snowpack during the spring and early summer. These trends suggest less accumulation of snowpack and earlier runoff of snowmelt.

Projections

As early as the mid-1980s and early 1990s, regional hydrologic modeling of the effects of climate change has suggested with increasing confidence that higher temperatures will affect the timing and magnitude of snowmelt and runoff in California. Over the past two decades, this has been one of the most persistent and well-established findings on effects of climate change for water resources in the U.S. and elsewhere, and it continues to be the major conclusion of regional water assessments.

By delaying runoff during the winter months when precipitation is greatest, snow accumulation in the Sierra Nevada acts as a massive natural reservoir for California. Despite uncertainties about how increased concentrations of GHGs may affect precipitation, there is very high confidence that higher temperatures will lead to dramatic changes in the dynamics of snowfall and snowmelt in watersheds dominated by substantially more snowfall. An analysis of the effect of rising temperatures on snowpack conducted by DWR shows that a 3°C (5.4°F) rise in average annual temperature would likely cause snowlines to rise approximately 1,500 feet. This would result in an annual loss of approximately five MAF of water storage in snowpack. Simulations conducted by N. Knowles and D. R. Cayan project a loss in April snowpack in the Sierra Nevada of approximately five percent with a 0.6°C (1.1°F) increase in average annual temperature, an approximately 33 percent loss with a 1.6°C (3.4°F) rise, and an approximately 50 percent loss in April snowpack with a 2.1°C (4.9°F) average annual temperature rise.

Loss of snowpack was projected to be greater in the northern Sierra Nevada and the Cascades than in the southern Sierra Nevada because of the greater proportion of land at the low and mid-elevations in the northern ranges. With a temperature increase of 2.1°C, the northern Sierra Nevada and the Cascades were projected to lose 66 percent of their April snowpack, while the southern Sierra Nevada was projected to lose 43 percent of its April snowpack. Future predictions confirm that not only will snowpack form a smaller part of overall precipitation, but it will also melt and run off earlier in the year. This change will occur as overall precipitation will likely increase slightly. These two trends will most likely cause reduced summer flows, reduced summer soil moisture, and increased winter flows and flood potential. Higher snowlines will cause a greater proportion of winter runoff and earlier snowmelt times will lengthen the duration of peak winter flows and flood potential.

Effect on the County

Based on the results of a variety of regional climate models and literature, it is reasonably foreseeable that snowpack will be reduced and/or will melt earlier or more rapidly in watersheds that feed the CVP. Consequently, changes in snowpack could affect the County indirectly by altering the timing and volume of runoff that feeds the CVP, which supplies much of the northern portion of San Benito County's water supply. As a result, CVP deliveries to the County may decrease over time.

Extreme Weather Events

Variability and extreme weather events are a natural part of any climatic system. The extent of climatic stability or variability is dependent in large part on the time frame examined. Climatic conditions may be characterized as relatively stable over periods of hundreds or thousands of years, but within that time frame there may be severe droughts or flood events that vary widely beyond the overall average condition.

Status and Trends

Paleoclimatic evidence from tree rings, buried stumps, and lakebed sediment cores suggests that in California, the past 200 years have been relatively wet and relatively constant when compared with older records. These older records reveal greater variability than the historical record, in particular in the form of severe and prolonged droughts, but are not likely to be as reliable as more recent records. Most identified climatic averages and extremes for California are based on the historical climate record since 1900, and cannot be considered fully representative of past or future conditions.

Extreme weather events are expected to be one of the more important indicators of climate change. Phenomena such as the El Niño/Southern Oscillation, which is the strongest natural inter-annual climate fluctuation, affect the entire global climate system and the economies and societies of many regions and nations. Direct effects of this climate fluctuation occur in California. The El Niño/Southern Oscillation for example, strongly influences storms and precipitation patterns. It is unclear how increases in global average temperatures associated with global warming might affect the El Niño cycles. However, the strong El Niños of 1982–83 and 1997–98 and associated flood events, along with the more frequent occurrences of El Niños in the past few decades, have forced researchers to try to better understand how human-induced climate change may affect inter-annual climate variability.

In addition to possible long-term changes in precipitation trends, increased variability of annual precipitation is a possible outcome of climate change. Based on a statistical analysis of California precipitation records, there appears to be an upward trend in the variability of precipitation over the 20th century, with variability values at the end of the century about 75 percent larger than at the beginning of the century. This indicates that there tended to be more extreme wet and dry years at the end of the century than there were at the beginning of the century. However, as stated above, paleoclimatic evidence suggests that weather patterns in California have been relatively constant over the last 200 years, which identifies the variable weather patterns toward the latter part of this period as more pronounced. As identified previously in the "Precipitation" discussion, there has been little change in the average amount of annual precipitation in California over the last 100 years. Therefore, the increased variability between wet and dry years in recent decades appears to oscillate around the same annual average established over a longer time frame.

Projections

While variability is not well modeled in large-scale GCMs, some modeling studies suggest that the variability of the hydrologic cycle increases when mean precipitation increases, possibly accompanied by more intense local storms and changes in runoff patterns. However, the results of another long-standing model point to an increase in incidents of drought, resulting from a combination of increased temperature and evaporation along with decreased precipitation. Based on the first model mentioned, this decrease in precipitation would lead to reduced variability in hydrologic cycles. A study that analyzed 20 GCMs in use worldwide suggests that the West Coast may be less affected by extreme droughts than other areas; instead, the region would experience increased average annual rainfall. A separate study that reviewed several GCM scenarios showed increased risk of large storms and flood events for California. Conflicting conclusions about climatic variability and the nature of extreme weather events (e.g., droughts, severe storms, or both) support the need for additional studies with models featuring higher spatial resolution.

Effect on the County

Although various climate change models predict some increase in variability of weather patterns and an increasing incidence of extreme weather events, there is no consistency among the model results, with some predicting increased incidents of droughts and others predicting increased frequency of severe storm events. Given the uncertainty associated with projecting the type and extent of changes in climatic variability and the speculative nature of predicting incidents of extreme weather events, the effect on the County of changing patterns of storms and other extreme weather remains unclear. Increased risk of drought presents increased risk of wildfire hazards. However, most urbanized areas of the County are bounded by agricultural land that is actively farmed or fallow, and are not generally adjacent to any wildlands. As the County continues to grow and development encroaches further into wildland interface areas, the potential for wildland fires will increase.

Sea Level Rise

Status and Trends

One of the major areas of concern related to global climate change is rising sea level. Worldwide average sea level appears to have risen about 0.4 to 0.7 foot over the past century based on data collected from tide gauges around the globe, coupled with satellite measurements taken over approximately the last 15 years. Various gauge stations along the coast of California show an increase similar to the global trends. Data specific to the San Francisco tide gauge near the Golden Gate Bridge shows that the 19-year mean tide level (the mean tide level based on 19-year data sets) has increased by approximately 0.5 foot over the past 100 years. Rising average sea level over the past century has been attributed primarily to warming of the world's oceans and the related thermal expansion of ocean waters, and the addition of water to the world's oceans from the melting of land-based polar ice. Some researchers have attributed most of the worldwide rise to thermal expansion of water, although there is some uncertainty about the relative contributions of each cause.

Projections

A consistent rise in sea level has been recorded worldwide over the last 100 years. Recorded rises in sea level along the California coast correlate well with the worldwide data. Based on the results of various global climate change models, sea level rise is expected to continue. Based on the consistency in past trends, the consistency of future projections, and the correlation between data collected globally and data specific to California, it is reasonably foreseeable that some amount of sea level rise will occur along the California coast over the next 100 years. Although sea level rise is expected to occur, the amount and timing of the increase is uncertain. Various global climate change models have projected a rise in worldwide average sea level of 0.6–1.9 feet by 2099. Although these projections are on a global scale, the rate of relative sea level rise (SLR) experienced at many locations along California's coast is relatively consistent with the worldwide average rate of rise observed over the past century. Therefore, it is reasonable to expect that changes in worldwide average sea level through this century will also be experienced by California's coast. For example, the Governor-appointed Delta Vision Blue Ribbon Task Force has recommended the State plan for a scenario of 16 inches of sea level rise by 2050, and 55 inches by 2100.

Effect on the County

For California's water supply, the largest effect of sea level rise would likely be in the Delta. Increased intrusion of salt water from the ocean to the Delta could degrade the quality of the fresh water that is pumped out for municipal, industrial, and agricultural purposes. This could lead to increased releases of water from upstream reservoirs or reduced pumping from the Delta to maintain compliance with water quality standards. Increased demand for stored surface water could affect other surface water supplies within the applicable watershed; however, until specific demands occur, the effect on regional supplies, especially those dependent on the CVP, remains speculative. While climate change-induced sea level rise is reasonably certain, with respect to the County, even the high-range projections would not directly affect low-lying areas of the County due to the County's location between two mountain ranges and its overall higher elevation compared to sea level. For example, projected seawater rise associated with global climate change is in the range of 0.6–1.9 feet or up to 55 inches (4.6 feet) by the year 2099. Minimum ground surface elevations within the County are near 80 feet in the northwest County at the Pajaro River.

Water Supply

Status, Trends, and Projections

Several recent studies have shown that existing water supply systems are sensitive to climate change. Potential effects of climate change on water supply and availability could directly and indirectly affect a wide range of institutional, economic, and societal factors. Much uncertainty remains, however, with respect to the overall effect of global climate change on future water supplies. For example, models that predict drier conditions (i.e., parallel climate model) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions project increased reservoir inflows and storage and increased river flows. Both projections are equally probable based on which model is chosen for the analyses.

Much uncertainty also exists with respect to how climate change will affect future demand on water supply. Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows. Little work has been performed on the effects of climate change on specific groundwater basins or groundwater recharge characteristics. Changes in rainfall and changes in the timing of the groundwater recharge season would result in changes in recharge. Conversely, warmer temperatures could lead to higher evaporation or shorter rainfall seasons, which could mean that soil deficits would persist for longer time periods, shortening recharge seasons. Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. This additional winter runoff, however, would be occurring at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity. Reductions in spring runoff and higher evapotranspiration, on the other hand, could reduce the amount of water available for recharge. However, the specific extent to which various meteorological conditions will change and the effect of that change on groundwater are both unknown.

A reduced snowpack, coupled with increased rainfall, could require a change in the operating procedures for California's existing dams and conveyance facilities. Tanaka explored the ability of California's water supply system to adapt to long-term climatic and demographic changes using the California Value Integrated Network, a statewide economic-engineering optimization model of water supply management. The results show that agricultural water users in the Central Valley are the most sensitive to climate change, particularly under the driest and warmest scenario, predicting a 37 percent reduction of Central Valley agricultural water deliveries and a rise in Central Valley water scarcity costs by $1.7 billion. Although the results of the study are only preliminary, they suggest that California's water supply system appears "physically capable of adapting to significant changes in climate and population, albeit at a significant cost." Such adaptation would entail changes in California's groundwater storage capacity, water transfers, and adoption of new technology.

Based on the conclusions of current literature regarding California's ability to adapt to global climate change, it is reasonably expected that over time the State's water system will be modified to be able to address the projected climate changes (e.g., under dry and/or warm climate scenarios). Although coping with climate change effects on California's water supply could come at a considerable cost, based on a thorough investigation of the issue, it is reasonably expected that statewide implementation of some, if not several, of the wide variety of adaptation measures available to the State will likely enable California's water system to reliably meet future water demands. For example, traditional water supply reservoir operations may be used, in conjunction with other adaptive actions, to offset the effects of climate change on water supply. Other adaptive measures include better urban and agricultural water use efficiency practices, conjunctive use of surface and ground waters, desalination, and water markets and portfolios. More costly statewide adaptation measures could include construction of new reservoirs and enhancements to the State's levee system.

As described by Medellin et al. 2006, with adaptation to the climate, the water deliveries to urban centers are expected to decrease by only 1 percent, with southern California shouldering the brunt of this decrease. Medellin et al. (2006) used the California Value Integrated Network model under a high-emissions "worst-case" scenario, called a dry-warming scenario. The study found that climate change would reduce water deliveries by 17 percent in 2050. The reduction in deliveries, however, was not equally distributed between urban and agricultural areas. Agricultural areas would see their water deliveries drop by 24 percent while urban areas would see a reduction of only one percent.

There was also a geographic difference: urban water scarcity was almost absent outside of Southern California. In 2003, CEC's Public Interest Energy Research program established the California Climate Change Center (CCCC) to conduct climate change research relevant to the State. Executive Order S-3-05 called on CalEPA to prepare biennial science reports on the potential effects of continued climate change on certain sectors of California's economy. CalEPA entrusted Public Interest Energy Research and its CCCC to lead this effort. The climate change analysis contained in its first biennial science report concluded that major changes in water management and allocation systems could be required to adapt to the change. As less winter precipitation falls as snow, and more as rain, water managers would have to balance the need to construct reservoirs for water supply with the need to maintain reservoir storage for winter flood control. Additional storage could be developed, but at high environmental and economic costs.

Lund et al. (2003) examined the effects of a range of climate warming estimates on the long-term performance and management of California's water system. The study estimated changes in California's water availability, including effects of forecasted changes in 2100 urban and agricultural water demands using a modified version of the California Value Integrated Network model. The main conclusions are summarized as follows: Methodologically, it is useful and realistic to include a wide range of hydrologic effects, changes in population and water demands, and changes in system operations in climate change studies. A broad range of climate warming scenarios show significant increase in wet-season flows and significant decreases in spring snowmelt. The magnitude of climate change effects on water supplies is comparable to water demand increases from population growth in the 21st century. California's water system would be able to adapt to the severe population growth and climate change modeled. This adaptation would be costly, but it would not threaten the fundamental prosperity of the State, although it could have major effects on the agricultural sector. The water management costs represent only a small proportion of California's current economy.

Under some wet-warming climate scenarios, flooding problems could be substantial. In certain cases, major expansions of downstream floodways and alterations in floodplain land use could become desirable. California's water system could economically adapt to all of the climate warming scenarios examined in the study. New technologies for water supply, treatment, and water use efficiency, implementation of water transfers and conjunctive use, coordinated operation of reservoirs, improved flow forecasting, and the cooperation of local, regional, State, and Federal governments can help California adapt to population growth and global climate change. Even if these strategies are implemented, however, the costs of water management are expected to be high and there is likely to be less "slack" in the system than under current operations and expectations.

Effect on the County

As described by the projections above, overall, climate change is expected to have the largest effect on southern California and on agricultural users. Most water scarcity would be felt by agricultural users in southern California. However, it is expected that southern California urban water users, especially in the Coachella Valley, would also experience some scarcity. By the year 2050, almost no urban water scarcity would exist north of the Tehachapi Mountains; however, agricultural water scarcity could increase in the Central Valley. To the extent that available data and projections suggest that climate change would intensify existing wet and dry patterns, resulting in more precipitation during the wet season and less during the dry season, if the appropriate infrastructure is developed to capture winter rainfall, the County could be less affected by these changes than the current agricultural water use regime. However, there is uncertainty with respect to the effects of climate change on future water availability in California, in terms of whether and where effects will occur, and the timing and severity of any such potential effect.

Water Quality

Status and Trends

Water quality depends on a wide range of interacting variables such as water temperatures, salinity, flows, runoff rates and timing, waste discharge loads, and the ability of watersheds to assimilate wastes and pollutants. The water quality of the County has experienced substantial adverse effects from human activities, including contaminant inputs from urban, industrial, and agricultural sources. Various water bodies in the County are considered impaired in their ability to provide beneficial uses (e.g., ecological habitat, recreation, irrigation, drinking water) because of the presence of a variety of pollutants and stressors. Existing water quality problems in the County may generally be placed in the categories of toxic materials, suspended sediments and turbidity, dissolved oxygen fluctuations and low dissolved oxygen levels, and bacteria.

Projections

Climate change could alter numerous water quality parameters in a variety of ways. Higher winter flows could reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers. Increases in water flows can also decrease chemical reactions in streams and lakes, reduce the flushing time for contaminants, and increase export of pollutants to coastal areas. Decreased flows can exacerbate temperature increases, increase the concentration of pollutants, increase flushing times, and increase salinity. Decreased surface-water flows can also reduce nonpoint-source runoff. Increased water temperatures can enhance the toxicity of metals in aquatic ecosystems.

Increases in water temperature alone are often likely to lead to adverse changes in water quality, even in the absence of changes in precipitation. A review performed by Murdoch et al. of the potential effects of climate change on water quality concluded that significant changes in water quality are known to occur as a direct result of short-term changes in climate. The review notes that water quality in ecological transition zones and areas of natural climate extremes is vulnerable to climate changes that increase temperatures or change the variability of precipitation. However, it is also argued that changes in land and resource use will affect water quality comparable to or even greater than those from changes in temperature and precipitation. A separate study performed by Kiparsky and Gleick in 2005 concluded that the net effect on water quality for rivers, lakes, and groundwater in the future is dependent not just on how climatic conditions might change, but also on a wide range of other human actions and management decisions.

Effect on the County

Although there are various ways in which climate change could affect water quality, effects could be positive or negative depending on a variety of conditions. Current water quality conditions in regional surface waters depend in large part on human activities, which would continue to be the case in the future. The effects of climate change on water quality could be alleviated or exacerbated by localized human actions. Given the uncertainty associated with projecting the types and extent of changes in water quality attributable to climate change, along with the variability of effects due to human activities, this potential climate change effect is too speculative to draw a conclusion regarding any direct effect on physical conditions throughout the County.

Agriculture

Status, Trends, and Projections

Numerous studies indicate that climate change may have a profound effect on agriculture in California. Many of the climate change forecasting models used in the studies predict a variety of direct and indirect effects on the sector's agronomic and economic conditions. The degree to which climate change will affect agriculture depends on a variety of factors. Although there remains uncertainty about what form of climate change will occur in California, the majority of research on the subject has focused on the likelihood that a climate-warming pattern will occur.

Although both dry-warm or wet-warm forms of climate warming would affect California agriculture, dry-warm climate scenarios are expected to be the most problematic. Potential effects of climate change include reductions in water supply and water supply reliability, increased evapotranspiration, changes in growing season, and altered crop choices. As discussed in the previous sections, substantial changes may occur in terms of water supply. As a primary consumer of surface water and groundwater, the agricultural sector will face significant challenges in the event of supply reductions. Higher levels of evapotranspiration would result from the increased temperatures and decreased humidity of a dry-warm climate scenario. In turn, evapotranspiration would cause increases in water demand, salt accumulation on plants, soil salinity, and additional water use for reducing saline soils. Such effects could reduce productivity and create adverse economic repercussions for farmers and ranchers in the State.

Changes to the growing season and altered crop choices may negatively or positively affect productivity, water supply, and profitability, depending on the adaptations farmers choose. Most year-2100 models indicate increased market water transfers from agriculture to urban users. Sector productivity could be maintained if water transfers were balanced with irrigation efficiency improvements. Although a dry-warm climate scenario would reduce agricultural water deliveries (24 percent statewide), models demonstrate that agricultural income will be reduced by only six percent and irrigated lands will be reduced by only 15 percent. It is expected that farmers will adopt changes in crop mix, cropping systems, and irrigation technology. These adaptations are likely to reduce the effect of reduced water deliveries on agriculture.

Increased evapotranspiration rates could have a considerable effect on agricultural water demand in the State. The IPCC expects a 3°C increase in temperature over the next century. Research demonstrates that such an increase in temperature will likely result in a five percent increase in plant transpiration, assuming no change in solar radiation (cloudiness) levels and other related variables (wind, humidity, and minimum temperature). Therefore, evapotranspiration alone could create a five percent increase in agricultural water consumption over the next 100 years, or a 0.5 percent increase per decade. Projected increases in CO2 concentrations are expected to increase plant growth by up to 20 percent and in turn lead to increased evapotranspiration. A caveat to this is that increased atmospheric CO2 concentrations may work to decrease plant stomata transpiration rates and thus reduce overall evapotranspiration rates. More research is needed to understand this relationship.

Effect on the County

How climate change affects agricultural operations on private land is a matter of public concern. Climate change may reduce the suitability of lands for agricultural uses. However, while climate change effects may occur, adaptation is also expected that would allow farmers and ranchers to minimize any potential negative effect on agricultural incomes. Adoption of new cropping systems and improved irrigation techniques are expected to allow agriculture to continue in the region. Although costly to farmers, implementation of more efficient irrigation techniques and systems would reduce the amount of water required to achieve the same crop yields, which would reduce overall agricultural water demand and GHG emissions associated with water conveyance.

Other less expensive agricultural practices that may be implemented to lessen the impact of climate change include introduction of later-maturing crop varieties and species, switching crop sequences, sowing earlier, adjusting the timing of field operations, and conserving soil moisture through different tillage methods, among others. However, the extent to which these farming practices will be implemented is dependent on the individual farmers. As of 2010, no regulations exist that would require agricultural operators to implement less GHG intensive practices. Because of the significant uncertainty in projecting future conditions, it would be too speculative to determine the reasonably foreseeable direct effects of climate change on physical conditions in San Benito County.

11.1.2 Regulatory Setting

Federal

- **USEPA Final Prevention of Significant Deterioration (PSD)/Title V GHG Tailoring Rule**. The final "GHG Tailoring Rule," released in May 2010, raised the GHG emission thresholds that define when permits are required for new and existing industrial facilities, and created a phased implementation approach. Specifically, facilities must also include GHG requirements in their Clean Air Act permits if they meet the determined emission thresholds.

- **Final Mandatory Reporting of GHG Rule**. The Final Mandatory Reporting of GHG Rule administered by the USEPA requires large emitters and suppliers of GHGs to collect data and submit annual reports to the USEPA. In San Benito County, industrial sources, including large agricultural operations, may be affected by this rule.

- **CO_2 from Bioenergy and Other Biogenic Sources under the PSD and Title V Programs**. In August 2010, the National Alliance of Forest Owners filed a Petition for Reconsideration related to the PSD and GHG Tailoring Rule. On July 20, 2011, the USEPA deferred for a period of three years the application of the PSD and Title V permitting requirements to biogenic CO_2 emissions from bioenergy and other biogenic stationary sources. Biogenic CO_2 emissions are defined as emissions of CO_2 from a stationary source directly resulting from the combustion or decomposition of biologically based materials other than fossil fuels and mineral sources of carbon. Examples of biogenic CO_2 emission sources include, but are not limited to, CO_2 generated from the biological decomposition of waste in landfills, and CO_2 from the combustion of biogas collected from the landfills, wastewater treatment, or manure management sources.

State

- **Assembly Bill (AB) 1493 (2002).** In 2002, the signing of AB 1493 required that CARB develop and adopt, by January 1, 2005, regulations that achieve the maximum feasible reduction of GHGs emitted by passenger vehicles, light-duty trucks, and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation. Legal challenges delayed the implementation of AB 1493 by CARB. On June 30, 2009, the USEPA granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks, and sport utility vehicles. The federal government will also be adopting California's "Pavley" auto emission standards nationwide, thereby establishing the country's first national auto emissions standard targeting GHGs. In exchange for cooperation from the auto industry, however, both California and President Obama's administration will be implementing the standards more slowly than originally established by California.

- **Assembly Bill 32 (2006), the California Global Warming Solutions Act of 2006**. In September 2006, Governor Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. The goal of the legislation is to reduce California's GHG emissions to 2000 levels by 2010, and to 1990 levels by 2020. California's Executive Order S-3-05 creates a long-range goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. Reducing GHG emissions to 1990 levels means cutting approximately 16 percent from business-as-usual (BAU) emission levels projected for 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. As required under AB 32, CARB approved the 1990 GHG emissions inventory on December 6, 2007, establishing the emissions limit for 2020 as 427 million metric tons CO_2e. CARB also adopted regulations requiring mandatory reporting of GHGs for large facilities on December 6, 2007. All industrial facilities emitting over 25,000 metric tons of CO_2e and any power generation facilities greater than or equal to one

(1) megawatt (MW) will need to report their GHG emission to CARB, the lead air pollution control agency for the state.

- **Climate Change Scoping Plan (2008).** As required by AB 32, CARB adopted a scoping plan in December 2008 showing how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. The Climate Change Scoping Plan contains the main strategies California would implement to achieve 1990 emissions by 2020. For the 2008 Scoping Plan, this was a reduction of 174 million metric tons (MMT) of CO_2e emissions, or approximately 29 percent, from the state's projected 2020 emission level of 596 MMT of CO_2e under the BAU scenario defined in the 2008 Scoping Plan (the "BAU (2008)"). The 2008 Climate Change Scoping Plan also includes a breakdown of the amount of GHG reductions CARB recommends for each emissions sector of the state's GHG inventory. The 2008 Scoping Plan includes several strategies to reduce GHG emissions, including the Low Carbon Fuels Standard (LCFS), the Pavley Rule, the Renewable Portfolio Standard (RPS), and the Sustainable Communities Strategy (SCS). These strategies are discussed more fully in Appendix B, Air Quality and GHG Technical Appendix.

- **First Update to the 2008 Climate Change Scoping Plan (2014).** In response to comments on the 2008 Scoping Plan, and AB 32's requirement to update the Scoping Plan every five years, CARB revised and reapproved the Scoping Plan, and prepared the First Update to the 2008 Scoping Plan in 2014 (the 2014 Scoping Plan). The 2014 Scoping Plan contains the main strategies California will implement to achieve a reduction of 80 million metric tons (MMT) of CO_2e emissions, or approximately 16 percent, from the state's projected 2020 emission level of 507 MMT of CO_2e under the BAU scenario defined in the 2014 Scoping Plan (the "BAU (2014)"). The 2014 Scoping Plan also includes a breakdown of the amount of GHG reductions CARB recommends for each emissions sector of the state's GHG inventory. The 2014 Scoping Plan includes several strategies to reduce GHG emissions, including the Low Carbon Fuels Standard (LCFS), the Pavley Rule, the Advanced Clean Cars (ACC) program, the Renewable Portfolio Standard (RPS), and the Sustainable Communities Strategy (SCS). These strategies are discussed more fully in Appendix B.

- **Senate Bill (SB) 375. Sustainable Communities Strategy (2012).** The Sustainable Communities and Climate Protection Act of 2008 require that CARB develop regional GHG emission reduction targets for passenger vehicles. Each of California's Metropolitan Planning Organizations (MPO) then prepares a SCS that demonstrates how the region will meet its GHG reduction target through integrated land use, housing, and transportation planning. Once adopted by the MPO, the SCS will be incorporated into that region's federally enforceable Regional Transportation Plan (RTP). CARB's SCS goals for the Monterey Bay MPO include a 0-percent-per-capita vehicle miles travelled (VMT) reduction by 2020 and a 5–percent-per-capita reduction by 2035 (CARB 2011d). The General Plan Update is not required to be consistent with the SCS, as made clear in California Government Code §65080(2)(J).

- **Senate Bill X1-2 (2011).** Signed into law April 12, 2011, SB X1-2 increases California's electricity utility Renewable Portfolio Standard (RPS) from 20 percent by 2010 to 33 percent (of total retail sales) by 2020, and extends the RPS to public utilities.

- **Senate Bill 97 (2007).** SB 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA, and required the Governor's Office of Planning and Research (OPR) to prepare amendments to the CEQA Guidelines for GHG emissions. The Amendments became effective on March 18, 2010. The adopted CEQA Guideline amendments require lead agencies to:

  - Calculate or estimate the amount of GHGs produced by a project using either a quantitative modeling approach or a qualitative approach that includes performance standards,

  - Use one or more of several approaches to determine the significance of emissions, including: the amount of the project's emissions increase over existing conditions; or the level of emissions compared to a significance threshold, and/or project compliance with an existing statewide, regional, or local plan to mitigate GHG emissions.

- **Executive Order S-3-05 (2005).** On June 1, 2005, Governor Schwarzenegger signed Executive Order No. S-3-05, which set the following GHG emission reduction targets for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and, by 2050, reduce GHG emissions to 80 percent below 1990 levels. Executive Order No. S-3-05 also instructed the Secretary of the California Environmental Protection Agency to coordinate with other state agencies and report to the Governor and State Legislature by January 2006 (and biannually thereafter) on progress made toward meeting the specified GHG emission reduction targets and the impacts of global climate change on California. This Executive Order is discussed for information disclosure purposes. (See 63 Ops. Cal. Atty. Gen. 583 (1980); 75 Ops. Cal. Atty. Gen. 263 (1992); Lukens v. Nye (1909) 156 Cal. 498, 501.)

- **CAPCOA.** CAPCOA has prepared three guidance documents that together describe methods for quantifying GHG emissions and mitigation measures. The first document, *CEQA and Climate Change*, was released in 2008 and describes methods to estimate and mitigate GHG emissions from projects subject to CEQA. This CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The second document, *Model Policies for Greenhouse Gases in General Plans*, provides background information, examples, references, links, and a systematic worksheet to help local governments in moving toward GHG considerations in General Plan updates, or in the development of specific Climate Action Plans. In cooperation with the Northeast States for Coordinated Air Use Management and the National Association of Clean Air Agencies, CAPCOA released a third document, *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, in August 2010. The document provides methodologies to quantify project-level mitigation of GHG emissions associated with land use, transportation, energy use, and other related project areas. The mitigation measures quantified in this document generally correspond to measures previously discussed in CAPCOA's earlier reports.

Local

- **Monterey Bay Unified Air Pollution Control District.** The MBUAPCD, as the regional air agency for the North Central Coast Air Basin (NCCAB), has air-permitting authority in San Benito County. In February 2008, the MBUAPCD issued revised adopted guidance for assessing and reducing the impacts of project-specific air quality emissions: *CEQA Air Quality Guidelines*. This document included a reserved section to address project-specific GHG emissions: Climate Change and Assessment of Project Impacts from Greenhouse Gases.

  The MBUAPCD has considered (although not yet formally adopted as of the date of this RDEIR) thresholds for GHG emissions as discussed in a February 2014 memorandum to its Advisory Committee (MBUAPCD 2014). The examined thresholds distinguish between stationary sources and land-use projects. For land-use projects, the thresholds under consideration are:

  - 2,000 MT CO_2e per year, or
  - Incorporate mitigation measures to reduce GHG emissions by 16 percent, relative to a BAU (2014), or
  - Compliance with an adopted Climate Action Plan.

11.2 ENVIRONMENTAL EFFECTS

The analysis examines whether the proposed 2035 General Plan would result in a significant increase in GHG emissions.

11.2.1 Significance Criteria

Section 15064.4 of the CEQA Guidelines recommends the following approach to determine the significance of impacts from GHG emissions:

a. The determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in §15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of GHG 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 GHG emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology 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; and/or

    2. Rely on a qualitative analysis or performance-based standards.

b. A lead agency should consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment:

    1. The extent to which the project may increase or reduce GHG 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 GHG emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG 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.

To date, the MBUAPCD has not adopted significance thresholds for GHG emissions, but it has considered adopting thresholds for GHG emissions as discussed in a February 2014 memorandum to its Advisory Committee (MBUAPCD 2014). The examined thresholds distinguish between stationary sources and land-use projects. As noted above, for land-use projects, the thresholds under consideration are:

- 2,000 MT CO2e per year, or
- Incorporate mitigation measures to reduce GHG emissions by 16 percent relative to a BAU (2014), or
- Compliance with an adopted Climate Action Plan.

In the absence of adopted significance criteria from MBUAPCD, San Benito County selected, and the analysis in this chapter uses, the significance criteria (quoted below) found in Appendix G of the State CEQA Guidelines (OPR 2014). San Benito County has broad discretion to select a threshold of significance. As identified in § 15064.7(c) of the CEQA Guidelines, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence. Appendix G of the State CEQA Guidelines has two significance thresholds for GHG emissions. Under these thresholds, a project's GHG emissions would be significant if the project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (VII.a) or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. (VII.b)

Threshold of Significance

The threshold selected for this RDEIR to analyze whether the project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment is a 29 perent reduction from the BAU (2008), which is consistent with CEQA guidance and CAPCOA guidance (CAPCOA 2008). Because this threshold is more stringent than the threshold of a 16 percent reduction from the BAU (2014) that is being considered by MBUAPCD, the selected threshold is consistent with both the CARB 2008 and 2014 Scoping Plans. The analysis seeks to determine whether the 2035 General Plan impacts would exceed the significance threshold by comparing to BAU (2008) emissions. The analysis considers two possible growth scenarios: Scenario 1 and Scenario 2.

The BAU (2008) approach represents GHG emissions from Scenario 1 that would occur in the absence of any existing state-mandated GHG emission reductions, primarily those resulting from CARB's *2008 Climate Change Scoping Plan* and in the absence of any reductions associated with 2035 General Plan policies. According to the 2008 Scoping Plan, if the mitigated project reduces GHG emissions by 29 percent or more as compared to the BAU (2008) approach, then GHG impacts are considered less than significant. If mitigation is unavailable to achieve at least a 29 percent reduction, then GHG emissions are significant under this criterion.

Using the threshold of 29 percent reduction from BAU (2008) is a conservative approach. For comparison, this RDEIR also presents a BAU analysis consistent with the 2014 Scoping Plan definition of BAU (the "BAU (2014)"), along with a comparison to the MBUAPCD's considered 16 percent reduction from the BAU (2014) significance threshold. For clarity, when the BAU is calculated according to the methods of the 2008 Scoping Plan, it is called the BAU (2008). When the BAU is calculated to incorporate the Pavley standards and 20 percent RPS, consistent with the 2014 Scoping Plan, it is called the "BAU (2014)." Additionally, the threshold can be applied to both 2020 and 2035 emissions forecasts as they relate to the BAU emissions in 2020 and 2035.

The County considered a threshold linked to the state's 2050 goals. As noted above, Executive Order S-03-05 directs California state agencies to emit 80 percent less GHGs in 2050 than were emitted in 1990. As of 2004, California was emitting 12 percent more GHG emissions than in 1990. For California to emit 80 percent less than it emitted in 1990, the emissions would need to be only 18 percent of the 2004 emissions. Accounting for a population growth from 35,840,000 people in 2004 to approximately 55,000,000 people in 2050, the emissions per capita would have to be only 12 percent of what they were in 2004. This means 88 percent reductions in per capita GHG emissions from today's emission intensities must be realized in order to achieve the 2050 GHG goals set forth in the Executive Order.

CARB's scoping plan provides insight as to how it anticipates California will achieve the 2050 reduction goal in Governor Schwarzenegger's Executive Order S-03-05:

> "Reducing our greenhouse gas emissions by 80 percent will require California to *develop new technologies* that dramatically reduce dependence on fossil fuels, and *shift into a landscape of new ideas, clean energy, and green technology*. The measures and approaches in this plan are designed to accelerate this necessary transition, promote the rapid development a cleaner, low carbon economy, create vibrant livable communities, and improve the ways we travel and move goods throughout the state… [T]he measures needed to meet the 2050 goal are too far in the future to define in detail," ((CARB 2008), p. ES-2; italics added).

The California Energy Commission (CEC) and CARB also have published an alternative fuels plan that identifies "challenging but plausible ways to meet 2050 [transportation] goals." (CARB/CEC 2007). The main finding from this analysis is that reducing today's average per capita driving miles by about 5 percent (or back to 1990 levels), in addition to the decarbonization strategies listed below, would achieve Governor Schwarzenegger's goal to reduce transportation-related emissions to 80 percent below the 1990 levels. The approach described below is from the CEC/CARB report, found on pages 67-68:

> An 80 percent reduction in GHG emissions associated with personal transportation can be achieved even though population grows to 55 million, an increase of 50 percent. The following set of measures could be combined to produce this result:
>
> 1. Lowering the energy needed for personal transportation by tripling the energy efficiency of on-road vehicles in 2050 with:
>   a. Conventional gas, diesel, and flexible fuel vehicles (FFVs) averaging more than 40 miles per gallon (mpg).
>   b. Hybrid gas, diesel, and FFVs averaging almost 60 mpg.
>   c. All electric and plug-in hybrid electric vehicles (PHEVs) averaging well over 100 mpg (on a greenhouse gas equivalents (GGE) basis) on the electricity cycle.
>   d. Fuel cell vehicles (FCVs) averaging over 80 mpg (on a GGE basis).
> 2. Moderating growth in per capita driving, reducing today's average per capita driving miles by about 5 percent or back to 1990 levels.
> 3. Changing the energy sources for transportation fuels from the current 96 percent petroleum-based to approximately:
>   a. 30 percent from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.
>   b. 30 percent from transportation biofuels.
>   c. 40 percent from a mix of electricity and hydrogen.
> 4. Producing transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result in, on

average, at least 80 percent lower life cycle GHG emissions than conventional fuels.

5. Encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

As indicated by CEC and CARB's preliminary plans with respect to the transportation sector, significant and drastic changes will need to be made across every economic sector to reduce emissions to 80 percent below 1990 levels by 2050. Most of the actions recommended by CARB (see items 1–5 above) relate to decarbonizing the fuel supply, which is outside the County's control. In light of the uncertainties regarding the specific reduction strategies and methods needed for California to achieve the 2050 reduction goal identified in Governor Schwarzenegger's Executive Order S-03-05, the County has determined not to use this executive order as a threshold of significance. Nevertheless, the analysis evaluates qualitatively the consistency of the 2035 General Plan with item 2 (moderating growth in per capita driving, reducing average per capita driving miles in 2005 by about 5 percent by 2050) and item 5 (encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people) in CARB's list of actions needed to meet the reduction goals in Executive Order S-03-05.

11.2.2 Analysis Methodology

A detailed description of the GHG emission estimation methodologies is available in Appendix B. Separate methodologies were used to estimate GHG emissions for each emission category: transportation, area sources, electricity, natural gas, water and wastewater, solid waste, and agriculture. The methodologies are based on emission factors and mitigation efficiencies developed by the USEPA, CARB, the California Climate Action Registry, and CAPCOA.

Chapter 4 describes the growth scenarios analyzed by this RDEIR, which are Scenarios 1 and 2. Emissions were estimated for both scenarios, as discussed in Appendix B. The 2035 General Plan allows Scenario 1 growth. Scenario 2 growth is more speculative because it would not be allowed under the existing 2035 General Plan proposal without further study and general plan amendments but is analyzed in this RDEIR for informational purposes.

The first step involved estimating 2010 GHG baseline emissions for unincorporated San Benito County (this date is based on the date of the NOP). Estimates were made using 2010 San Benito County activity data, along with appropriate California Emission Estimator Model (CalEEMod®) data specific to San Benito County, as described in Appendix B. CalEEMod calculates annual GHG emissions which can be used in support of analyses in environmental documents such as EIRs and Negative Declarations used to support a CEQA evaluation.

CalEEMod utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources such as the USEPA AP-42 emission factors, CARB on-road and off-road equipment emission models such as the Emission Factor model (EMFAC) and the Off-road Emissions Inventory Program model (OFFROAD), and studies commissioned by California agencies such as the CEC and CalRecycle.

The second step involved estimating 2020 and 2035 BAU (2008) emissions for unincorporated San Benito County. These emissions were estimated using 2020 and 2035 activity data related to the 2035 General Plan proposed land uses, but using emission factors per unit of activity data representative of the absence of any existing state-mandated GHG emission reductions, primarily those resulting from CARB's Scoping Plan, and in the absence of any reductions associated with 2035 General Plan policies.

The third step involved estimating 2020 and 2035 project conditions GHG emissions for unincorporated San Benito County. These emissions were estimated using 2020 and 2035 estimated activity data and using emission factors specific to the respective years. Unlike the 2020 and 2035 BAU estimates, the project conditions 2020 and 2035 GHG emissions account for emission reduction programs included in CARB's scoping plan. These include CARB's LCFS, the Pavley Rule, the ACC program, the RPS, and the SCS, as described earlier in the Regulatory Setting Section (CARB 2010; CARB 2011d; PG&E 2011). In addition to the state regulatory programs to reduce GHG, estimated GHG emissions for each Scenario under the project conditions include reductions attributable to the 2035 General Plan. Wood-burning fireplaces are included in new construction emissions estimates in BAU (2008) and the project conditions. A mitigated scenario, in which the emissions forecasts under project conditions include a restriction on wood-burning fireplaces in new construction per the proposed General Plan policies for Scenario 1 and 2, is also considered. This restriction comes from mitigation measure AIR-1. Many of the policies listed in Table 11-1 were not quantifiable, such as policies that encourage certain growth or sustainability strategies, and thus were not included in the forecasted emissions under the project condition.

For comparison, as a fourth step, emissions were estimated for the 2020 and 2035 BAU (2014) scenarios. As discussed in the 2014 Scoping Plan, the Pavley standards were implemented at the time of the 2014 Scoping Plan and therefore are considered business as usual in the definition of BAU (2014). In addition, the Renewables Portfolio Standard of 20 percent renewable energy was included in the definition of BAU (2014). These are the only differences in the BAU (2008) and BAU (2014).

Construction activities would generate GHG emissions through the use of on- and off-road construction equipment in new development or redevelopment projects. One-time GHG emissions from short-term construction associated with buildout of the 2035 General Plan Update were estimated in CalEEMod for the net new residential, commercial, and industrial land uses. Construction was assumed to begin in 2015 and occur each year at the same rate. Accordingly, emissions were estimated for the full buildout, then averaged over the 20 years between 2015 and 2035, the period covered by this General Plan Update. However, given the programmatic nature of this analysis, no project-specific details are known at this time, so this estimate of annual construction emissions from CalEEMod represents an approximate value for construction emissions for the 2035 General Plan Update buildout. In addition to this programmatic analysis, it is anticipated that individual development projects under the 2035 General Plan would prepare additional project-level evaluations of GHG emissions generated as a result of the specific development proposal being considered.

As with all emissions estimation methods, there are limitations and uncertainties associated with the methods used for this analysis. In accordance with §15064.4 of the CEQA guidelines, a good-faith effort was made, based on scientific and factual data available, to calculate and estimate the GHGs resulting from the project. Emissions estimation was done using CalEEMod version 2013.2.2; CalEEMod is the recommended model to estimate GHG emissions by the MBUAPCD for use in CEQA analyses. CalEEMod was used to estimate emissions for all but agricultural sources, which are not covered by CalEEMod. Inputs to CalEEMod for transportation emissions come from the VMT data in Chapter 19 of this RDEIR. Inputs to CalEEMod for emissions from area sources, electricity, natural gas, water and wastewater, and solid waste are consistent with the land use and jobs data in Chapter 19 of this RDEIR. Estimations of inputs to CalEEMod use the EMFAC2011 and OFFROAD2007 models, as well as California Commercial End-Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) data, which are also standard resources. Estimates of GHG emissions from agriculture rely on the most up-to-date agricultural data and trends available for the County, as shown in Appendix B. CalEEMod outputs of emissions from electricity and natural gas incorporate the most recent statewide survey data, as discussed in Appendix B; which contains detailed tables of all inputs to CalEEMod, as well as a narrative discussion of the calculations. The tables of Appendix B also summarize total unincorporated County GHG emissions for 2010, 2020, and 2035.

As discussed above, since CalEEMod does not estimate emissions from livestock and agriculture, emissions associated with agriculture in the unincorporated County were estimated outside of CalEEMod by using a scaled approach based on the most up-to-date agricultural data available, which is discussed in more detail in Appendix B. This approach considered agricultural emissions from the following sources, each of which was considered based on historical data in agricultural land uses in the County, including: enteric fermentation and manure from livestock; exhaust from agricultural equipment; fugitive dust from agricultural equipment and agricultural land; fertilizer use; and water.

11.2.3 Environmental Impacts

The following discussion examines the potential impacts of the proposed 2035 General Plan based on the impact threshold criterion described above. Table 11-1 summarizes 2035 General Plan policies that would mitigate environmental impacts associated with GHGs, including an explanation of how the policy would avoid or reduce impacts.

Table 11-1 2035 General Plan Policies that Mitigate GHG Emissions Impacts

Policies	How the Goals/Policies Avoid or Reduce Impacts
Land Use Element	
LU-1.1: Countywide Development The County shall focus future development in areas around cities where infrastructure and public services are available, within existing unincorporated communities, and within a limited number of New Communities, provided they meet the requirements of goal section LU-7.	Focuses and encourages development primarily in areas of existing infrastructure and public services. Reduces vehicle miles traveled and thereby reduces GHG emissions.
LU-1.2: Sustainable Development Patterns The County shall promote compact, clustered development patterns that use land efficiently; reduce pollution and the expenditure of energy and other resources; and facilitate walking, bicycling, and transit use.	Encourages sustainable development patterns that reduce energy use and encourage walking, bicycling, and transit use. Reduces VMT and associated GHG emissions.
LU-1.5: Infill Development The County shall encourage infill development on vacant and underutilized parcels within Hollister and the City of San Juan Bautista's city limits and unincorporated communities in order to maximize the use of land within existing urban areas, minimize the conversion of productive agricultural land and open spaces, and minimize environmental impacts associated with new development.	Encourages infill development that reduces VMT while preserving agricultural land. Reduces vehicle miles traveled and thereby reduces GHG emissions.
LU-2.1: Sustainable Building Practices The County shall promote and, where appropriate, require	Encourages whole-system sustainable building practices. Reduces the consumption of

Policies	How the Goals/Policies Avoid or Reduce Impacts
sustainable building practices that incorporate a "whole system" approach to designing and constructing buildings that consume less energy, water, and other resources; facilitate natural ventilation; use daylight efficiently; and are healthy, safe, comfortable, and durable.	natural gas and electricity from new and existing structures and thereby reduces GHG emissions.
LU-2.2: Sustainable Building Practices The County shall encourage sustainable building practices that go beyond the minimum requirements of the Title 24 CalGreen Code (i.e., Tier 1 or Tier 2 measures) and to design new buildings to achieve a green building standard such as Leadership in Energy and Environmental Design (LEED).	Encourages energy efficient buildings that go beyond code requirements. Reduces the consumption of natural gas and electricity from new and existing structures and thereby reduces GHG emissions.
LU-2.3: Energy Conservation Standards for New Construction The County shall cooperate with the local building industry, utilities, and air district to promote enhanced energy conservation standards for new construction.	Encourages cooperation with other agencies and industry regarding energy standards in new construction. Reduces consumption of natural gas and electricity from new and existing structures and thereby reduces GHG emissions.
LU-2.4: Solar Access The County shall encourage new residential subdivisions and new commercial, office, industrial, and public buildings to be oriented and landscaped to enhance natural lighting and solar access in order to maximize energy efficiency.	Encourages solar orientation for new buildings. Increases energy efficiency, thereby reducing energy consumption and GHG emissions.
LU-2.5: Energy Retrofits The County shall promote the retrofitting of existing buildings with new and innovative energy and water efficiency technologies and encourage structures being renovated to be built to a green building standard such as Leadership in Energy and Environmental Design (LEED).	Encourages energy efficiency retrofits to existing buildings. Reduces the consumption of natural gas and electricity from new and existing structures and thereby reduces GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
LU-2.6: Green Building Standard The County shall require all new County buildings be constructed to green building standards, such as Leadership in Energy and Environmental Design (LEED), and all existing County buildings to be retrofitted with energy efficient technologies.	Requires County buildings to be built to green building standards. Reduces the consumption of natural gas and electricity from new structures and therefore reduces GHG emissions.
LU-2.7: Sustainable Location Factor The County shall encourage new development in locations that provide connectivity between existing transportation facilities to increase efficiency, reduce congestion, and improve safety.	Requires new development to be located adjacent to transportation corridors. Reduces VMT and GHG emissions.
LU-3.3: Increased Agricultural Sustainability and Energy Efficiency The County shall encourage and support farms, vineyards, and ranches that seek to implement programs that increase the sustainability of resources, conserve energy, and protect water and soil in order to bolster the local food economy, increase the viability of diverse family farms and improve the opportunities for farm workers.	Encourages sustainable agricultural practices. Reduces energy consumption from agricultural operations, which would reduce GHG emissions.
LU-4.2: Urban Residential Development The County shall ensure new urban residential development (e.g., greater than two units per acre) occurs in areas that have, or can provide, adequate public facilities and services to support such uses, and are near major transportation networks, transit and/or bicycle corridors, pedestrian paths and trails, and employment centers.	Encourages residential development to be located near transportation networks and employment centers. Reduces VMT and associated GHG emissions.
LU-4.4: Multi-Family Residential The County shall require multi-family housing to be located within walkable mixed-use neighborhoods that include uses such as employment centers, shopping districts, civic uses, and other forms of residential development, and have good automobile access and are near transit if possible.	Encourages residential development to be located near transportation networks and walkable neighborhoods. Reduces VMT and associated GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
LU-4.5: Innovative Site Planning and Residential Design The County shall encourage new residential developments to use innovative site planning and features that increase the design quality, and efficiency, and water conservation of structures and landscapes while protecting the surrounding environment.	Encourages residential development that conserves water. Reduces water use and associated energy use, thereby reducing GHG emissions.
LU-5.1: New Regional Commercial Centers The County shall encourage new regional commercial centers to be located at or near existing or future highway interchanges and major intersections and along existing or future transit, bicycle, and pedestrian and trail corridors, and include transit, bicycle, and pedestrian facilities.	Encourages regional commercial centers to be located near highway interchanges and transportation infrastructure. Reduce VMT to and from commercial centers and offices and associated GHG emissions.
LU-5.3: New Neighborhood Commercial The County shall allow new neighborhood commercial uses so long as they are located within reasonable distance of a community, are centrally located to serve an unincorporated community that is lacking neighborhood commercial services, or where the need for expanded neighborhood commercial services can be demonstrated. The County shall ensure neighborhood commercial uses connect to surrounding residences along transit corridors and bicycle and pedestrian paths, and include appropriate transit, bicycle, and pedestrian facilities.	Limits new neighborhood commercial to locations near residences. Reduces VMT to and from commercial centers and offices and associated GHG emissions.
LU-5.6: Mixed-Use Development The County shall encourage both vertical and horizontal mixed-use development within community centers and near or along transportation and transit corridors, bicycle paths, and pedestrian and trail routes as a means of providing efficient land use, housing, and transportation options for County residents. The County shall ensure that mixed use developments include appropriate transit, bicycle, and pedestrian facilities.	Encourages mixed-use development by reducing the distances between residences and employment centers, which would reduce VMT to and from commercial centers and offices and associated GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
LU-6.2: Employment Center Access Where appropriate, the County shall encourage new employment centers and industrial developments near existing or future highway interchanges and major intersections and along existing or future transit, bicycle, and pedestrian and trail corridors, and include transit, bicycle, and pedestrian facilities. The County shall ensure that industrial uses and employment center developments include appropriate transit, bicycle, and pedestrian facilities.	Encourages new employment centers and industry to locate near transportation infrastructure. These policies would encourage alternative modes of transportation, reduce VMT associated with employment centers and industry, and reduce GHG emissions.
LU-6.4: Sustainable Technologies The County shall encourage all employment and industrial projects to incorporate sustainable technologies including energy and water efficient practices.	Encourages energy and water efficiency practices in employment centers and industrial projects, thereby reducing GHG emissions.
LU-8.5: Sustainable New Communities The County shall encourage New Communities to be planned and designed to reflect the spirit and intent of sustainable growth strategies, such as providing: a. easy access to transit and bicycle networks; b. a balance between jobs and housing; walkable streets with shade trees and sidewalks; c. good internal connectivity and good connectivity to the community at large; d. a reduced parking footprint; a transportation demand management program; e. institutions such as schools within walking distance from residences; f. distinct, compact, walkable neighborhoods, each with a recognizable center; g. habitat avoidance and conservation plans; and h. restoration of resources such as riparian corridors; and permanent preservation of open space.	Encourages that communities be built to LEED standards. Community environmental design requirements would reduce energy use and GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
Economic Development Element	
ED-5.6: Safe and Convenient Tourist Travel The County, in coordination with Council of San Benito County Governments (SBCOG), should enhance tourists' ability to travel safely and conveniently to different destinations throughout the County. This should include developing strategies to ensure tourists travel safely on rural roads and to promote an integrated, multi-modal transportation system that includes bicycle rental services, pedestrian connections, and hiking, biking and riding trails.	Requires tourism enhancements to encourage multi-model travel. Reduces VMT and associated GHG emissions.
ED-6.1: Workforce Education and Training Promotion The County shall support programs that educate the local workforce on: conventional, productive, sustainable, and organic agriculture concepts, including water conservation strategies; emerging high-tech industries; and alternative energy production.	Provides program support for water conservation and alternative energy production. Support for green technology sectors and sustainable agriculture reduces energy use and GHG emissions.
Circulation Element	
C-1.1: Intermodal Connectivity The County shall ensure that, whenever possible, roadway, highway, public transit systems, and pedestrian and bicycle trails are interconnected with other modes of transportation.	Ensures interconnections of travel options. These policies encourage a more efficient circulation system that will reduce GHGs.
C-1.2: Complete Streets To promote a road and street network that accommodates cars without requiring car-dependence, the County shall plan for use of roadways by all vehicle types and users, including automobiles, trucks, alternative energy vehicles, agricultural equipment, transit, bicyclists, and pedestrians, when constructing or modifying roadways. Additionally, the County shall plan its road and street network to reflect a context-sensitive approach to the design of thoroughfare assemblies, where the allocation of right-of-way and the	Promotes complete streets program that discourages car dependence. Encourages a more efficient circulation system that will reduce GHGs from mobile sources.

Policies	How the Goals/Policies Avoid or Reduce Impacts
facilities provided within are based on the intended character, whether urban or rural, of a particular location (urban context). Roads and streets within communities shall be designed to support and encourage walkability as a response to their context, whereas roads in open areas of the County shall be designed primarily for vehicular circulation. As such, thoroughfares that serve both open areas and communities in the County shall change as the surrounding urban context varies. This includes: a. Encouraging thoroughfare designs that are context sensitive, such as those recommended in Designing Walkable Urban Thoroughfares: A Context Sensitive Approach by the Institute of Transportation Engineers (ITE); b. Supporting urban design principles that promote walkability within communities to include: i. A mix and variety of land uses designed to be relatively compact and in proximity to one another; ii. Buildings that are oriented toward streets, with appropriately narrow setbacks and functional entries directly fronting onto sidewalks; iii. Pedestrian-scaled architecture, landscape, and thoroughfares designed to provide engaging sidewalk views and comfort to pedestrians traveling at slow speeds; and iv. Circulation networks that provide an interconnected system of streets and open spaces with relatively small block lengths; c. Creating multi-modal street connections in order to establish a comprehensive, integrated, and connected transportation network; d. Incorporating pedestrian and bicycle facilities, where appropriate and feasible, that promote safety and maximize access;	

Policies	How the Goals/Policies Avoid or Reduce Impacts
e. Planting street trees adjacent to curbs and between the street and sidewalk to provide a buffer between the pedestrian and the automobile, where appropriate; f. Incorporating traffic calming devices such as roundabouts, bulb-outs at intersections, and traffic tables; and g. Coordinating with other agencies and cities to ensure connections are made between jurisdictions.	
C-1.10: Street Network Plans The County shall require project applicants to prepare a street network plan for any subdivision proposal located near existing, approved, or proposed development (county or city). The plan shall illustrate how adjoining properties will inter-connect over the long-term and how the plan will improve pedestrian and bicycle connectivity. The plan shall include an interim access plan and a long-term plan that consolidates vehicular access onto arterials/collectors (via street network design, or some other method).	Encourages complete street interconnections between distinct subdivisions. Encourages bicycle and pedestrian travel, reducing VMT, and associated GHG emissions.
C-2.1: Bicycle, Pedestrian and Equestrian Systems The County shall encourage complete, safe, and interconnected bicycle, pedestrian, and equestrian systems, as appropriate to the context, that serve both commuter travel and recreational use, and provide access to major destinations in the County.	Encourages interconnected bicycle and pedestrian systems. Encourages the use of alternative modes of transportation, such as bicycling and walking, and would reduce GHG emissions.
C-2.2: Pedestrian and Bike Path Construction The County shall plan, design, and construct pedestrian routes and bikeways consistent with the 2009 County Bikeway and Pedestrian Master Plan or its succeeding plan. Priority shall be given to bicycle commuting routes, routes to schools, bike lanes on all new streets classified as arterials or collectors, and bike lanes on or adjacent to existing heavily traveled roads.	Encourages interconnected bicycle and pedestrian systems. Encourages the use of alternative modes of transportation, such as bicycling and walking, and would reduce GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
C-2.8: Sidewalks in Subdivisions The County shall require project applicants to provide sidewalks or other safe and convenient accommodations for pedestrians (e.g., shared-space streets) on all new roads or modifications to existing roads, in accordance with County roadway design standards.	Encourages pedestrian amenities. Encourages walking, which would reduce GHG emissions.
C-3.12: Commuter Rail in Hollister The County shall support efforts to extend Caltrain service from Gilroy to Hollister to link San Benito County to San Jose and San Francisco.	Supports use of train travel rather than automobile travel. Encourages the use of public transit and would reduce VMT and GHG emissions.
C-4.2: Ridesharing Promotion The County shall support SBCOG programs that promote the use of ridesharing, vanpooling, and carpooling to decrease vehicle trips on road systems in the County.	Supports ridesharing and carpooling programs. Encourages less single-occupant travel, which will reduce VMT and GHGs.
C-4.3: Employer Incentives The County shall encourage employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting, employee education, and preferential parking for carpools/vanpools.	Encourages employers to support policies that promote ridesharing and multiple occupancy commutes to reduce emissions per passenger. Also encourages alternative transportation that will reduce VMT and GHGs.
C-4.4: San Benito County Employee Incentive Programs As a major employer, San Benito County shall demonstrate leadership in the implementation of programs encouraging the use of alternative modes of transportation by its employees. Example programs may include: • Preferential carpool parking and other ridesharing incentives; • Flexible working hours or telecommuting where consistent with job duties and customer service needs; • Secure bicycle parking; and • Incentives for using transit, such as discounted passes or tokens.	Encourages San Benito County to demonstrate leadership regarding support of policies that promote ridesharing and multiple occupancy commutes to reduce emissions per passenger. Also encourages alternative transportation that will reduce VMT and GHGs.

Policies	How the Goals/Policies Avoid or Reduce Impacts
Public Facilities and Services Element	
PFS-1.3: Efficient Infrastructure and Facilities The County shall update and replace public facilities and infrastructure with technologies that improve energy efficiency and conserve water, when feasible.	Requires that County facilities implement energy efficiency improvements. Reduces energy use and associated GHG emissions.
PFS-1.6: Adaptive Facilities and Services The County shall monitor expected impacts of climate change on public facilities and services and make appropriate adaptive modifications and upgrades as needed. Where public facilities and services are provided by other agencies, the County shall assist with identifying impacts and solutions.	Requires that the County take measures to adapt to climate change. Ensures implementation of climate change adaptation measures.
PFS-2.1: Efficient Operations The County shall maintain facilities and service standards and conduct operations in a manner that meets community needs in an efficient manner, conserves resources, and reduces the County's contribution to greenhouse gas emissions.	Requires that the County operate its facilities in an energy efficient manner that reduces GHG emissions. Reduces energy use and associated GHG emissions.
PFS-2.2: Sustainable Plans and Operations The County shall integrate sustainability concepts, greenhouse gas reduction strategies, and climate change resiliency planning into County facility and service plans and operations.	Requires that the County become more climate change resilient. Encourages GHG reduction strategies and climate resiliency planning into County operations.
PFS-2.3: Reducing GHG Emissions The County shall reduce GHG emissions from County facilities and activities.	Acknowledges fundamental goal of the County to take steps to reduce GHG emissions.
PFS-2.4: Monitoring Efficiency and Conservation The County shall monitor and regularly report on its progress in implementing energy efficiency, water conservation, and waste reduction measures and in meeting its greenhouse gas reduction targets and goals for County facilities and activities.	Requires that the County monitor progress in energy efficiency, water conservation, and waste conservation. Provides feedback regarding how well the County is doing to meet its GHG reduction goals.

Policies	How the Goals/Policies Avoid or Reduce Impacts
PFS-2.5: Sustainability Retrofits The County shall increase energy efficiency in older County buildings through energy efficiency and retrofits (e.g., compact florescent light bulbs, motion-activated lighting, computerized HVAC systems), renewable energy generation (e.g., photovoltaic cells), and water conservation retrofits (e.g., low flow toilets and sinks, drip irrigation, water reuse).	Requires energy efficiency improvements in older buildings. Ensures that older buildings attain energy retrofits, thereby reducing GHG emissions.
PFS-2.6: Sustainable New Buildings In building new facilities and buildings, the County shall achieve a high standard (e.g., equivalent to LEED® certification) of energy efficiency and water conservation and employ renewable energy technologies.	Requires that new County buildings are energy efficient, conserve water, and use renewable energy. Ensures that County buildings will reduce GHG emissions.
PFS-2.7: New Fleet and Equipment Purchases The County shall purchase lower-emission or electric vehicles and energy efficient equipment when purchasing new fleet vehicles and maintenance and construction equipment.	Requires that the County purchase energy efficient vehicles in their fleets. Ensures that County's vehicles will have a lower GHG footprint.
PFS-2.8: Energy and Fuel Sources The County shall use available clean energy and fuel sources to operate its buildings, vehicles, and maintenance/construction equipment.	Requires that the County use clean energy sources to operate facilities. By using clean energy sources, GHG emissions are reduced.
PFS-2.9: Fleet Operations The County shall require County staff to reduce vehicle idling, reduce trips, establish efficient routing, and use public transportation, carpooling, and alternate modes of transportation when available to reduce energy consumption and costs.	Requires County staff to reduce energy consumption associated with travel. Ensures that County will reduce its GHG emissions associated with travel.

Policies	How the Goals/Policies Avoid or Reduce Impacts
PFS-2.10: Purchasing Preferences The County shall use Environmentally Preferable Purchasing (EPP) when carrying out operations and activities, including giving preference to products that reduce or eliminate indirect greenhouse gas emissions and promote recycling.	Requires that County purchases account for indirect GHG emissions. Reduces GHG emissions associated with procurement activities.
PFS-2.11: Preference for Reduced- Emission Equipment The City shall give preference to contractors using reduced-emission equipment for County construction projects and contracts for services, as well as businesses which practice sustainable operations.	Requires that the County give preference to contractors using reduced emission equipment. Reduces GHG emissions and encourages contractors to use energy efficient vehicles.
PFS-7.7: Waste-to-Energy Projects The County shall promote technologies, including biomass and biofuels, that use solid waste as an alternative energy source. The County shall support efforts to develop and install waste-to-energy projects in appropriate locations.	Promotes use of biomass and biofuels from solid waste. Reduces GHG emissions by converting methane from solid waste into fuel.
PFS-2.5: Sustainability Retrofits The County shall increase energy efficiency in older County buildings through energy efficiency and retrofits (e.g., compact florescent light bulbs, motion-activated lighting, computerized HVAC systems), renewable energy generation (e.g., photovoltaic cells), and water conservation retrofits (e.g., low flow toilets and sinks, drip irrigation, water reuse).	Requires energy efficiency improvements in older buildings. Ensures that older buildings attain energy retrofits, thereby reducing GHG emissions.
Natural and Cultural Resources Element	
NCR-4.8: Water Education The County shall encourage water districts to provide public education to encourage existing homeowners to adopt water conservation practices for landscaping and interior plumbing.	Promotes education regarding water conservation practices. Supports efficient water use, which will reduce GHG emissions associated with energy expenditures to develop, transport, or treat water.

Policies	How the Goals/Policies Avoid or Reduce Impacts
NCR-4.10: Water Efficient Landscape Ordinance The County shall adopt a Water Efficient Landscape Ordinance, consistent with the Model Water Efficient Landscape Ordinance prepared by the California Department of Water Resources, to require greater use of regionally native drought-tolerant vegetation, limitations on the amount of turf in residential development, and other measures as appropriate.	Encourages landscaping that minimizes water use. Supports efficient water use, which will reduce GHG emissions associated with energy expenditures to develop, transport, or treat water.
NCR-4.11: Reclaimed Water The County shall require the use of reclaimed water irrigation systems in new development wherever possible.	Supports the use of recycled water for new development. Supports efficient water use, which will reduce GHG emissions associated with energy expenditures to develop, transport, or treat water.
NCR-4.12: Rainwater Catchment The County shall encourage homeowners to install roof catchment systems and use rainwater for non-potable uses in order to reduce the need for groundwater.	Supports the use of rainwater catchment systems to reduce groundwater use. Supports efficient water use to reduce GHG emissions associated with energy expenditures to develop, transport, or treat water.
NCR-6.1: Local Renewable Energy The County shall strive to increase the supply of locally-produced, renewable energy (e.g., solar, wind, geothermal, and biomass) in order to promote energy independence and efficiency.	Promotes renewable energy sources. Reduces demand for fossil fuel- generated electricity, thereby lowering GHG emissions.
NCR-6.8: Remove Barriers to Renewable Energy The County shall remove or otherwise address barriers to renewable energy production in the County (e.g., solar, wind, biomass).	Requires removal of barriers to renewable energy production. Encourages renewable energy that will lower GHG emissions.

Policies	How the Goals/Policies Avoid or Reduce Impacts
Health and Safety Element	
HS-1.12: Climate Change Monitoring and Adaptation The County shall monitor the potential impacts of climate change and use adaptive management to develop new strategies and modify existing strategies to respond to the impacts of climate change.	Requires climate change monitoring and adaptation. Encourages preparation for climate change including the use of adaptive management.
HS-1.13: Public Awareness of Climate Change The County shall support public awareness of water conservation measures, agricultural changes, storm and flood preparedness, forest/range fire protection, air quality issues, extreme weather events, and disease prevention to help prepare for the potential impacts of climate change.	Supports public awareness of climate change. Encourages public awareness to potential response to climate change.
HS-5.7: Greenhouse Gas Emission Reductions The County shall promote greenhouse gas emission reductions by supporting carbon-efficient farming methods (e.g., methane capture systems, no-till farming, crop rotation, cover cropping); supporting the installation of renewable energy technologies; and protecting grasslands, open space, oak woodlands, riparian forest and farm-lands from conversion to urban uses.	Promotes GHG reductions in agriculture, renewable energy, and preservation of areas that sequester carbon. Encourages measures designed to reduce GHGs, including in agriculture and through preservation of ecosystems that sequester carbon.
HS-5.8: GHG Reduction Targets The County shall strive to reduce greenhouse gas (GHG) emissions by 15 percent below 2010 levels by 2020, and establish a long-term goal to reduce GHG emissions by 80 percent below 1990 levels by 2050.	Encourages that the County reduce GHG emissions.

Sources: San Benito County 2011, 2014; EMC Planning Group 2014; URS 2012; Planning Partners 2012.

Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (VII.a).

Level of Significance: Significant and unavoidable for Scenarios 1 and 2.

Implementation of the 2035 General Plan would result in emissions from the construction and operation of new rural and urban developments in the County when compared to the existing condition, but would result in a decrease in emissions as compared to future BAU cases. This additional development would generate GHG emissions; however, numerous policies would be in place under project conditions to help reduce the County's GHG emissions. Those policies are grouped into two categories. The first category includes the state-mandated policies: LCFS, the Pavley Rule, the ACC program, the RPS, and the Title 24 standards. Many aspects of these programs and standards are outside of the control of the County, but the emissions estimates herein assume the reasonably foreseeable success of these programs given that they are state-mandated. The second group of strategies includes the policies that are included in the 2035 General Plan, which includes numerous policies that will either directly or indirectly help reduce GHG emissions. These policies are within the 2035 General Plan's Land Use, Economic Development, Circulation, Public Facilities and Services, Natural and Cultural Resources, and Health and Safety Elements. Long-term operational and short-term construction impacts are discussed separately, below.

Long-Term Operational GHG Emissions

Table 11-2 summarizes 2010, 2020 BAU (2008), 2020 project conditions, 2035 BAU (2008), and 2035 project conditions operational GHG emissions for Scenarios 1 and 2. Scenarios 1 and 2 both include emissions reductions associated with state GHG reduction programs and 2035 General Plan policies. As mentioned earlier, with respect to the emissions reductions associated with the proposed General Plan policies, many of the proposed policies are qualitative in nature and the emissions impact of such policies were not able to be quantified. Thus, emissions from the resulting new land uses under the proposed General Plan may actually be lower than estimated in Table 11-2. Proposed mitigation measure AIR-1, to ban wood-burning fireplaces in new development, would reduce GHG emissions under project conditions by 2,351 MT CO_2e/year in 2020 and 7,805 MT CO_2e/year in 2035.

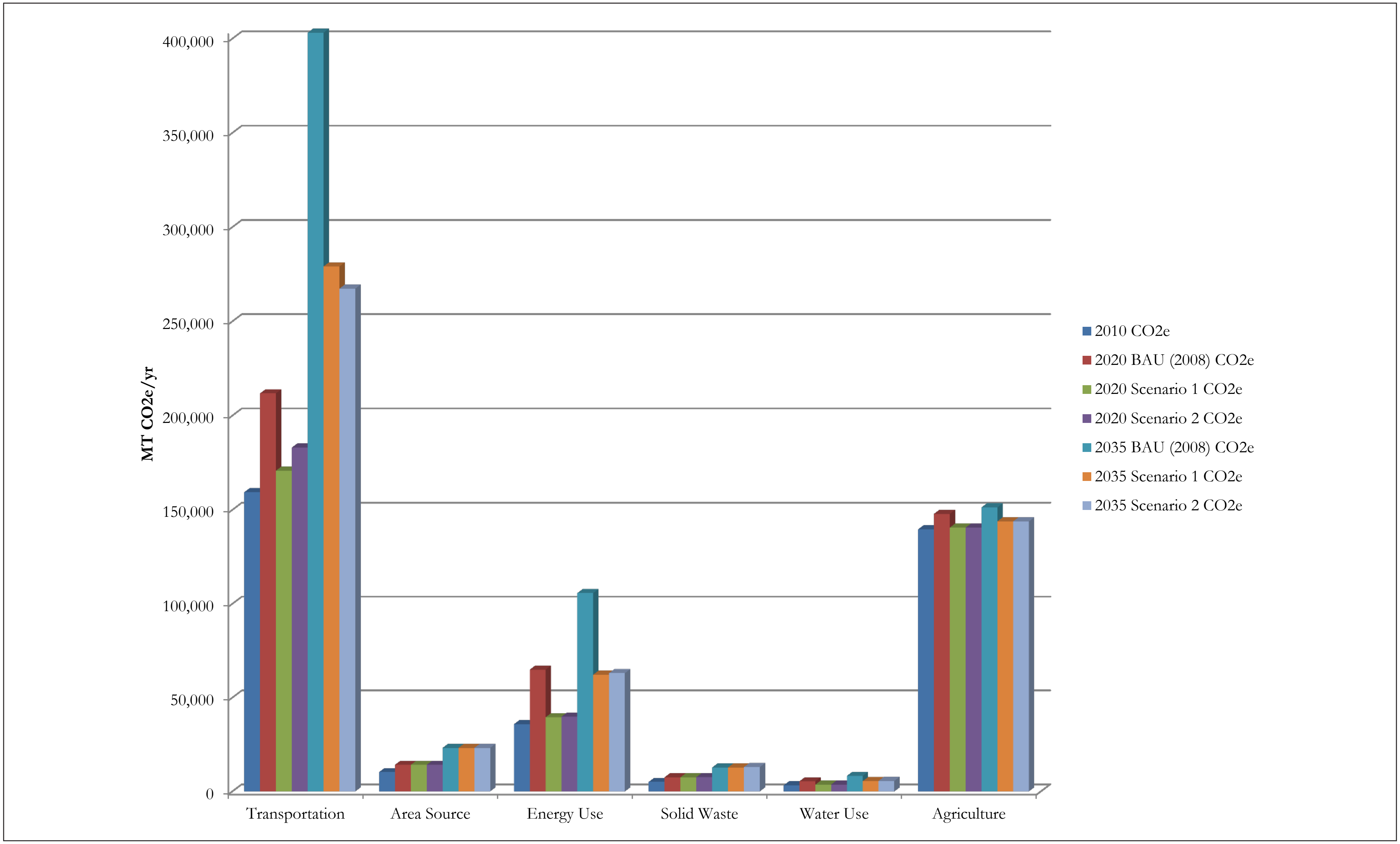
Figure 11-1 compares the total emissions by scenario and Figure 11-2 compares the total emissions by category for each scenario. Transportation represents the largest GHG category of BAU (2008) emissions, while agriculture represents the second largest category. Without the emissions reductions associated with the state and proposed General Plan policies, the unincorporated San Benito County BAU (2008) GHG emissions would more than double between 2010 and 2035, in large part due to a more than two-fold increase in emissions from transportation.

As in the BAU (2008) scenarios, transportation is the major contributor to long-term operational GHG emissions in the project conditions Scenarios 1 and 2. Emissions from energy use in both of the studied project condition scenarios decrease significantly from BAU (2008) emissions due to aggressive energy-reduction measures posed by State regulations (i.e., the Renewable Portfolio Standard and Title 24). Agricultural emissions are the second-largest contributor to GHG emissions in the project conditions Scenarios 1 and 2.

Table 11-2 Comparison of Operational GHG Emissions by Emission Category with BAU (2008)

Emission Category	2010 Existing	2020 BAU (2008)	2020 Scenario 1	2020 Scenario 2	2035 BAU (2008)	2035 Scenario 1	2035 Scenario 2
	CO_2e (metric tons per year)						
Transportation	159,361	211,808	170,799	183,050	403,163	279,148	267,363
Area Source, without mitigation	10,279	16,515	16,515	16,515	30,982	30,982	30,982
Area Source, with mitigation	N/A	N/A	14,164	14,164	N/A	23,178	23,178
Energy Use	35,814	64,906	39,525	39,862	105,717	62,219	63,061
Solid Waste	5,069	7,546	7,546	7,626	12,761	12,761	12,961
Water	3,210	5,371	3,566	3,628	8,262	5,463	5,618
Agriculture	139,651	147,854	140,566	140,566	151,277	143,847	143,847
Total, without mitigation	353,385	454,000	378,516	391,247	712,163	534,420	523,833
Total, with mitigation	N/A	N/A	376,165	388,896	N/A	526,615	516,028
% Reduction from BAU (2008) - Significance Threshold			29%	29%		29%	29%
% Reduction from BAU (2008) – Estimated without mitigation	--	--	17%	14%	--	25%	26%
Meets Threshold?			No	No		No	No

Source: Appendix B.



Source: Appendix B

Figure 11-1

Comparison of Unincorporated San Benito County Operational GHG Emissions by Scenario for Scenarios 1 and 2 with BAU (2008)

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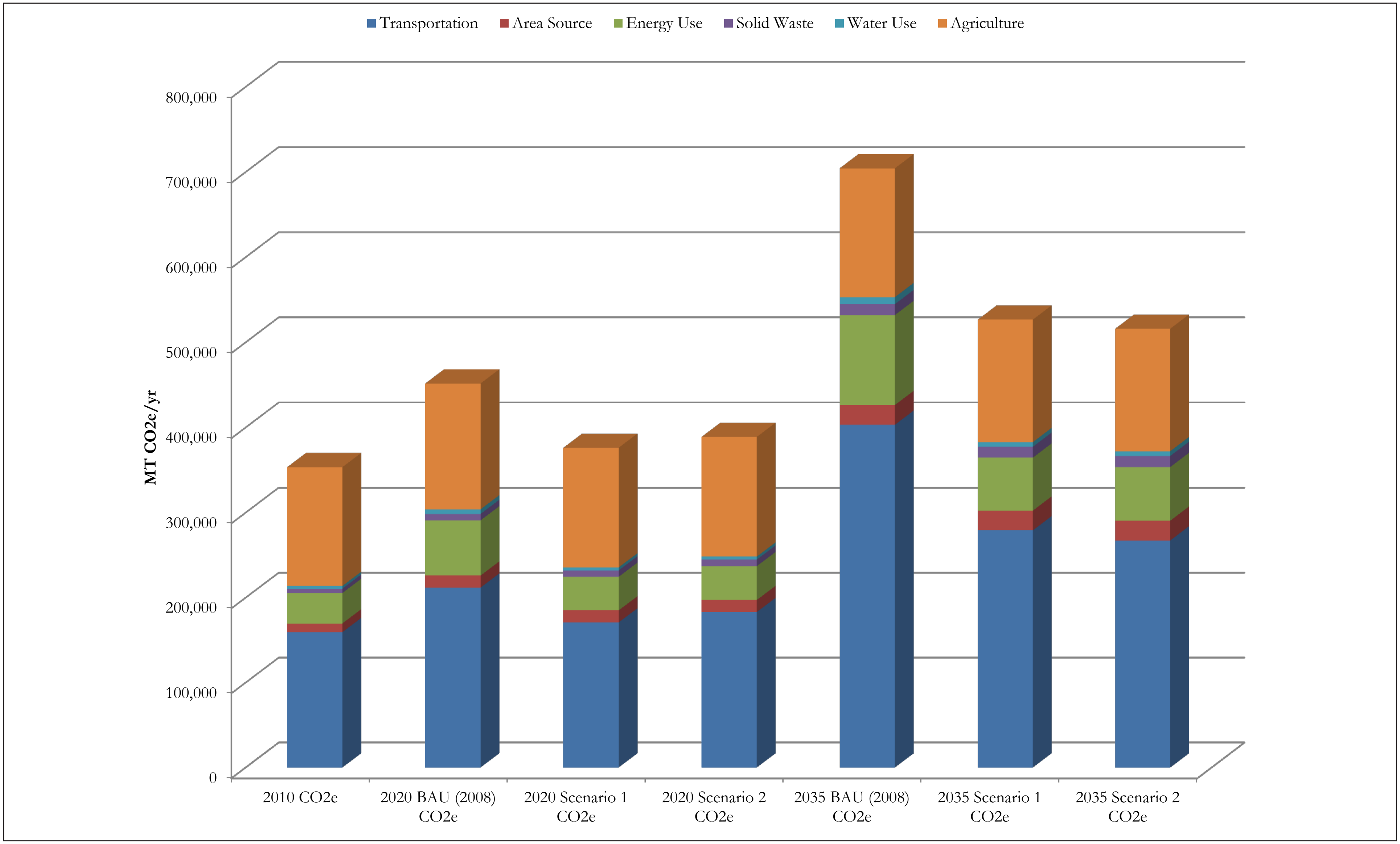

Source: Appendix B

Figure 11-2

Comparison of Unincorporated San Benito County Operational GHG Emissions by Category for Scenarios 1 and 2 with BAU (2008)

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The proposed General Plan policies and anticipated state policies, to the extent that they are quantifiable, would result in approximately 17 percent lower GHG emissions in 2020 as compared to 2020 BAU (2008) emissions for Scenario 1. The 2020 Scenario 2 GHG emissions would be approximately 14 percent lower than 2020 BAU (2008) emissions. In 2035, the proposed General Plan and state policies are expected to have approximately 25 percent and 27 percent lower emissions as compared to the 2035 BAU (2008) emissions, respectively. The reduction for Scenario 2 is larger than Scenario 1 for 2035 because Scenario 2 assumes more growth in the northern portion of the County, near San Jose. As more of the population gradually moves into areas located closer to San Jose than the other growth areas in the County, the total VMT decreases, decreasing both GHG emissions from mobile sources, and therefore, total GHG emissions.

Scenario 2 has the cumulative benefit of reducing VMT countywide. This is due to the fact that Scenario 2 is closer in proximity to the economic hub of San Jose. Many residents from the County commute to San Jose and thus, the total VMT would be reduced if many of these commuters lived closer to their workplace. This shift in the location of the population will take time, thus emissions are still higher in 2020 in Scenario 2 than in Scenario 1, depending on the relative time frame of the build-out of Scenario 2.

While the scope of this analysis is limited to the unincorporated areas of the County considered in the 2035 General Plan (incorporated areas follow their own general plans), as shown in Appendix B, countywide VMT are lower in Scenario 2 than Scenario 1 because fewer vehicle miles would be traveled under Scenario 2, as described above. Chapter 19, Transportation and Circulation of this RDEIR includes additional information on this topic.

The significance criteria selected for this RDEIR is a 29 percent reduction in GHG emissions from the BAU scenario in 2020, which is not achieved for either Scenario 1 or 2. Therefore, the GHG impacts would be significant under either scenario. By 2035, the reduction in 2035 GHG emissions relative to the 2035 BAU (2008) Scenario is 25 percent for Scenario 1 and 27 percent for Scenario 2, because in 2035 Scenario 2 VMT are reduced further than in Scenario 1. As discussed in Section 11.2.1, there is no adopted threshold for 2035, but Policy HS 5.8 states that the County will strive to have GHG emissions continue to decrease past 2020 (e.g. 2035/2050).

For comparison, the results of an analysis of the BAU (2014) are compared to the proposed MBUAPCD significance threshold of a 16 percent reduction from the BAU (2014). Table 11-3 summarizes 2010, 2020 BAU (2014), 2020 project conditions, 2035 BAU (2014), and 2035 project conditions GHG emissions for Scenarios 1 and 2. Scenarios 1 and 2 both include GHG reductions associated with state GHG reduction programs and 2035 General Plan policies, identical to those presented in Tables 11-2 and 11-3. The difference between the BAU (2008) and the BAU (2014) scenarios is that the BAU (2014) emissions estimates account for the Pavley standards and the 20 percent Renewable Portfolio Standard and the BAU (2008) scenarios do not. Figure 11-3 compares the total emissions by scenario and Figure 11-4 compares the total emissions by category for each scenario. Transportation represents the largest GHG category of

BAU (2014) emissions, while agriculture represents the second largest category. Without mitigation, the unincorporated San Benito County BAU (2014) GHG emissions would more than double between 2010 and 2035, in large part due to a more than two-fold increase in emissions from transportation.

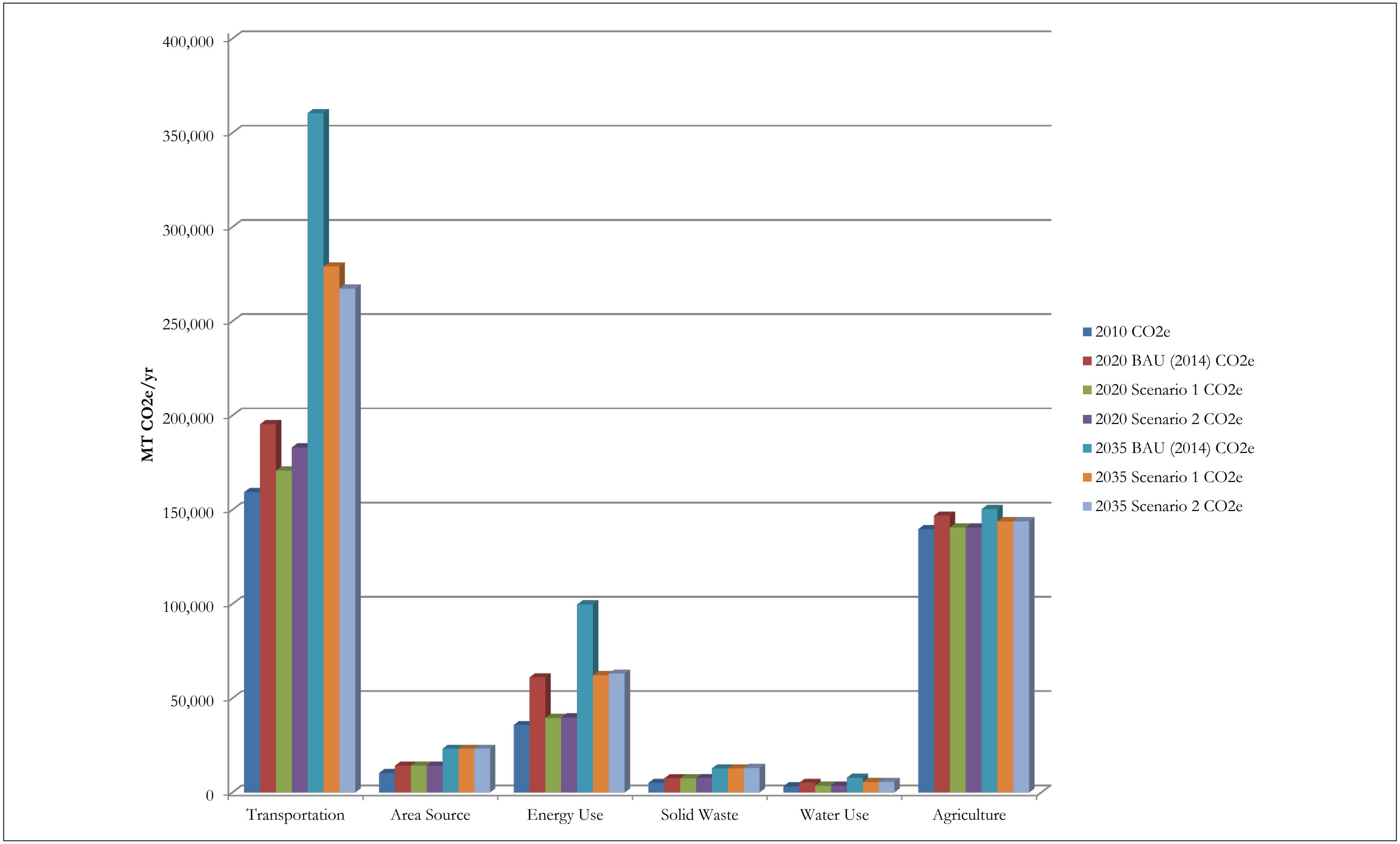
As in the BAU (2014) scenarios, transportation is the major contributor to GHG emissions in the project condition Scenarios 1 and 2. Emissions from energy use in both of the studied project condition scenarios decrease significantly from BAU (2014) emissions due to aggressive energy-reduction measures posed by State regulations (i.e., the RPS and Title 24). Agricultural emissions are the second-largest contributor to GHG emissions in the project condition Scenarios 1 and 2.

Table 11-3 Comparison of Operational GHG Emissions by Emission Category with BAU (2014)

Emission Category	2010 Existing	2020 BAU (2014)	2020 Scenario 1	2020 Scenario 2	2035 BAU (2014)	2035 Scenario 1	2035 Scenario 2
	CO_2e (metric tons per year)						
Transportation	159,361	195,408	170,799	183,050	360,434	279,148	267,363
Area Source, without mitigation	10,279	16,515	16,515	16,515	30,982	30,982	30,982
Area Source, with mitigation	N/A	N/A	14,164	14,164	N/A	23,178	23,178
Energy Use	35,814	61,096	39,525	39,862	99,759	62,219	63,061
Solid Waste	5,069	7,546	7,546	7,626	12,761	12,761	12,961
Water	3,210	5,070	3,566	3,628	7,796	5,463	5,618
Agriculture	139,651	146,921	140,566	140,566	150,319	143,847	143,847
Total, without mitigation	353,385	432,556	378,516	391,247	662,051	534,420	523,833
Total, with mitigation	N/A	N/A	376,165	388,896	N/A	526,615	516,028
% Reduction from BAU (2014) – Estimated without mitigation	--	--	13%	10%	--	19%	21%

Source: Appendix B.

Notes: For informational purposes only.



Source: Appendix B

Figure 11-3

Comparison of Unincorporated San Benito County Operational GHG Emissions by Scenario for Scenarios 1 and 2 with BAU (2014)

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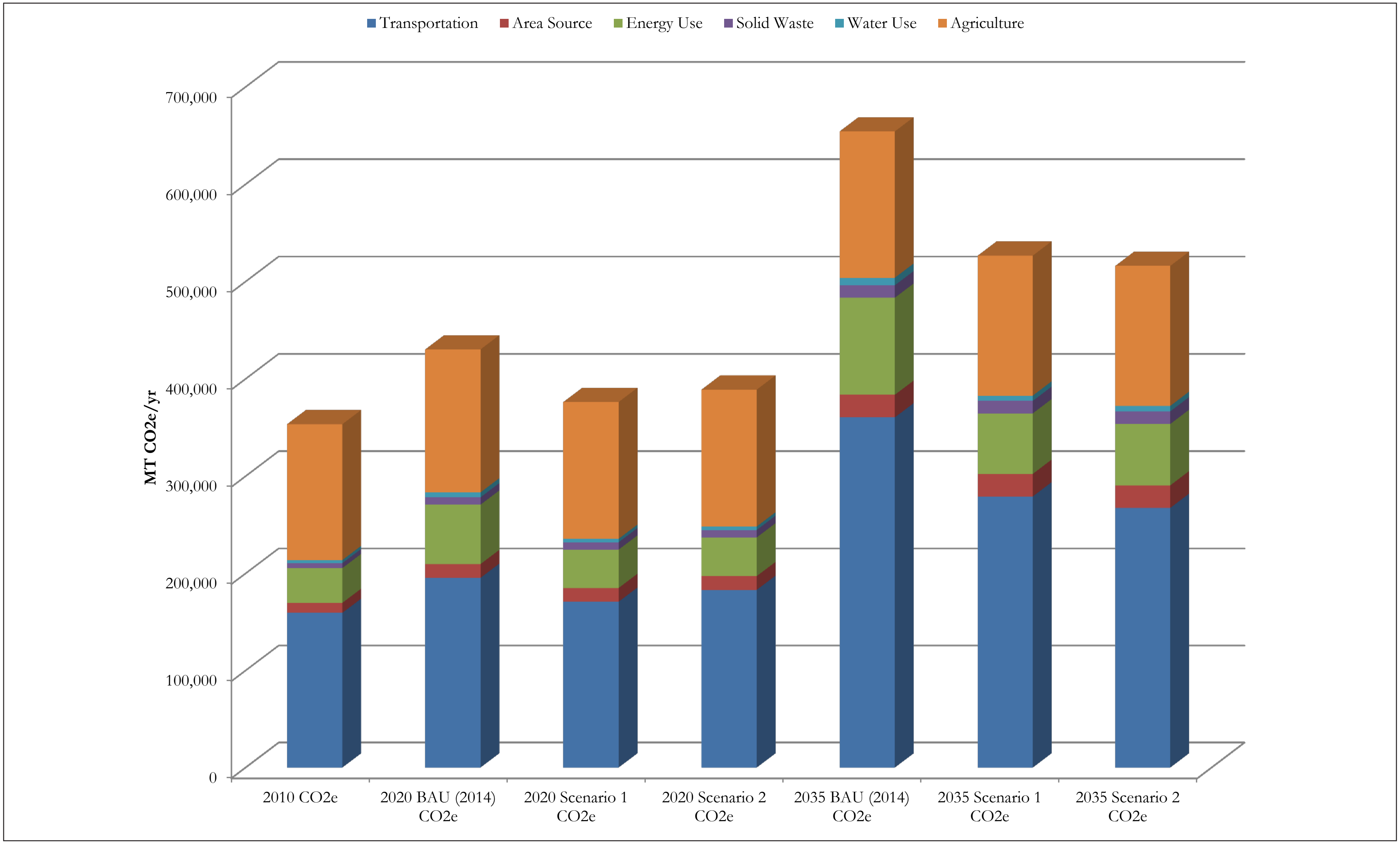

Source: Appendix B

Figure 11-4

Comparison of Unincorporated San Benito County Operational GHG Emissions by Category for Scenarios 1 and 2 with BAU (2014)

2035 San Benito County General Plan Revised DEIR

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In 2020, the policy-based measures described above would reduce GHG emissions by 13 percent as compared to 2020 BAU (2014) emissions for Scenario 1. The 2020 Scenario 2 GHG emissions would be reduced by 10 percent as compared to 2020 BAU (2014) emissions for Scenario 1.

In 2035, the policy-based measures described above would reduce Scenario 1 GHG emissions by 19 percent as compared to 2035 BAU (2014) emissions. The 2035 Scenario 2 GHG emissions would be reduced by 21 percent as compared to 2035 BAU (2014) emissions. The reduction for Scenario 2 is larger than Scenario 1 for 2035 because, as discussed above, as more of the population moves into New Community Study Areas over time, the total VMT decreases, decreasing both GHG emissions from mobile sources, and therefore, total GHG emissions.

Neither Scenario 1 nor Scenario 2 achieves a reduction from BAU (2014) emissions of 16 percent in 2020. Considering the significance threshold of a 16 percent reduction from the BAU (2014) proposed by the MBUAPCD, both Scenario 1 and Scenario 2 would have significant GHG emissions impacts in 2020. In 2035, however, both Scenarios are expected to exceed 16 percent reduction from the 2035 BAU.

The emission reduction potential of the policies listed in Table 11-1 was evaluated by reviewing several sources. These sources included reports and planning documents issued by AMBAG, CAPCOA, and by several counties (AMBAG 2011b; CAPCOA 2009a; CAPCOA 2009b; Yolo County 2010; Sutter County 2010; Tulare County 2010; Solano County 2008; Kings County 2010, Madera County 2010; San Bernardino County 2011). Emissions reductions were estimated by relying on current regulations and policies, as discussed for each category below. Emissions reductions may exceed those estimated here due to implementation of General Plan policies encouraging further reductions that are not readily quantifiable.

Transportation Emissions. A number of the policies listed in the 2035 General Plan Land Use and Circulation Elements would reduce GHG emissions from transportation. They include smart growth and mixed use policies that result in growth patterns that reduce the number and length of vehicle trips (Policies LU-1.1, LU-1.2, LU-1.5, LU-2.7, LU-4.2, LU-4.4, LU-5.1, LU-5.3, and LU-5.6). They also include specific policies that are designed to favor transit, bicycling, and pedestrian trips (Policies C-1.1, C-1.2, C-1.10, C-2.1, C-2.2, and C-2.8). Due to 2035 General Plan's policies that favor smart growth development strategies and transit, bicycle, and pedestrian infrastructure, these policies would result in a 2 percent reduction in VMT compared to BAU VMT in 2020 and a 6 percent reduction in VMT compared to BAU VMT in 2035. This is also consistent with AMBAG's attempt to develop a smart growth strategy for the Monterey Bay Area (AMBAG 2012b, CARB 2011d).

Building Energy Efficiency. The 2035 General Plan also includes numerous policies that are designed to improve building energy efficiency, which results in GHG reductions. They include land use policies (Policies LU-2.1, LU-2.2, LU-2.3, LU-2.4, LU-2.5, LU-2.6, LU-4.5, LU-6.4, and LU-8.5) and public facilities and services policies (Policies PFS-1.3, PFS-2.1, PFS-2.2, PFS-2.4, PFS-2.5, and PFS-2.6). These reductions are estimated to result in an 11 percent reduction in energy-related GHG emissions by 2020 and a 10 percent reduction by 2035 (Sentieri 2012). This analysis does not consider each policy individually, but assumes compliance with the 2013 State's Title 24 requirements. The effect of the policies may be to lower GHG emissions below those estimated here.

Agriculture. The 2035 General Plan includes a policy designed to increase agricultural sustainability and energy efficiency (Policy LU-3.3). Based on Policy LU-3.3, emissions associated with nitrogen fertilizer and the energy required to pump agricultural water may actually be reduced in 2020 and 2035 as compared to 2020 and 2035 BAU conditions, respectively. However, this reduction was conservatively not taken into account in this analysis because the wide variety of interpretations that could be implemented to satisfy LU-3.3 make this policy difficult to quantify.

Short-Term Construction GHG Emissions

Short-term construction GHG emissions that would occur between 2015 and 2035 were estimated in CalEEMod using the annual average growth in San Benito County and CalEEMod default assumptions for residential and commercial construction. An annual average value of 4,712 MT CO_2e per year is estimated to occur from one-time construction activities under both Scenario 1 and BAU (2008). This is because the amount of new land uses being constructed are the same under Scenario 1 and BAU (2008) and new policies under the project condition only marginally affect off-road construction vehicles.

Proposed General Plan policies are anticipated to only affect the criteria pollutant emissions from construction vehicles (HS-5.1) and State policies (Pavley, RPS, and LCFS) would mostly affect electrically powered construction vehicles. Construction of Scenario 2 would result in 4,776 MT CO_2e per year from one-time construction activities, with the difference from Scenario 1 construction emissions due to different projected land uses between the Scenarios. While by this estimate one-time construction emissions from Scenario 2 are higher than those for Scenario 1, these are general estimates for average County-wide growth and does not represent future actual emissions, which could be different based on project-specific data for each future project. This estimate does not include GHG emissions from any infrastructure construction in the County, as infrastructure construction depends on the specific phasing, duration, excavation, and other parameters for proposed roadway improvements and at this point there is insufficient detail to allow for an estimate.

In summary, taking into account the reductions in GHG from state-mandated policies and 2035 General Plan policies and the additional emissions from amortized construction, GHG emissions in Scenarios 1 and 2 are still estimated to be above the selected threshold of significance, a 29 percent reduction from BAU (2008). The estimated GHG emissions reductions from BAU (2014) in Scenarios 1 and 2 also do not meet the MBUAPCD-proposed threshold of significance of a 16 percent reduction from BAU (2014). Referring solely to the emissions estimates presented in Table 11-2, reducing project emissions in 2020 by an additional 53,825 to 68,907 $MTCO_2e$ from the mitigated scenario emissions would allow the County to meet the 29 percent reduction goal.

Mitigation Measure

GHG-1. Add the following policy to the 2035 General Plan Health and Safety Element:

HS-5.11: Prepare and Implement a GHG Reduction Strategy

To reduce GHG emissions, the County shall prepare and adopt a greenhouse gas reduction strategy that meets the following CEQA Guidelines § 15183.5 standards:

1. *Quantifies greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area,*
2. *Establishes a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable, i.e., in alignment with General Plan Policy HS-5.8,*
3. *Identifies and analyzes the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area,*
4. *Specifies measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level, and*
5. *Be adopted in a public process following environmental review.*

As specified in the recommended new Policy HS-5.11 above, the County will prepare and adopt a greenhouse gas reduction strategy that complies with CEQA Guideline § 15183.5. After adoption, the County would apply the reduction strategy in evaluating the significance of GHG emissions and climate change impacts associated with any development projects to be carried out consistent with the 2035 General Plan. Consistent with the provisions for elements of GHG reduction strategies set forth in Guideline § 15183.5(b)(1)(A) through (f), the GHG reduction strategy shall be adopted following a public process with environmental review, and shall include the following components:

- A quantified inventory of GHG emissions, both existing and projected, over the term of the 2035 General Plan, resulting from development with the unincorporated area of the County;
- A level of emissions, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the 2035 General Plan would not be cumulatively considerable. This level will be established based on current requirements and programs for GHG emissions when the GHG reduction strategy is prepared, but absent further legislation or regulatory direction, this level will be based on CARB's *2008 Climate Change Scoping Plan*. However, at the time the strategy is prepared, the most up-to-date approach will be determined (e.g., CARB is currently in the process of updating the newly adopted Scoping Plan that will include a 2035 goal);
- An identification and analysis of anticipated GHG emissions anticipated as a result of development pursuant to the 2035 General Plan within the unincorporated area of the County;
- Specific goals and measures or groups of measures, including detailed performance standards, that if implemented will achieve the specified level of emissions set forth in the reduction strategy. Examples of these goals and measures include, but are not limited to those listed in Table 11-4. These goals and measures cannot be adopted now because the exact percent reduction to meet the County's reduction targets has yet to be determined and will require a GHG survey and further GHG analysis. Any quantitative targets presented in Table 11-4 are for illustrative purposes only and would be subject to further feasibility assessments and analysis when the GHG reduction strategy is developed.

Table 11-4 List of Sample GHG Reduction Goals and Supporting Measures That May Be Included in the GHG Reduction Plan by GHG Reduction Sector

Sample Reference Name	Sample Reduction Goals and Measures	Estimated GHG Reduction[1]
	Overall	
Overall Goal	The County shall strive to reduce per capita emissions by 2035 from 2010 levels.	
	Energy	
Energy-1	As feasible, the County shall strive to have 80% of the electricity purchased for County-run facilities to be sourced from renewable sources by 2035.	
	Adopt Community Choice Aggregation	*Varies*

Sample Reference Name	Sample Reduction Goals and Measures	Estimated GHG Reduction[1]
Energy-2	The County shall strive to have 20% of all new residential and 15% of all new non-residential developments have solar panels installed by 2035, as feasible.	
	Install On-Site Renewable Energy Systems on County Facilities – Solar Power	*0 - 100%*
Energy-3	The County shall strive to have 20% of all new developments to be at least 15% more efficient than the 2013 Title 24 standards by 2020, if not already exceeded by future Title 24 standards in 2020.	
	Exceed Title 24 by 15%	*Up to 15%*
	Replace Appliances with Energy Efficient Appliances	*Residential building: 2-4%* *Grocery Stores: 17-22%*
	Install Higher Efficacy Public Street and Area Lighting	*16-40%*
	Limit Outdoor Lighting	*Depends on BMP*
	Prohibit gas powered Landscape Equipment	*64.1-80.3%*
	Implement Lawnmower Exchange Program Reduction	*Depends on BMP*
	Water	
Water-1	The County shall strive to reduce emissions from County water usage by 30% by 2035 from 2035 BAU levels.	
	Adopt a Water Conservation Strategy	*Varies*
	Use Reclaimed Water for Outdoor Water Use	*Up to 40%*
	Use Graywater for Outdoor Water Use	*0-100%*
	Use Water-Efficient Irrigation	*6.10%*
	Design Water-Efficient Landscapes at County Facilities	*0-70%*
	Waste	
Waste-1	The County shall strive to generate at least 100% of the energy required to operate the County's on-site waste and landfill operations from renewable energy recovered from landfills by 2020.	
	Establish Methane Recovery at Local Landfills	*73-77%*
	Extend Recycling and Composting Services	*Depends on BMP*
	Agriculture	
Ag-1	The County shall strive to reduce emissions from Agriculture by 30% per livestock population by 2035 from 2010 levels.	
	Require BMP in Agriculture and Animal Operations	*Depends on BMP*
	Install Methane Capture Recovery at Manure Management Facilities	*Varies*

Sample Reference Name	Sample Reduction Goals and Measures	Estimated GHG Reduction[1]
Transportation		
Trans-1	The County shall strive to reduce per capita commute-based transportation emissions by 25% by 2035 from 2010 levels.	
	Commute Trip Reduction	*Up to 25%*
	Support a car-sharing program	*0.70%*
	Transit System Improvements	*Up to 10%*
Other GHG Reduction Measures		
	Establish Off-site Mitigation	*Varies*
	Carbon Sequestration through Tree Planting	*Varies*

Sources: CAPCOA 2010, Ascent Environmental 2014.

Notes: Measures are presented in italics, BMP = Best Management Practices.

[1]Estimated range of GHG reduction from BAU for given measure. These estimated ranges and further explanations of the GHG reduction potential of these measures can be found in *Quantifying Greenhouse Gas Mitigation Measures* published by CAPCOA in 2010.

The GHG reduction strategy must be prepared after the 2035 General Plan has been fully formulated so the detailed provisions in the reduction strategy implement all of the policies for reducing GHG emissions in the 2035 General Plan. This cannot be done until after the Board of Supervisors has considered the GHG policies in the 2035 General Plan, and determined whether to adopt all of those policies, or to change, modify, or add to those policies in some manner. Accordingly, Mitigation Measure GHG-1 sets forth the standards for the GHG reduction strategy that will be used to ensure that the strategy, when prepared, not only implements the general GHG reduction policies in the 2035 General Plan, but also will accomplish the County's goal of reducing GHG emissions. As part of the GHG reduction strategy, the County must quantify existing GHG emissions and set forth reduction measures and targeted goals to achieve specified emission reduction levels. GHG-1 will allow the County to develop clear actions on how to attain emissions reductions needed to reach the County's emissions target. Even with the GHG reduction strategy, it is possible that Impact GHG-1 would be significant and unavoidable because many aspects of the GHG reduction strategy depend on actions outside the control of the County. For example, many of the proposed general policies and measures listed in Table 11-4 depend on the cooperation of other government agencies, business owners, and residents. In addition, the State government could retract or revise either or both the Pavley standard or LCFS and, if that occurs, vehicle emissions may not decrease as expected. For these reasons, the project will have significant and unavoidable impacts on climate change due to greenhouse gas emissions.

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (VII.b).

Level of Significance: Significant and unavoidable for Scenarios 1 and 2.

As discussed under Section 11.2.1, the selected GHG threshold of a 29 percent reduction from the 2020 BAU (2008) is consistent with both the CARB 2008 and 2014 Scoping Plans. No other GHG reduction plans currently apply to the County.

Although both Scenarios exceed the VMT reduction needed by 2050 for consistency with Executive Order S-03-05, because the analysis under Impact GHG-1 finds that the project will not meet the 29 percent reduction goal selected as a significance threshold and because the County does not have the jurisdiction to force the successful outcome of the proposed mitigation measures to meet the adopted threshold; this impact is considered significant and unavoidable.