
6.6 CLIMATE CHANGE

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INTRODUCTION

This section evaluates the potential changes in global climate associated with greenhouse gas emissions and the potential for emissions generated by implementation of the proposed Sutter County General Plan (proposed General Plan or proposed project) to cumulatively contribute to climate change on a global scale. This section describes the conditions within Sutter County, relevant state and federal climate change standards, regulatory agencies responsible for managing greenhouse gas (GHG) emissions, and legislation and plans focused on the reduction of these emissions. This analysis focuses on the three major GHGs, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

Air quality improvements, including climate change, are fundamental objectives that underlie policies throughout the General Plan. The General Plan addresses GHG emissions primarily by providing climate change, land use, air quality, and mobility policies intended to reduce automobile trips, energy and water consumption, and waste generation county wide.

No comments related to climate change were received during the public comment period for the Notice of Preparation (NOP).

Data for this section was taken from the *Sutter County Climate Action Plan (CAP)*, U.S. Environmental Protection Agency (U.S. EPA), the California Energy Commission (CEC), Feather River Air Quality Management District (FRAQMD), and the California Air Resources Board (CARB). Appendix E includes all the model outputs and calculations on the CD at the back of this document.

ENVIRONMENTAL SETTING

The discussion of climate change included below is presented on a countywide basis. Because climate change impacts are on a regional and global level, there are no unique issues present in any of the five Growth Areas associated with GHG emissions; therefore, these areas of the county are not discussed individually in this section.

Overview of Climate Change

Parts of the earth's atmosphere act as an insulating blanket, trapping solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that these gases

'trap' heat similar to the glass walls of a greenhouse. These gases, mainly water vapor, CO₂, CH₄, N₂O, ozone (O₃), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride, and aerosols act as global insulators, reflecting visible light and infrared radiation back to the earth. Without the natural heat trapping effect of greenhouse gas, the earth's surface would be about 34°C (93°F) cooler.¹ However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the upper atmosphere beyond the naturally occurring level.

Changes in climate result from radiative forcing and feedback. Radiative forcing is the difference between the radiation energy entering the earth's atmosphere and the radiation energy leaving the atmosphere. Greenhouse gases allow solar radiation to penetrate the earth's atmosphere but slow the release of atmospheric heat. A feedback is an internal process that amplifies or dampens the climate's response to a specific forcing. For example, the heat trapped by the atmosphere may cause temperatures to rise or may alter wind and weather patterns. A gas or aerosol's global warming potential (GWP) is its ability to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas."²

Individual greenhouse gases have varying GWPs and atmospheric lifetimes (see Table 6.6-1). The carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes the various greenhouse gases to a consistent metric. The reference gas for GWP is CO₂, which has a GWP of one. By comparison, methane's GWP is 21, as CH₄ has a greater global warming effect than CO₂ on a molecule-to-molecule basis.³ In order to combine the impacts of multiple greenhouse gases, the carbon dioxide equivalent (CO₂e) metric is used, this is total amount of each individual greenhouse gas multiplied by the that gas's GWP.

Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. It is not considered a pollutant in the atmosphere because it is naturally occurring, does not have pollutant characteristics, and it maintains a climate necessary for life. 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 ice and snow, and transpiration from plant leaves.

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- 1 California Air Resources Board, 2006. CARB Proposed Early Actions to Mitigate Climate Change in California.
 - 2 U.S. Environmental Protection Agency. 2006. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.
 - 3 U.S. Environmental Protection Agency, 2006. Non CO₂ Gases Economic Analysis and Inventory. Global Warming Potentials and Atmospheric Lifetimes. <www.epa.gov/nonco2/econ-inv/table.html>.

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50–200	1
Methane	12 ±3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF ₄)	50,000	6,500
PFC: Hexafluoroethane (C ₂ F ₆)	10,000	9,200
Sulfur Hexafluoride (SF ₆)	3,200	23,900
SOURCE: EPA, 2006.		

Carbon dioxide (CO₂) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO₂ are from burning coal, oil, natural gas, and wood. CO₂ is the most common greenhouse gas generated by California activities, constituting approximately 84 percent of all greenhouse gas emissions. CO₂ emissions attributed to California activities are mainly associated with in-state fossil fuel combustion and fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO₂ emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

Methane (CH₄) is a flammable gas and is the main component of natural gas. When one molecule of CH₄ is burned in the presence of oxygen, one molecule of CO₂ and two molecules of water are released. A natural source of CH₄ is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH₄, which is extracted for fuel. Other sources are landfills, fermentation of manure, and cattle.

Nitrous oxide (N₂O), also known as laughing gas, is produced naturally by microbial processes in soil and water. Anthropogenic sources of N₂O include agricultural sources, industrial processing, fossil fuel-fired power plants, and vehicle emissions. Nitrous oxide also is used as an aerosol spray propellant and in medical applications.

The participation of water vapor and ozone as GHGs is poorly understood. It is unclear the extent to which water vapor acts as a GHG. The uncertainty is because water vapor can also produce cloud cover, which reflects sunlight away from the Earth and can counteract its effect, if any, as a GHG. In addition, water vapor tends to increase as the earth warms so it is not clearly defined whether an increase in water vapor is contributing to climate

change or rather a result of changes in the climate. Ozone tends to break down in the presence of solar radiation but the mechanism is not well understood.

Other gases that contribute to the greenhouse effect include chlorofluorocarbons (CFCs), HFCs, PFCs, sulfur hexafluoride (SF₆), and aerosols. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and has successfully reduced or stopped the increase in the levels of the major CFCs. However, due to the long atmospheric lifetimes, CFCs will remain in the atmosphere for over 100 years. CFCs, Tetrafluoromethane (CF₄), SF₆, and HFCs have been banned and are no longer commercially available. For these reasons, this analysis, following methodologies approved by the Intergovernmental Panel on Climate Change (IPCC), EPA, and the California Air Resources Board (CARB), focuses on carbon dioxide, methane and nitrous oxide.

Emissions Inventories

Worldwide, United States and California Inventories

A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specified period of time attributed to activities by a particular entity (e.g., annual emissions and reductions attributed to the state of California). A greenhouse gas inventory also provides information on the activities that cause emissions to increase and those that result in reductions, as well as the methods and calculations used to determine emission levels. In 2004, total worldwide greenhouse gas emissions were estimated to be 49,000 teragram (Tg) CO₂e.⁴ In 2006, greenhouse gas emissions in the U.S. were 7,054 Tg CO₂e, a 14.7 percent increase over 1990 emissions (427 million tons (MT) CO₂e).

California, as a single entity, is the second largest contributor of greenhouse gas emissions in the U.S. and the sixteenth largest in the world. In 2004, California produced 427 Tg CO₂e, which was approximately 6 percent of 2004 U.S. emissions and 0.9 percent of global emissions. As part of the California Global Warming Solutions Act of 2006 (AB 32) the CARB was required to establish a statewide greenhouse gas emissions limit for 2020 equivalent to 1990 emissions.

Sutter County Existing Inventory

The Sutter County existing emissions inventory was determined in conjunction with the development of the Sutter County CAP. The inventory identifies and categorizes the major sources (energy, solid waste, landscape emissions, transportation, and agriculture) and quantities GHG emissions produced by county residents, businesses, and municipal

4 A teragram (Tg) is equal to one million metric tons of carbon dioxide equivalent (Tg CO₂e) is the mass emissions of an individual GHG multiplied by its GWP.

operations. For example, water emissions are determined based on the amount of electricity needed to treat and pump potable water, therefore they are included as part of the “energy” emissions.

Sutter County emitted approximately 1.2 million metric tons (MMT) of CO₂e in 2008. Table 6.6-2 summarizes the net 2008 County emissions of CO₂e broken down by emissions category. A detailed breakdown of the 2008 existing emissions inventory is included in the Sutter County CAP (see Appendix E).

Category	MT CO₂e
Energy	158,627
Solid Waste	2,750
Landscape Emissions	32
Agriculture	805,005
Transportation	254,610
Total	1,221,024
Source: Draft CAP, PBS&J, 2010,	

REGULATORY CONTEXT

International and Federal

Kyoto Protocol

The United States participated in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. It should be noted that although the U.S. is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol’s commitments.

In anticipation of providing an updated international treaty for the reduction of GHG emissions, representatives from 170 countries met in Copenhagen in December 2009 to ratify an updated UNFCCC agreement (Copenhagen Accord). The Copenhagen Accord, a voluntary agreement between the United States, China, India, and Brazil, recognizes the need to keep global temperature rise to below 2°C and obliges signatories to establish measures to reduce greenhouse gas emissions and to prepare to provide help to poorer countries in adapting to Climate Change. It is anticipated that the Copenhagen Accord

will be finalized and signed by representatives of the participating governments by the end of 2010.

Climate Change Technology Program

The U.S. has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.

U.S. Environmental Protection Agency (US EPA)

The United States Environmental Protection Agency (US EPA) is responsible for implementing federal policy to address global climate change. The Federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the U.S. These programs focus on energy efficiency, renewable energy, methane and other non-CO₂ gases, agricultural practices, and implementation of technologies to achieve GHG reductions. The EPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In *Massachusetts v. Environmental Protection Agency* (Docket No. 05-1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that the EPA has authority to regulate greenhouse gases, and the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO₂ and other greenhouse gases as pollutants under Section 202(a)(1) of the federal Clean Air Act (CAA).

The EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufactures of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The Final Rule was effective December 29, 2009, with data collection to begin on January 1, 2010 and the first annual reports due in March 2011. This rule does not regulate the emission of GHGs it only requires the monitoring and reporting of greenhouse gas emissions for those sources above certain thresholds.⁵ EPA adopted a Final Endangerment Finding for the six defined GHGs on December 7, 2009. The Endangerment Finding is required before EPA can regulate GHG emissions under Section 202(a)(1) of the CAA in fulfillment of the U.S. Supreme Court decision.

5 U.S. EPA, 2009 U.S. Greenhouse Gas Inventory Report, Section 6 Agriculture, <www.epa.gov/climatechange/emissions/downloads09/Agriculture.pdf>, accessed February 2010.

On May 13, 2010, the EPA issued a final rule that establishes a common sense approach to addressing greenhouse gas emissions from stationary sources under the CAA permitting programs. This final rule sets a threshold of 75,000 tons per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit under the New Source Review Prevention of Significant Deterioration and title V Operating Permit programs. This rule will take effect on January 2, 2011.

State

California Air Resources Board (CARB)

The California Air Resources Board, a part of the California EPA is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets state ambient air quality standards (California Ambient Air Quality Standards (CAAQS)), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

Executive Order S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets:

- California shall reduce GHG emissions to 2000 levels by 2010;
- California shall reduce GHG emissions to 1990 levels by 2020; and
- California shall reduce GHG emissions to 80 percent below 1990 levels by 2050.

The first California Climate Action Team (CCAT) Report to the Governor in 2006 contained recommendations and strategies to help meet the targets in Executive Order S-3-05. In April 2010, the Draft California Action Team (CAT) Biennial Report expanded on the policy oriented 2006 assessment. The new information detailed in the CAT Assessment Report includes development of revised climate and sea-level projections using new information and tools that have become available in the last two years; and an evaluation of climate change within the context of broader social changes, such as land-use changes and

demographic shifts.⁶ The action items in the report focus on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described below.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

In 2006, the California State Legislature adopted AB 32, the California *Global Warming Solutions Act of 2006*. AB 32 focuses on reducing GHG in California. GHG, as defined under AB 32, includes carbon dioxide, methane, nitrous oxide, HFCs, PFCs, and sulfur hexafluoride. AB 32 required CARB to adopt rules and regulations that would achieve greenhouse gas emissions equivalent to 1990 statewide levels by 2020. On or before June 30, 2007, CARB was required to publish a list of discrete early action GHG emission reduction measures that would be implemented by 2010. The law further required that such measures achieve the maximum technologically feasible and cost effective reductions in GHGs from sources or categories of sources to achieve the statewide greenhouse gas emissions limit for 2020

CARB published its final report for Proposed Early Actions to Mitigate Climate Change in California in October 2007. This report described recommendations for discrete early action measures to reduce GHG emissions. The measures included are part of California's strategy for achieving GHG reductions under AB 32. Three new regulations are proposed to meet the definition of "discrete early action greenhouse gas reduction measures," which include the following: a low carbon fuel standard; reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture.⁷ CARB estimates that by 2020, the reductions from those three measures would be approximately 13-26 MMT CO₂e.

Under AB 32, CARB has the primary responsibility for reducing GHG emissions. CARB has published a staff report titled California 1990 GHG Emissions Level and 2020 Emissions Limit⁸ that determined the statewide levels of GHG emissions in 1990 to be 427 MMT CO₂e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan, which outlines the State's strategy to achieve the 2020 GHG limit. This Scoping Plan proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health. The plan emphasizes a cap-and-trade program, but also includes the discrete early actions.

6 California Climate Action Team, The Climate Action Biannual Report, April 2010.

7 California Air Resources Board, Proposed Early Actions to Mitigate Climate Change in California <www.arb.ca.gov/cc/factsheets/support_ccoverview.pdf>, December 20, 2007.

8 Ibid.

Senate Bill 97

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directed the California Office of Planning and Research (OPR) to develop draft State CEQA Guidelines “for the mitigation of GHG emissions or the effects of GHG emissions” and directed the Resources Agency to certify and adopt the State CEQA Guidelines.

Recent amendments to the CEQA Guidelines that address GHG became effective March 2010 and provide regulatory guidance with respect to the analysis and mitigation of the potential effects of GHG emissions.

CEQA Guidelines section 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments and describes the criteria needed in a CAP that would allow for tiering and streamlining of CEQA analysis for subsequent development projects. The following is from section 15183.5 of the CEQA Guideline:

- (a) Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in section 15152 (tiering), 15167 (staged EIRs) 15168 (program EIRs), 15175-15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).
- (b) Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document. A plan to reduce greenhouse gas emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project’s incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.
 - (1) Plan Elements. A plan for the reduction of greenhouse gas emissions should:
 - (A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
 - (B) Establish 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;
 - (C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;

- (D) Specify 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;
- (E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;
- (F) Be adopted in a public process following environmental review.
- (2) Use with Later Activities. A plan for the reduction of greenhouse gas emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the plan for the reduction of greenhouse gas emissions, an EIR must be prepared for the project.

One of the goals of the Sutter County CAP, which is evaluated in this EIR, is to allow a programmatic level review and mitigation of GHG emissions that allows for the streamlining of CEQA review for subsequent development projects. To accomplish this, the Sutter County CAP framework is designed to fulfill the requirements identified in CEQA Guidelines section 15183.5, described above.

Executive Order S-13-08

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08, the Climate Adaptation and Sea Level Rise Planning Directive, which provides clear direction for how the State should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Change Adaptation Strategy (CAS) that will assess the State's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies;
- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform State planning and development efforts;
- Issue interim guidance to State agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects; and
- Initiate studies on critical infrastructure projects and land-use policies vulnerable to sea level rise.

The 2009 CAS report summarizes the best known science on climate change impacts in the state to assess vulnerability, and outlines possible solutions that can be implemented within and across state agencies to promote resiliency. This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts.

California Code of Regulations (CCR) Title 24, Part 6

CCR Title 24, Part 6: *California's Energy Efficiency Standards for Residential and Nonresidential Buildings* (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and the Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. The Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards for several reasons:

- To provide California with an adequate, reasonably priced, and environmentally sound supply of energy;
- To respond to AB 32 which mandates that California must reduce its GHG emissions to 1990 levels by 2020;
- To pursue California energy policy which states that energy efficiency is the resource of first choice for meeting California's energy needs;
- To act on the findings of California's Integrated Energy Policy Report (IEPR) that concludes that the Standards are the most cost effective means to achieve energy efficiency, expects the Building Energy Efficiency Standards to continue to be upgraded over time to reduce electricity and peak demand, and recognizes the role of the Standards in reducing energy related to meeting California's water needs and in reducing GHG emissions;
- To meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of state building codes; and
- To meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.

Regional

Feather River Air Quality Management District (FRAQMD)

The FRAQMD is responsible to promote and improve the air quality of Sutter and Yuba counties. This is accomplished through monitoring, evaluation, education, implementation of control measures to reduce emissions from stationary sources, permitting and inspection of pollution sources, enforcement of air quality regulations, and by supporting and implementing measures to reduce emissions from motor vehicles. The FRAQMD contains stationary-, area-, and mobile-source control measures designed to bring the area into compliance with the state ozone standards.

Currently the FRAQMD has not established guidance for the evaluation of GHGs or the establishment of a CAP, opting instead to recommend the use of existing methodologies. The FRAQMD specifically cites the California Air Pollution Control Officers Association, and California Natural Resources Agency's Climate Change Portal, and the Office of the Attorney General among others.

Sutter County Climate Action Plan (CAP)

The Draft Sutter County CAP was designed under the premise that the county, and the community it represents, is uniquely capable of addressing emissions associated with sources under the County's jurisdiction. Therefore, the County's emission reduction efforts should coordinate with the state strategies of reducing emissions in order to accomplish emission reductions in an efficient and cost effective manner. The CAP was developed with the following purposes in mind:

- Create an emissions baseline from which to benchmark GHG reductions;
- Provide a plan that is consistent with and complementary to: the GHG emissions reduction efforts being conducted by the State of California through the Global Warming Solutions Act (AB 32); the Federal Government through the actions of the Environmental Protection Agency; and the global community through the Kyoto Protocol;
- Guide the development, enhancement, and implementation of actions that aggressively reduce GHG emissions; and
- Provide a policy document with specific measures to be incorporated into the planning process for future development projects.

To fulfill the purposes of the CAP, the County identified the following goals to be achieved:

- Provide a list of specific actions that will reduce GHG emissions, giving the highest priority to actions that provide the greatest reduction in GHG emissions and benefits to the community at least cost;

- To reduce emissions attributable to Sutter County to levels at or below 1990 GHG emissions by 2020 consistent with the target reductions of AB 32; and
- Establish a qualified reduction plan for which future development within the County can tier and thereby streamline the environmental analysis necessary under the California Environmental Quality Act (CEQA).

The CAP achieves the purpose and goals described above by providing:

- An analysis of GHG emissions and sources attributable to Sutter County;
- Estimates on how those emissions are expected to increase;
- Recommended policies and actions that can reduce GHG emissions to meet state, federal and International targets;
- A timeline of implementation; and
- A defined tracking and reporting mechanism that will measure progress toward the goals. The following discussion summarizes the findings of the CAP. The complete CAP text is included as Appendix E.

The methodology to prepare the GHG inventories in the CAP incorporates the protocols, methods, and emission factors found in the California Climate Action Registry (CCAR) General Reporting Protocol (version 3.1, January 2009), and the Local Government Protocol (version 1.1, May 2010). The discussion below under the title "Methods of Analysis," summarizes the methodology employed in preparing the inventories for the CAP as well as the estimated emissions inventory for the General Plan build-out horizon. A copy of the draft CAP is included in Appendix E.

1990 Inventory

In 1990, the County's total GHG annual emissions were approximately 1.3 MT CO₂e. As shown in Table 6.6-3, the greatest sources of emissions for Sutter County are agriculture, transportation, and energy at 71, 17, and 11 percent of the total inventory respectively.

Category	MT CO ₂ e
Energy	146,001
Solid Waste	8,938
Landscape Emissions	27
Agriculture	956,315
Transportation	226,910
Total	1,338,192
Source: Draft CAP, PBS&J, 2010.	

2020 Business as Usual Inventory

In 2020, the County is predicted to emit approximately 1.5 MMT of CO₂e using business-as-usual assumptions. Business-as-usual refers to continued operations and development of the county according to current 2008 policies, without the inclusion of the initiatives proposed in the Draft General Plan (see “Policy” section below) or the CAP and assuming the adjusted buildout level of development. As shown in Table 6.6-4, the greatest sources of emissions for Sutter County are agriculture, transportation, and energy at 52, 32, and 15 percent of the total inventory, respectively.

2020 'BUSINESS AS USUAL' INVENTORY¹	
Category	MT CO₂e
Energy	233,626
Solid Waste	12,006
Landscape Emissions	36
Agriculture	792,267
Transportation	479,641
Total	1,517,575
Note:	
1. This assumes the adjusted buildout level of development.	
Source: Draft CAP, PBS&J, 2010,	

2020 Reduced Inventory

By 2020, Sutter County is projected to emit a total of 1.5 MMT of CO₂e without the incorporation of CAP reduction measures or proposed General Plan policies. In order to reach the AB 32 reduction goal of meeting 1990 emissions by 2020, Sutter County must reduce their emissions by 179,383 metric tons of CO₂e.

The state of California has set specific targets for reducing greenhouse gas emissions from the burning of fossil fuels and enhancing state energy efficiency and renewable requirements. The CAP takes into account the reductions that would occur within the county as a result of these actions. A full discussion of these measures and their reductions are provided in Appendix E.

The following reduction measures are those included in the CAP that would be incorporated at the County level to provide additional reductions in greenhouse gas emissions. A detailed explanation of these measures, their assumptions, and reductions are included in the CAP (see Appendix E). R2 measures are those measures that have been quantified in the CAP whereas R3 measures are those that would enhance the success of R2 measures, but cannot be independently quantified. These measures are summarized below and are listed by source category then by their ability to be quantified and finally by

a successive number to give them a unique identification. The following designations are used for source identification: E- energy; W- solid waste; A- agriculture; and T- transportation. The County regulated programs, initiatives, and policies to reduce GHG emissions include:

- R2-E1 Residential Energy Efficiency Program.** This measure involves the adoption of a program that facilitates energy efficient design for all new residential buildings of 5% and 20% beyond the current Title 24 Standards respectively for unincorporated Sutter County and the Sutter Point Specific Plan area.
- R2-E2 Residential Renewable Energy Program.** This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments such that the new home's projected energy use from the grid is reduced by 50%.
- R2-E3 Residential Retrofit Implementation Program.** This measure would initiate a County program that facilitates the incorporation of energy reduction measures for residential buildings undergoing major renovations such that a reduction in energy consumption of 15% is realized.
- R2-E4 Residential Renewable Retrofit Program.** This measure will initiate an incentive program that encourages residents to retrofit their homes with photovoltaic panels such that 50% of all of the home's electrical usage is offset. The California Energy Commission's Solar Initiative has incentives available to home owners.
- R2-E5 Commercial Energy Efficiency Program.** This measure involves the adoption of a program that facilitates energy efficient design for all new commercial buildings of 5% and 20% beyond the current Title 24 Standards respectively for unincorporated Sutter County and the Sutter Point Specific Plan area.
- R2-E6 Commercial/Industrial Renewable Energy Program.** This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new commercial/industrial development such that the development's projected energy use from the grid is reduced by 20%.
- R2-E7 Commercial/Industrial Retrofit Program.** This measure encourages all commercial or industrial buildings undergoing major renovations to reduce their energy consumption by a minimum of 20%.
- R2-E8 Agricultural Alternative Energy Program.** This program combines Agricultural Draft General Plan Policies AG 3.7 (Alternative Energy), and AG 4.3 (New Technologies) to support the incorporation and expansion of existing and new technologies to increase the energy efficiency and profitability of agricultural processes throughout Sutter County.
- R2-E9 Water Use Reduction Initiative.** This measure encourages the County to adopt a per capita water use reduction goal in support of the Governors Executive Order S-14-08 which mandates the reduction of water use of 20 % per capita.

- R3-E1 Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining.** This measure would encourage the County to identify and remove regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems.
- R3-E2 Energy Efficiency Training & Public Education.** This measure would provide public education and publicity about energy efficiency measures and reduction programs available within the County, including rebates and incentives available for residences and businesses.
- R3-E3 Energy Efficiency and Solar Energy Financing.** This measure would facilitate the incorporation of innovative, grant funded or low-interest financing programs for energy efficiency and renewable energy projects for both existing and new developments.
- R3-E4 Cross-Jurisdictional Coordination.** Under this reduction measure the County would coordinate with other local governments, special districts, nonprofit, and other organizations in order to optimize energy efficiency and renewable resource development and usage throughout the County.
- R3-E5 Alternative Energy Development Plan.** The accomplishment of this measure would encourage the County to work with PG&E to explore the possibilities for producing energy by renewable means within the built environment. This would be developed to identify appropriate alternative energy facilities (i.e., photovoltaic) for use within residential and commercial developments.
- R3-E6 Energy Compliance Documentation.** Sutter County currently requires energy compliance documentation and testing with third party certification for new developments.
- R2-W1 County Diversion Program.** This measure would implement a county wide waste diversion plan to further the goal of diverting 75% of all waste from landfills by 2020.
- R2-W2 Construction Diversion Program.** This reduction measure would encourage a diversion of 60% of construction waste by 2020.
- R2-W3 Sutter Pointe Solid Waste Reduction Measures.** All development within the Sutter Pointe Specific Plan area would be required to abide by specific solid waste reduction measures as described in detail in the CAP.
- R3-W1 Encourage Increased Efficiency of the Gas to Energy Systems at Landfills.** This measure would encourage Recology to keep current with upgrades in efficiencies to waste to energy systems and to upgrade as feasible when significant increases in conversion efficiencies are available.
- R3-W2 Waste Education Program.** This measure would build on the Sutter Pointe education program to provide county wide public education and increased publicity about commercial and residential recycling.

- R3-L1 Expand County Tree Planting.** This program evaluates the feasibility of expanding tree planting within the county.
- R3-L2 Heat Island Plan.** The implementation of this measure would include expanding the Sutter Pointe guidelines for cool roofs, cool pavements, and strategically placed shade trees, and parking lot shading to the entire county.
- R2-A1 Agricultural Water Management.** This measure encourages the agricultural community to be cognizant of the necessity of water conservation and to provide access to information on technologies to reduce potable water usage where feasible. This would encourage the County in conjunction with the local water purveyors to explore the feasibility of and promote using recycled water while maintaining water quality and quantity necessary for agriculture purposes.
- R3-A1 Promote Soil Management Practices.** Under this reduction measure the County would promote soil management practices that reduce nitrogen dioxide emissions through strategies such as fertilizer management, nitrification inhibitors, water management, and efficient use of fossil fuels.
- R2-T1 Employment Based Trip and VMT Reduction.** Implementation of this measure would require adopting a voluntary trip reduction ordinance that promotes commuter-choice programs, employer transportation management, guaranteed ride home programs and commuter assistance and outreach type programs intended to reduce commuter vehicle miles traveled.
- R2-T2 Land use Based Trip and VMT Reduction Policies.** This measure will provide a reduction in VMT for the County, by changing the focus of land use away from vehicle centered transportation to the increased densities and lay-outs that foster the implementation and use of alternate modes of transportation.
- R2-T3 Preferential Parking.** Implementation of this reduction measure would encourage the County to adopt a comprehensive parking program for public and private parking lots that facilitate carpooling and alternate transportation.
- R2-T4 Roadway Improvements including signal Synchronization and Transportation Flow Management.** This measure supports the modification of arterial roadways to promote and support multimodal transportation options for automobiles, transit, and trucks.
- R2-T5 Increase the Use of Ridesharing as an Alternative to Single Occupancy Vehicle Use.** This measure promotes the use of ridesharing throughout the County by strengthening the transportation network within the unincorporated County as well as between the unincorporated County and the cities within the county.
- R2-T6 Provide a Comprehensive System of Facilities for Non-motorized Transportation.** This measure requires the County to address bicycle and pedestrian facilities.

- R2-T7 Expand Renewable Fuel/Low-Emission Vehicle Use.** Implementation of this policy would promote the expanded use of renewable fuel and low-emission vehicles.
- R2-T8 Transit Infrastructure Development within Sutter Pointe Specific Plan.** This policy facilitates the reduction of vehicle miles traveled and help to reduce greenhouse gas emissions throughout the county.
- R3-T1 Regional Land Use & Transportation Coordination.** This measure promotes the development and use of transit between the incorporated and unincorporated portions of the county as well as within the unincorporated County.

With the incorporation of the reduction measures listed above, County emissions for 2020 are estimated to be reduced by 229,004 metric tons CO₂e to approximately 1.28 MMT (Table 6.6-5). A target has been set to reduce countywide GHG emission emissions to 1990 levels by 2020 consistent with the State reduction goals contained within AB 32. As summarized here, and demonstrated by the CAP, with the incorporation of the reduction strategy the County is predicted to meet the State reduction goal.

Category	MT CO ₂ e		
	1990	2020 ¹	2020 Reduced ²
Energy	146,001	233,626	178,223
Solid Waste	8,938	12,006	9,359
Landscape Emissions	27	36	36
Agriculture	956,315	792,267	752,739
Transportation	226,910	479,641	348,213
Total	1,338,192	1,517,575	1,288,571
Notes:			
1. This assumes the adjusted buildout without the inclusion of any reduction measures or policies.			
2. This assumes the adjusted buildout factoring in the reduction measures and policies.			
Source: Draft CAP, PBS&J, 2010.			

IMPACTS AND MITIGATION MEASURES

Methods of Analysis

To determine potential impacts the analysis contains a quantification of an inventory of the County's GHG emissions, as well as a qualitative analysis of compliance with the emission reduction strategies contained in federal, state, and local legislation.

The analysis is tailored to include all projected emission sources within the county in 2030 while providing, to the fullest extent feasible, a comprehensive analysis of GHG impacts and mitigation measures available to reduce impacts.

Sutter County's main contribution to GHGs is carbon dioxide. Future development in the County would directly generate emissions of CO₂ primarily in the form of vehicle exhaust, consumption of natural gas for heating and agriculture production. Sutter County would also generate emissions from methane and nitrous oxide. Methane is directly generated through agricultural production, natural gas, petroleum systems and wastewater treatment. Nitrous oxide results predominately from agricultural production and motor vehicle use.

Equations used in the calculations of GHG's are included in Appendix E. Calculations of GHG's for the 2030 inventory are included in Appendix E. GHG emissions are typically segregated into direct and indirect sources. However, direct and indirect sources are not completely independent of each other and are often combined into other more encompassing categories. For example, although natural gas combustion is a direct source and electricity generation is an indirect source, they both are typically discussed under a heading of "Energy" when policies are put in place to reduce emissions. Therefore, this analysis discusses emissions with respect to the general source categories of energy, solid waste, landscape emissions, transportation, and agriculture.

In this analysis, Business-As-Usual (BAU) refers to continued operations and development of the county without the inclusion of proposed policies, CAP reduction measures or additional mitigation. The BAU scenario includes the adjusted buildout level of development and describes how emissions would be in year 2030, if the emissions inventory continued to grow strictly based upon the land use growth projections for the county and the naturally occurring events that might change the character of emissions. Therefore, BAU follows a linear growth pattern with minor changes associated with the increasing density that is naturally occurring due to the increasing density of the county. There is a modest reduction in vehicle miles traveled based on densification, but BAU does not include any of the specific programs (i.e., General Plan policies or CAP reduction measures) that Sutter County is proposing.

Energy

Electricity

The County emits CO₂, CH₄, and N₂O through the use of electricity. PG&E provides electricity from a variety of sources including natural gas, nuclear, large hydroelectric, renewable and coal. Each of these sources of electricity emits different levels of GHGs. The annual usage in megawatt hours per year (MWh/year) was multiplied by the PG&E emission factors for CO₂, CH₄, and N₂O to determine emissions from these sources.

Natural Gas

The County emits GHGs from the combustion of natural gas. The annual natural gas usage for the county in million British Thermal Units (MMBTUs) was multiplied by the respective emissions factors for CO₂, CH₄, and N₂O to determine the emissions from natural gas combustion, typically used for heating.

Potable Water

Electricity is needed to move and treat water. Water Works District No. 1 (WWD #1) is responsible for providing water and wastewater services to the Community of Robbins. The water system currently operates one active ground water well, one backup ground water well and one storage tank that provides the Community's residents with potable water. The remainder of the water in the county is from wells associated with individual land uses. In order to avoid double counting of emissions, the electricity used to draw water from these wells is included in the electricity consumption of these uses instead of quantifying emissions based on the number of gallons used per day.

Electricity from Potable water supplied by the WWD #1 is calculated by multiplying annual gallons of water purchased by a conversion factor for the amount of MWh of electricity used to treat and transport the water to Robbins. Emissions are then determined for electrical consumption as discussed above.

Wastewater Treatment

Wastewater treatment within Sutter County is either through onsite septic systems or through a Septic Tank Effluent Pumping (STEP) system. The STEP system serves the communities of Robbins, Rio Ramaza and a subdivision in Tierra Buena. The STEP system treats on average 10 million gallons of wastewater per year using primary and secondary treatment technology. As a conservative estimate of wastewater generation, 100 percent of all of the potable water is assumed to be exported as wastewater. As with potable water, emissions from wastewater are determined based on the electricity needed to pump and treat the wastewater. A majority of wastewater is treated via septic systems/tanks.

Solid Waste Management

Emissions from solid waste are determined as the sum of emissions generated by transportation from its source to the landfill, the equipment used in its disposal at the landfill, and the fugitive emissions from decomposition in landfills.

Emissions from the transportation of solid waste is determined based on the annual pounds per year (lbs/year) of total waste disposed in landfills, the density of the waste, the capacity

of the hauling trucks, the average number of miles traveled by each truck; and the CO₂, CH₄, and N₂O emissions generated per mile traveled.

Emissions from the equipment used at the landfills is calculated by determining the average hours of operation per day, the number of days of operation, and the emission factors for disposal equipment for CO₂, CH₄, and N₂O as determined from CARB off-road mobile source emission factors. However, according to current methodologies, these emissions are not included in the following inventories because the landfills are not under the jurisdiction of the County and therefore the County has no direct control over the emissions generated from onsite operations.

Fugitive emissions of methane from the decomposition of solid waste are calculated based on annual waste generation multiplied by the respective emission factors for waste production for CH₄. Although CO₂ is a bi-product of waste decomposition, the EPA considers these emissions to be natural and not anthropogenic and therefore they are not included in the emissions inventories. Nitrous Oxide is not a bi-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated from this source.

Landscape Emissions

Emissions of CO₂, CH₄, and N₂O are generated by the use of landscape equipment through the combustion of gasoline. CO₂ emissions were determined directly through URBEMIS2007. URBEMIS2007 is a computer software package that is used for modeling projected emissions of air quality pollutants including carbon dioxide. From the CO₂ emissions, the approximate number of gallons of gasoline consumed through landscape equipment use was calculated. This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1⁹ to determine both CH₄ and N₂O emissions.

Transportation

On-Road Vehicles

Carbon dioxide emissions from vehicles were calculated using EMFAC2007 emission factors through the URBEMIS2007 model for the 2030 inventory. Motor vehicle emissions of CH₄, and N₂O were also calculated using U.S. EPA emission factors for on-road vehicles based on the total annual mileage driven (as obtained from URBEMIS2007) multiplied by their respective emission factors. Vehicle miles are determined through URBEMIS based on the number of dwelling units for residential land use types, or the square footage of commercial and industrial lands use types. URBEMIS2007 assumes that all vehicles are either gasoline or diesel powered. The estimates therefore do not account for electrical, biodiesel (a blend of diesel and vegetable oil), or hydrogen powered systems. Any electrically powered vehicles

9 California Climate Action Registry, Local Government Protocol, Version 1.1, May 2010.

which draws its power from a residence, commercial, or industrial land use, will be accounted for in the electrical usage for the County. Predicted 2030 BAU (or adjusted buildout) vehicle trips were based on the project specific traffic study prepared for the EIR.¹⁰

Airport

In 2008, the Sutter County airport accommodated approximately 77 planes predominantly for agricultural use. The GHG emissions from the usage of the aircraft were calculated based on the annual fuel consumption and the emission factors for airplane fuel for CO₂, CH₄, and N₂O. The consumption of fuel from an airport of this size is a minor portion of the total transportation emissions for the County. The assumption was made that, following current trends, agriculture would, if anything decrease and thereby decrease the consumption of airplane fuel. A conservative analysis for 2030 emissions was based on the number of aircraft and amount of fuel used at Sutter County airport remaining constant.

Agriculture

Agricultural activities contribute directly to emissions of greenhouse gases through a variety of ways. Assessment of non-carbon-dioxide emissions are from the following source categories: enteric fermentation in domestic livestock, livestock manure management, rice and other crop cultivation, and field burning of agricultural residues.

Livestock emissions are divided into two categories based on the emissions source: enteric fermentation and manure management. Enteric fermentation is defined as a fermentation process that takes place in the stomach of ruminant animals. This process produces methane that is released through belching and flatulence. Manure management is the process of gathering and disposing of manure from livestock. Management practices vary by type of livestock, but in the case of dairy cows, manure is often collected and stored in lagoons. As the manure breaks down, methane is released.

Methane and nitrous oxide are the primary greenhouse gases emitted from crop cultivation and associated activities. Rice cultivation and field burning of agricultural residues are major contributing sources of agricultural CH₄.¹¹

Agricultural related emissions for year 2030 were estimated assuming that there is no growth in Agriculture and, conservatively, that the only reduction in Agriculture is attributed to the reduction in rice production from build-out of the Sutter Pointe Specific Plan area.

10 DKS Associates, 2010, traffic study for the Draft 2030 Sutter County General Plan.

11 U.S. EPA, 2009 U.S. Greenhouse Gas Inventory Report, Section 6 Agriculture, <www.epa.gov/climatechange/emissions/downloads09/Agriculture.pdf>, accessed February 2010.

Proposed Sutter County General Plan Goals and Policies

The following goals and policies from the proposed General Plan relevant to greenhouse gases within the entire policy area are listed below.

AGRICULTURAL RESOURCES ELEMENT (AG)

Natural Resources for Agriculture (Sustainability)

Goal AG 3 Protect the natural resources needed to ensure that agriculture remains an essential and sustainable part of Sutter County's future.

Policies

AG 3.1 **Efficient Water Management.** Support the efficient management and use of agricultural water resources where economically feasible to support agriculture.

AG 3.2 **Water Conservation and Recycling.** Support the efforts of the multiple water agencies operating in Sutter County to adopt water conservation practices and explore the feasibility of water recycling for agriculture.

AG 3.3 **Water Quality and Quantity.** Maintain water resource quality and quantity for the irrigation of productive farmland.

AG 3.6 **Groundwater Resources.** Support the efforts of the local water agencies to promote groundwater recharge, conjunctive use, conservation of significant recharge areas, and other activities to protect and manage Sutter County's groundwater resources.

AG 3.7 **Alternative Energy.** Support the use of energy-saving technologies and alternative energy sources (solar, wind, biofuels) in all agricultural industries and operations such as the pumping of irrigation water, food processing, and water treatment. Support the use of alternative energy-powered farm vehicles and trucks.

AG 3.9 **Chemical Use.** Support the efforts of growers to follow state and federal regulations concerning the use of pesticides, herbicides, and manufactured fertilizers.

Agricultural Industries

Goal AG 4 Provide for growth, expansion, and diversification of Sutter County's agricultural industries.

Policies

AG 4.1 **Transportation Systems.** Maintain existing regional transportation systems to support the local, national, and global movement of agricultural products. Support the extension of freight rail into Sutter County's industrial areas.

AG 4.3 **New Technologies.** Support the development and use of new technologies that facilitate resource efficient operation of agriculturally related industries, including

food processing. These technologies may include: energy development technologies, such as wind, solar and waste sources; energy and water conservation technologies; cultivation practices; global positioning system (GPS) applications; and others that improve the profitability of agriculture in Sutter County. (New)

AG 4.4 **Farmworker Housing.** Collaborate with incorporated cities, rural communities, the agricultural industry, and housing developers to provide affordable housing for farmworkers.

AG 4.6 **Local Processing.** Support the local processing and distribution of agricultural products grown in Sutter County and other nearby locations.

AG 4.7 **Local Purchasing.** Promote Sutter County farmers' efforts to market their produce locally including the purchase and consumption of locally-grown and processed foods by local households, institutions, and businesses.

AG 4.12 **Support Uses.** Facilitate agricultural production by allowing agriculture related support uses, such as processing, storage, packaging, and soil preparation services, to be conveniently and accessibly located in agricultural production areas when related to the primary agricultural production in the area. Such uses shall be allowed by discretionary permit approval, subject to all of the following criteria:

- a. The use shall provide a service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operation characteristics;
- b. The use should not be sited on productive agricultural land if less productive land is available in the immediate vicinity;
- c. The operational or physical characteristics of the use shall not have a significant adverse impact on water resources or the use or management of surrounding agricultural properties.

Implementation Programs

AG 4-A Work with the cities and other appropriate agencies and interests to establish a marketing committee to promote Sutter County agriculture through the following and other means: agricultural industry promotional activities, including farmers' markets; agri-tourism marketing; marketing of locally-grown food; and promotion of events that expose residents of urban places to agricultural activities and issues.

LAND USE ELEMENT (LU)

Countywide Land Use

Goal LU 1 Promote the efficient and sensitive use of lands to protect and enhance Sutter County's quality of life and meet the needs of existing and future residents and businesses.

Policies

- LU 1.2 **Balanced Land Use Pattern.** Maintain a balance of land uses that allows residents the opportunity to live, work, and shop in the County.
- LU 1.3 **Adequate Land Use Supply.** Retain an adequate supply of Commercial and Employment designated land to promote a wide range of employment and revenue generating land uses, provide a choice of sites, and enhance the County's jobs to housing ratio and fiscal vitality.
- LU 1.11 **Efficient Land Use Patterns.** Encourage land use patterns that support the efficient use of resources, enhance the timely provision of services and infrastructure, promote a variety of transportation modes, facilitate pedestrian mobility, and support health and wellness.

Rural Communities

Goal LU 3 Protect the character of the County's unincorporated rural communities while allowing appropriate opportunities for new growth.

Policies

- LU 3.5 **Infill Development.** Encourage infill development within rural communities prior to expansion beyond current community boundaries.
- LU 3.9 **Rural Hubs.** Promote opportunities to enhance rural communities as retail, service, and employment hubs for local residents as well as the residents in surrounding agricultural areas.
- LU 3.12 **Mixed Use.** Provide opportunities for mixed-use projects, such as second floor residential units above commercial businesses, within rural communities.

General Growth

Goal LU 4 Facilitate orderly, well planned, sustainable, and efficient growth that balances aesthetic, functional, resource, and economic considerations.

Policies

- LU 4.8 **Quality New Development.** Require high quality, efficient, and well designed new development.
- a. Use significant natural, historic, and visual site features to guide site planning and design, and incorporate such features as focal points when feasible.
 - b. Enhance scenic views to the Sutter Buttes, rivers, agricultural lands, and other visual resources through project siting and design.
 - c. Provide for a mix of interconnected uses and a compact development form that makes efficient use of the land.
 - d. Facilitate non-automobile transportation modes.

- e. Screen visually obtrusive activities and facilities from roadways and other public spaces through the use of landscaping, walls, building orientations, and other methods.
- f. Design and locate lighting to avoid spillage and glare on adjacent properties and protect the rural night sky.

LU 4.15 **Residential Neighborhoods.** Provide for the development of new residential neighborhoods that are diverse, distinct, and highly livable.

- a. Establish a network of attractive streets, sidewalks, paths and other routes that promote neighborhood connectivity, a pedestrian friendly environment, and safe and convenient access to parks, schools, and adjacent uses.
- b. Promote diversity of architecture, materials, colors, and rooflines within neighborhoods.

Implementation Programs

LU 1-B Complete a comprehensive review of the Sutter County Design Guidelines and amend as appropriate to:

- Minimize land use conflicts between uses;
- Define Agricultural buffers;
- Define Industrial and Commercial buffers;
- Incorporate Landscape Design measures from the Climate Action Plan;
- Discourage strip development along key roadways and highways;
- Enhance the design of development located along roadways and highways to protect quality views;
- Ensure compatible new development in agricultural areas;
- Preserve and protect local landmarks and significant natural resources within rural communities;
- Define appropriate design standards to enhance rural communities;
- Define gateways to rural communities;
- Require high quality, efficient, and well designed new development;
- Promote well defined, diverse and distinct residential neighborhoods and housing;
- Address street frontages, pedestrian access, compatibility with surrounding uses, architectural design, scale and massing, screening, sign design, transit facilities, visual impact of parking areas, and shared access and parking or new commercial and industrial uses;
- Ensure compatible design of public facilities; and,
- Establish Industrial Commercial and Employment Corridor buffers.

LU 1-C Complete a comprehensive review of the Sutter Zone Code and amend as appropriate to:

- Prohibit new Agriculture Rural Community and Ranchette zoning and uses;
- Allow for the Commercial Recreation Overlay;
- Limit new Estate Residential development;
- Allow mixed use developments including employee-serving businesses within industrial areas;
- Allow for the development of second residential units in appropriate zones;
- Provide for consistent signage and flexible development standards for new commercial and industrial uses;
- Provide for expedited Design Review processing within the Employment Corridor;
- Make necessary changes to ensure consistency between the Sutter County Zoning Code and the General Plan.

LU 3-A Consider preparing and adopting a Community Plan for each rural community to supplement the policies of General Plan. The Community Plan for each rural community may address: assignment of land uses and development patterns; land use compatibility; infill development and community expansion; infrastructure and services; economic development opportunities; community character and design; and other issues relevant to each community.

MOBILITY ELEMENT (M)

Streets and Highways

Goal M 2 Provide for the long-range planning and development of the County's roadway system and the safe, efficient, and reliable movement of people and goods throughout Sutter County.

Policies

M 2.9 **External Development Mitigation.** Coordinate with the cities and neighboring counties to require new development within those jurisdictions to analyze and fully mitigate their impacts to Sutter County roadways through construction of improvements and/or fair share funding of improvements within Sutter County.

Transit

Goal M 3 Promote a safe and efficient transit system to reduce congestion and provide viable alternatives to automobile use.

Policies

M 3.1 **Transit Service for Residents.** Support development of transit facilities in strategic locations, including areas of concentrated activity, density, and intensity.

- M 3.2 **Transit in New Development.** Require new, large-scale developments to facilitate the provision of adequate transit service for users and to coordinate with local transit agencies to situate transit service and stops at locations that are convenient and accessible to users.
- M 3.3 **Transit Integration.** Support multi-modal stations at appropriate locations to integrate transit with other transportation modes.
- M 3.4 **Reduce Vehicle Miles Traveled.** Implement, as appropriate, reduction measures in the Climate Action Plan targeted to facilitate the reduction in vehicle miles traveled and help to reduce greenhouse gas emissions. Such measures include implementing the conceptual transit plan for the Sutter Pointe Specific Plan area, which provides phased transit service.

Implementation Programs

- M 3-A Coordinate with local transit agencies to ensure that residents have convenient transit service to workplaces, government services, shopping, and other destinations, as funding allows. Coordinate with Yuba-Sutter Transit in periodically reviewing and updating the transit plan for the County.
- M 3-B Cooperate with Yuba-Sutter Transit as they identify potential locations for rideshare facilities.
- M 3-C Condition new development to construct or fund transit stops and hubs with upgraded amenities such as pull-outs, sheltered stops, benches and lighting, where appropriate.

Standards of Significance

For the purposes of this EIR, impacts to climate change are considered significant if implementation of the proposed General Plan would:

- generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment; or
- conflict with any plan, policy, or regulation of an agency adopted for the purpose of reducing emissions of greenhouse gases.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the above determinations. However, the FRAQMD does not have established thresholds for evaluating impacts from GHG emissions. Therefore, the County defines significance as follows. The implementation of the General Plan would be considered significant if operational activities would:

- exceed the reduction goals stipulated within the Sutter County CAP and by AB 32. Specifically the goal of reducing down to 1990 GHG emission levels by 2020 and maintaining the reduced level of emissions in post 2020 years.

Impacts and Mitigation Measures

6.6-1 Implementation of the proposed General Plan could generate greenhouse gases that would either directly or indirectly have a significant impact on the environment.

Implementation of the proposed General Plan would generate greenhouse gases through the construction and operation of new residential and commercial uses. Greenhouse gas emissions assumed under the adjusted buildout scenario would specifically arise from project construction and from sources associated with project operation, including direct sources such as motor vehicles, natural gas consumption, solid waste handling/treatment, and indirect sources such as electricity generation. Emissions from these operational sources are estimated and presented below.

Construction of future land uses would result in GHG emissions from the use of construction equipment. However, the details of these future construction activities are unknown at this time and, therefore, cannot be quantified. Proposed policies and mitigation measures identified in the CAP as well as below would contribute to reducing construction-related emissions. Individual projects would have to undergo additional project-specific environmental analysis in order to determine significance with respect to combined construction and operational activities. However, because construction activities are temporary and the total impact is amortized over the life of the project, impacts from construction are anticipated to represent only a minor portion of the total project GHG inventory. That, along with the incorporation of reduction measures included in the air quality analysis (see Section 6.4) and those presented below, would reduce construction-related GHG impacts to a less-than-significant level.

A detailed emissions inventory for the BAU scenario for Sutter County is presented below by source type. Emissions calculations are included in Appendix E. Table 6.6-6 summarizes the emissions associated with the BAU scenario, which assumes the same level of development as the adjusted buildout but does not factor in any of the proposed General Plan policies or CAP reduction measures. Table 6.6-6 also includes the adjusted buildout scenario assuming implementation of proposed General Plan policies and CAP reduction measures. The total emissions from electricity also includes indirect energy emissions associated with pumping and treating potable water and wastewater. Energy emissions represent approximately 19 percent and 16 percent of the total GHG emissions generated by Sutter County in 2030 under BAU and adjusted buildout respectively. Solid-waste-related emissions represent approximately one percent, and landscape emissions are less than one percent of the total GHG emissions generated by Sutter County in 2030 under both BAU and adjusted buildout.

Agricultural emissions represent the majority of County emissions accounting for 42 and 49 percent of all emissions respectively for 2030 BAU and adjusted buildout scenarios. Transportation emissions do not include pass-through traffic on the freeways within Sutter County and only account for vehicle trips related to Sutter County land uses as starting points and destinations. Transportation-related emissions represent approximately 38 and 34 percent of the total GHG emissions generated by Sutter County in 2030 respectively under BAU and adjusted buildout scenarios.

Category	MT CO ₂ e	
	BAU	Adjusted Buildout
Electricity	129,434	65,454
Natural Gas	215,552	178,278
Solid Waste	21,899	16,907
Landscape Emissions	40	40
subtotal	366,925	260,679
Agricultural Emissions		
Enteric Fermentation	24,248	22,572
Manure Management	29,780	27,515
Rice Cultivation	171,663	137,331
Agricultural Residue Burning	3,011	3,011
Crop Growth	378,097	372,557
Animals and Runoff	77,806	76,704
Fertilizer Use	101,392	99,760
subtotal	785,997	739,450
Transportation		
On-Road Emissions	693,377	500,260
Airport Emissions	155	116
subtotal	693,532	500,377
Total	1,846,454	1,500,505
Source: PBS&J, 2010.		

Table 6.6-7 summarizes the net 2030 County emissions of CO₂e broken down by emissions source category in comparison with 1990 levels under both the BAU and adjusted buildout. As shown, CO₂e emissions are above 1990 levels without the incorporation of any reduction measures.

The State of California has set specific targets for reducing greenhouse gas emissions from the burning of fossil fuels in both power plants and vehicles by adopting various regulations. In addition, State energy efficiency and renewable requirements provide another level of reductions. In order to provide credit to the County for regulatory actions already taken or planned by the State of California, this analysis first evaluated the greenhouse gas reductions that would occur within the county as a result of these actions. Reduction measures that would be incorporated at the county level to provide additional reductions

Category	MT CO ₂ e		
	1990	BAU 2030 ¹	Adjusted Buildout 2030
Energy	146,001	344,986	243,732
Solid Waste	8,938	21,899	16,907
Landscape Emissions	27	40	40
Agriculture	956,315	785,997	739,450
Transportation	226,910	693,532	500,377
Total	1,338,192	1,846,454	1,500,505
Note: 1. BAU does not factor in any reduction measures or policies. Source: PBS&J, 2010.			

in greenhouse gas emissions are discussed here in terms of compliance with the Sutter County CAP and proposed General Plan policies. A complete list of assumptions and reductions is included in Appendix E. Specifically General Plan policies, AG 3.5, AG 3.10, M 3.4, M 7.1, LU 1.11, and LU 1.12 would further reduce GHG emissions.

In addition, the proposed CAP includes a variety of reduction measures to be implemented at the County level that would further reduce GHG emissions. Because the information known about climate change, along with the technologies and methodologies used to reduce and analyze emissions is constantly changing, the CAP will need to be updated on a regular basis in order to adequately characterize the County's contribution to GHG impacts. The CAP estimates potential impacts based on the known methodologies and reduction measures for growth between 2008 and 2020. On or before 2020, the County will need to update the CAP in order to account for the emissions attributable to the post 2020 growth of Sutter County through 2030. The revised CAP will take into account new regulatory requirements, review the emissions reductions strategy, and provide additional reduction measures to reduce impacts from the County's growth.

Under the BAU scenario the impact is significant without incorporation of any General Plan policies or reduction strategies set forth in the CAP. Under the adjusted buildout scenario assuming incorporation of General Plan policies and CAP reduction measures the impact is *significant* for the ten years between 2020 and 2030.

Full Buildout Analysis

Under the full buildout scenario, the same effects would occur as discussed above under the adjusted buildout scenario. The increase in GHG emissions would be significant without factoring in any of the reduction measures included in the CAP. However, the additional

growth that could occur under full buildout would go beyond 2030 and future planning efforts and environmental analysis would address this additional growth and the potential implications of this growth. Any future development would be subject to rigorous review to determine impacts to historical resources in accordance with CEQA. Table 6.6-8 shows a comparison between GHG emissions for 1990 and what would occur if the full buildout scenario was accomplished by 2030. Given the level of growth and the current limitations on technology to further reduce emissions, impacts from the full buildout scenario in 2030 would not meet the 1990 reduction threshold, even including the General Plan policies, CAP reduction measures and additional mitigation included under the 2030 adjusted buildout scenario.

Category	MT CO ₂ e		
	1990	2030 ¹	2030 Reductions ²
Energy	146,001	525,526	335,883
Solid Waste	8,938	19,744	13,830
Landscape Emissions	27	40	40
Agriculture	956,315	777,724	722,283
Transportation	226,910	1,296,745	673,076
Total	1,338,192	2,619,778	1,745,112
Notes:			
1. Assumes full buildout without factoring in any reduction measures or policies.			
2. Assumes full buildout including reduction measures and policies.			
Source: PBS&J, 2010			

Mitigation Measure

By 2030, Sutter County is projected to emit a total of 1.8 MMT of CO₂e without the incorporation of reduction measures. With incorporation of General Plan policies and reduction measures set forth in the CAP the 2030 adjusted build out emissions would be 1.5 MMT of CO₂e and would exceed the 1990 threshold (see Table 6.6-7). If adopted, the CAP would need to be updated by 2020 to address any new regulatory requirements for GHG reductions or, in their absence, to ensure the County's continued compliance with maintaining the 1990 GHG emission level beyond 2020. The addition of the following reduction measures would help to further reduce emissions after 2020 in compliance with the goal of AB 32 by maintaining 1990 GHG emission levels beyond 2020.

Table 6.6-9 shows the comparison between the 1990, 2030 BAU, and 2030 adjusted buildout scenarios with all reduction measures and policies specified in the CAP as well as Mitigation Measure 6.6-1. As shown, the reductions afforded to the County reduce projected GHG emissions for 2030 to below 1990 levels. Therefore, impacts with respect to emitting

significant levels of GHGs after 2020 and before 2030 are *less than significant*. The mitigation presented below is based on current technology and assumed technological progress. While the mitigation would effectively reduce 2030 emissions to maintain 1990 levels, it is possible that during the revision of the CAP in 2020, new technologies and reduction strategies may be equally or more effective.

Category	MT CO ₂ e		
	1990	2030 ¹	2030 Reductions ²
Energy	146,001	344,986	234,786
Solid Waste	8,938	21,899	15,671
Landscape Emissions	27	40	40
Agriculture	956,315	785,997	722,283
Transportation	226,910	693,532	362,332
Total	1,338,192	1,846,454	1,335,112
Notes:			
1. Assumes adjusted buildout without factoring in any reduction measures or policies.			
2. Assumes adjusted buildout including reduction measures, mitigation, and General Plan policies.			
Source: PBS&J, 2010.			

6.6-1 The following criteria, or equally effective measures, shall be added to the CAP as interim post 2020 reductions to account for the increased emissions due to growth between 2020 and 2030.

R2-T8: The 2030 analysis assumes that the Sutter Point Specific Area's Conceptual Transit Plan is built-out.

R2-E4: The 2030 analysis assumes an increase in electrical energy efficiency through the strengthening of Title 24 regulations.

R2-E5: The 2030 analysis assumes an increase in natural gas energy efficiency through the strengthening of Title 24 regulations; R2-E3 and R2-E5: The 2030 analysis assumed that community participation in the retrofit programs would equal 30% by 2030.

R2-E6 and R2-E7: The 2030 analysis assumes that the commercial and industrial retrofit programs will have a minimum of 35% participation from businesses within Sutter County.

R2-E9: The 2030 analysis assumes that water efficiency is increased to 30%.

R2-W1 and R2-W3: The 2030 analysis assumes that an 80% diversion rate for non-construction generated solid waste is achieved.

R2-W2: The 2030 analysis assumes a 70% diversion rate for construction related solid waste is achieved.

6.6-2 Implementation of the proposed General Plan has the potential to conflict with the reduction of greenhouse gas emissions per the Sutter County Climate Action Plan and AB 32.

As indicated in Impact 6.6-1, the reduced 2030 emissions scenario would result in a reduction of over 503,069 metric tons of CO₂e and would reduce anticipated emissions to below 1990 levels. Because the 1990 target emission level is consistent with both the CAP and with AB 32, and emissions from 2030 build-out conditions are reduced to below the target emissions level, buildout of the General Plan would not conflict with the reduction of GHG emissions in the CAP. Therefore, the implementation of the General Plan would have a *less-than-significant impact* on climate change.

Mitigation Measure

None required.