Appendix A: The Greenhouse Effect, Greenhouse Gases, and Climate Change Impacts

GLOBAL CLIMATE CHANGE

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient 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 the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone, and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities such as producing electricity and driving vehicles have contributed to the elevated concentration of these gases in the atmosphere. This in turn, is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Leading scientists around the world agree that Global Warming Potential is a reality and that human activities are disrupting the earth's climate by intensifying the greenhouse effect.

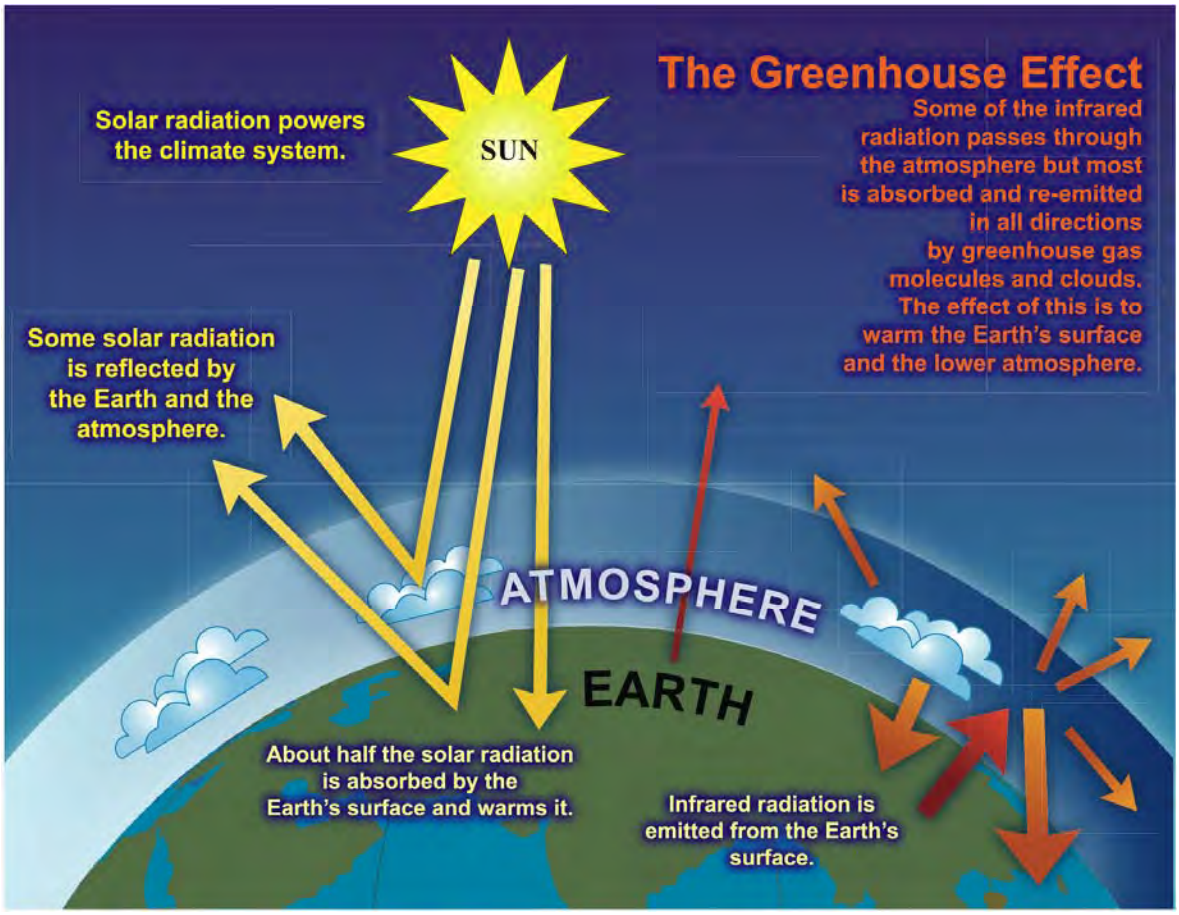
1. THE GREENHOUSE EFFECT

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping solar heat. This phenomenon is known as the greenhouse effect. As sunlight passes through our atmosphere, the incoming solar radiation is eradiated from the Earth's surface as heat energy. Greenhouse gases trap some of this reradiated energy, which warms the Earth. Figure A-1 illustrates the Greenhouse Gas Effect.

2. GLOBAL WARMING

The natural "greenhouse effect" allows the Earth to remain warm, and sustain life, and helps determine the existing climate. The increased consumption of fossil fuels (wood, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. As atmospheric concentrations of greenhouse gases rise, so do temperatures. Over time this rise in temperatures would result in climate change. Theories concerning climate change and global warming existed as early as the late 1800s. By the late 1900s the understanding of the Earth's atmosphere had advanced to the point where many climate scientists began to accept that the Earth's climate is changing. Today, many climate scientists agree that some warming has occurred over the past century and will continue through this century.

Figure A.1 - The Greenhouse Gas Effect



Source: IPPC, 2008

The United Nations Intergovernmental Panel on Climate Change predicts that changes in the Earth's climate will continue through the 21st century and that the rate of change may increase significantly in the future because of human activity. Many researchers studying California's climate believe that changes in the earth's climate have already affected California and will continue to do so in the future.

3. GREENHOUSE GASES

Changes in climate result from radiative forcings and feedbacks. 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."[1]

Individual GHGs have varying global warming potential (GWP) and atmospheric lifetimes. The carbon dioxide equivalent (CO_2e) is a consistent methodology for comparing greenhouse gas emissions since it normalizes the various greenhouse gases to a consistent metric. The reference gas for GWPs is carbon dioxide, which has a GWP of one. By comparison, methane's GWP is 21, as CH_4 has a greater global warming effect than CO_2 on a molecule-to-molecule basis.[2] In order to combine the impacts of multiple greenhouse gases, the carbon dioxide equivalent metric is used. CO_2e is the total amount of each individual greenhouse gas multiplied by that gas's GWP.

Atmospheric lifetimes vary from 1.5 (HFC-152a) to 50,000 years (tetrafluoromethane). One teragram (equal to one million metric tons) of carbon dioxide equivalent (Tg CO_2 Eq.) is the mass emissions of an individual GHG multiplied by its GWP. The atmospheric lifetime and GWP of selected greenhouse gases are also summarized in Table A.1.

Table A.1 Global Warming Potentials and Atmospheric Lifetimes

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 (CF4)	50,000	6,500
PFC: Hexafluoroethane (C2F6)	10,000	9,200
Sulfur Hexafluoride (SF6)	3,200	23,900
Source: U.S. Environmental Protection Agency, 2006.		

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 it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent).

[1] U.S. Environmental Protection Agency (EPA). 2006a. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.

[2] EPA, 2006. Non CO_2 Gases Economic Analysis and Inventory. Global Warming Potentials and Atmospheric Lifetimes. www.epa.gov/nonco2/econ-inv/table.html

Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

Ozone is also a greenhouse gas; however, unlike other GHGs, ozone in the troposphere is relatively short-lived and therefore is not global in nature. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change (GCC).

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning and incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon Dioxide

The natural production and absorption of carbon dioxide (CO_2) is achieved through the terrestrial biosphere and the ocean. However, humankind has contributed to the alteration of the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these human-caused activities has increased in scale and distribution. Carbon dioxide was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 ppm. Today, they are around 370 ppm, an increase of well over 30 percent[3]. 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. This will result in an average global temperature rise of at least two degrees Celsius (3.6 ^{O}F)[4].

Carbon dioxide emissions are directly generated primarily in the form of vehicle exhaust and in the consumption of natural gas for heating. Carbon dioxide emissions are also generated from natural gas combustion and indirectly through the use of electricity. Other indirect sources of carbon dioxide include the use of potable water and generation of wastewater (potable water and wastewater treatment generates greenhouse gases), and the generation of solid waste.

[3] U.S. Environmental Protection Agency, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, Third Edition, September 2006.
[4] Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate. http://www.ipcc.ch/pub/reports.htm. 2001.

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 some other GHGs (such as carbon dioxide, nitrous oxide, and CFCs). Methane has both natural and anthropogenic (human) 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[5].

Nitrous Oxide

Concentrations of nitrous oxide (N_2O) also began to rise at the beginning of the industrial revolution. Microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen, produce nitrous oxide. The use of fertilizers has increased over the last century. Global concentration for nitrous oxide in 1998 was 314 ppb, and in addition to agricultural sources for the gas, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load[6].

Chlorofluorocarbons

Chlorofluorocarbons (CFCs) have no natural source, but were synthesized for use as refrigerants, aerosol propellants and cleaning solvents. Since their creation in 1928, concentrations of CFCs in the atmosphere have been rising. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs in the atmosphere are now remaining static or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years. Since they are also a GHG, along with such other long-lived synthesized gases as CF_4 (carbontatrafuoride) and SF_6 (sulfurhexafluoride), they are of concern. Another set of synthesized compounds called HFCs (hydrofluorcarbons) are also considered GHGs, though they are less stable in the atmosphere and therefore have a shorter lifetime and less of an impact[7]. CFCs, CF_4, SF_6 and HFCs have been banned and are no longer available on the market.

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[5] U.S. Environmental Protection Agency, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, Third Edition, September 2006.

[6] U.S. Environmental Protection Agency, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, Third Edition, September 2006.

[7] U.S. Environmental Protection Agency, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, Third Edition, September 2006.

4. HUMAN AND CULTURAL CAUSES OF CLIMATE CHANGE

Like all other animals, humans participate in the natural carbon cycle, but there are important differences between human and animal activities. By burning coal, oil, and natural gas, humans are adding carbon dioxide (CO_2) to the atmosphere much faster than the carbon in rocks is released through natural processes. Clearing and burning forests to create agricultural land converts organic carbon to carbon dioxide gas. The oceans and land plants are absorbing a portion, but not nearly all of the CO_2 added to the atmosphere by human activities. Human climate drivers include heat-trapping emissions from cars and power plants, aerosols from pollution, and soot particles.

5. IMPACTS FROM GREENHOUSE GAS EMISSIONS

Global Impacts

While in some cases global climate change may temporarily improve certain aspects of a region, such as lengthening the growing season, it is estimated that the ecology of the natural world will not be able to adjust quickly enough to prevent widespread environmental degradation[8]. In California, it is likely that warmer temperatures will result in frequent and longer periods of drought. The majority of the scientific community has stated that beyond doubt, global climate change will be one of the most significant challenges the globe will face in the twenty-first century, and will impact almost every system we depend upon for survival.

Just as humans are affected by climate change, so too are plants and animals. Animals must breathe the same air and are subject to the same types of negative health effects as humans. Certain plants and trees may absorb air pollutants that can stunt their development or cause premature death.

There are also numerous impacts to the human economy including lost workdays due to illness, a desire on the part of business to locate in areas with a healthy environment, and increased expenses from medical costs. Pollutants may also lower visibility and cause damage to property. Certain air pollutants are responsible for discoloring painted surfaces, eating away at stones used in buildings, dissolving the mortar that holds bricks together, and cracking tires and other items made from rubber.

The United States has the highest per capita emissions of GHGs in the world, 22 tons of CO_2 per person per year (see figure 1-2). With only five percent of the world's population, the United

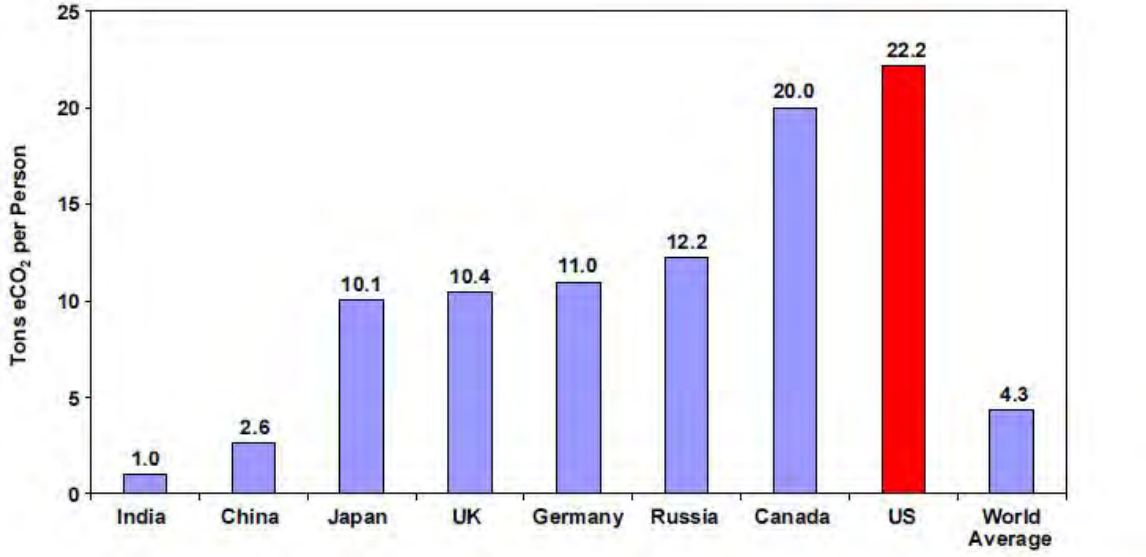
[8] Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate. http://www.ipcc.ch/pub/reports.htm. 2001.

States is responsible for 24 percent of the world's CO_2 emissions. California, despite its strong environmental regulations, is the second largest greenhouse gas polluting state in the nation, and emits 2% of global human-generated emissions. Its largest contribution of CO_2 is from vehicle emissions.

According to the International Panel on Climate Change (IPCC), the following are current worldwide statistics for CO_2 concentrations[9]:

- The atmospheric concentration of carbon dioxide (CO_2) during the last two decades has increased at the rate of 0.4% every year.
- Current CO_2 concentrations are higher than they have been in the last 420,000 years, and according to some research, the last 20 million years.
- About three-quarters of the CO_2 emissions produced by human activity during the past 20 years are due to the burning of fossil fuels.

Figure A-2 – Per Capita CO_2 Emissions from 2001



Source: Energy Information Administration, 2001.

Human Health

According to the Pew Center's report on Human Health and Climate Change, health threats may depend on surpassing a threshold level of a climate factor such as significant change in temperature, precipitation, or storm frequency. Once that threshold has passed, the incidence of disease may drastically increase.

[9] Intergovernmental Panel on Climate Change, Sixteen Years of Scientific Assessment in Support of the Climate Convention, http://www.ipcc.ch/about/anniversarybrochure.pdf. December 2004.

Environmental factors play a significant role in some diseases carried by insects. Warming could make tick-borne Lyme disease more prevalent. Mosquito-borne diseases such as West Nile virus, Dengue Fever, and Malaria could acquire new ranges and access to previously unexposed populations. For example, the temperature range at which the malaria-carrying mosquito lives is sensitive to a mere one-degree in temperature change; thus an overall increase in global temperatures will increase the land areas where it may spread disease. These temperature changes affect not only the mosquitoes, but also disturb and in some cases decrease the habitats of its natural predators.

Ecosystems

Scientists predict serious consequences of global warming. The rapid, unprecedented increase in temperatures accelerates the water cycle, which then increases the occurrence, variability, and severity of storms and drought. Such extreme climate events will potentially disrupt ecosystems and damage food and water supplies. In addition, increased temperatures cause thermo-expansion of the oceans and accelerate the melting of the icecaps, thereby raising the overall level of the oceans. The sea-level rise may have multiple outcomes, including significant environmental disturbances, coastline destruction, major population displacement and economic disruption.

While there is some degree of uncertainty, scientists are able to predict many of the challenges that climate change presents to ecosystems. Warmer temperatures may force some species to higher altitudes or more northern latitudes. This migration may be prevented by human developments that literally block the path as well as non-native species that can out-compete native plants and animals in new locations or make those areas uninhabitable. For example, there is evidence that certain butterflies, often a species that is used to indicate the health of an ecosystem, are moving further north, and are seldom seen in the southern reaches of their range. In addition, warmer temperatures have enabled the Jeffrey pine beetle to have more than one birth cycle per season, lengthening the amount of time this pest is able to damage trees. Furthermore, human impact other than greenhouse gas emissions will exacerbate challenges to ecosystems attempting to reestablish at higher elevations or new locations. According to the UCS report, “In many parts of California, fragmentation of the landscape by human developments, invasions by nonnative species, and air pollution may limit the reestablishment of native ecosystems.”[10]

[10] Union of Concerned Scientists and The Ecological Society of America, 1999 Confronting climate change in California.pdf, November 1999.

Impacts to California

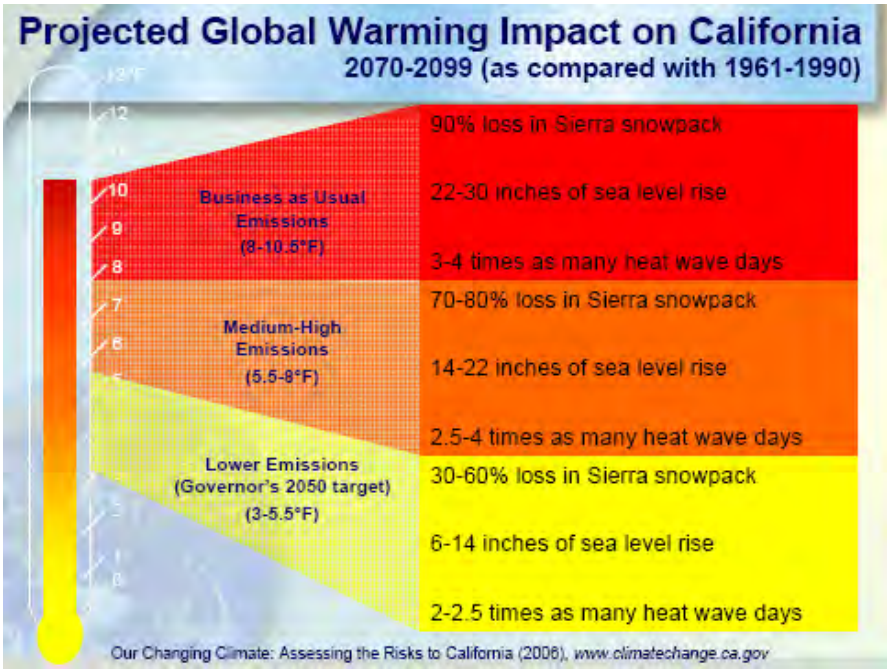
While it is a global problem, influenced by an array of interrelated factors, climate change is also a regional and local problem, with serious impacts foreseen for California, the Northern California Area, and Placer County.

The impacts of climate change will be variable and widespread. Global and local climate change will impact weather, sea-level rise, water resources, ecosystems, human health, economy, and infrastructure.

Projected future climate change may affect California in a variety of ways. Public health can suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agriculture is especially vulnerable to altered temperature and rainfall patterns, and new pest problems. Forest ecosystems would face increased fire hazards and would be more susceptible to pests and diseases. The Sierra snowpack that functions as the state's largest reservoir could shrink by one third by 2060, and to half its historic size by 2090. Runoff that fills reservoirs will start in midwinter, not spring, and rain falling on snow will trigger more flooding. The California coast is likely to face a rise in sea level that could threaten its shorelines. Sea level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges. Figure A-3 illustrates potential impacts from global warming on California (2070-2099)[11].

[11] California Energy Commission, Our Changing Climate Assessing Risks to California: CEC-500-2006-077, 2006.

Figure A- 3 – Projected Global Warming Impacts on California (2070-2099)



Ultimately, in the next few decades, the impacts of climate change on weather in Sutter County, like the rest of California, will see warmer overall temperatures and an increase in precipitation events, with an increase of intensity and frequency of rainstorms.

Climate and Weather

There is a key difference between climate and weather. According to the National Science Foundation report on climate change in California, "Weather is the day-to-day phenomena we experience—sun, rain, fog, warm, cold, wind—that vary greatly. Climate is long term statistical patterns of weather…and is reflected in average temperatures, rainfall, and other weather events at a given location, and climate change is signaled by long-term changes in those averages"[12].

In 1999, the Union of Concerned Scientists and the Ecological Society of America published a report called *Confronting Climate Change in California*, which describes the predicted impacts of climate change in California. According to this report, California has had a 2 °F increase in temperature over the past 100 years, and annual precipitation has decreased by 10-25% in some regions The report also noted that most climate change models predict a temperature increase of 4° F in California in the next 20 to 40 years. These models also projected a decrease in the number of long dry spells, and an annual precipitation increase of 20-30% (with a range of 10-50%) in spring and fall, with somewhat larger increases in winter. One model reveals a large

[12] National Science Foundation, The Potential Consequences of Climate Variability and Change for California, The California Regional Assessment "*A Report of the California Regional Assessment Group*" For the U.S. Global Change Research Program, June 2002.

increase in precipitation over California, particularly in the form of rain, but with dry areas to the east of the Sierra. This regional model projects that winter precipitation over the coastal areas and the Sierra will increase by 25% or more, with an associated risk of increases in winter mud slides and flooding[13].

Much of the anticipated changes in climate will depend on the frequency and strength of the El Niño-Southern Oscillation phenomenon (ENSO). Most global climate change models indicate the possibility of more frequent ENSO events. El Niño historically happens every two to seven years off the west coast of South America, as a result of changes in ocean currents and prevailing winds over the Pacific Ocean. These changes bring warm water from the western oceans, displacing the nutrient-rich cold water that normally wells up on the western coasts of the Americas from deep in the ocean. These changes bring more frequent and extreme weather anomalies, including severe droughts and floods, hurricanes and winter storms. According to the National Science Foundation, "the invasion of warm water disrupts both the marine food chain and the economies of coastal communities that are based on fishing and related industries"[14] The effects of El Niño in California vary across the state, but in the past have included abnormally frequent winter rains and storms, and abnormally dry summers and associated wildfires The 1982-83 El Niño, the strongest event in recorded history, brought $8 billion in economic impacts and $100 million in California alone.

Water Resources

Climate change impacts will bring an additional burden to California's already over-taxed water supply system. According to the IPCC there will be an increase in the number of intense precipitation days and flood frequencies in basins driven by snowmelt, such as California's Central Valley.[15] For this type of basin, the accumulation of snow in winter is the essential "water tower" that stores water until the spring's warmer temperatures begins to melt the snow, forming the streams and rivers that supply the entire watershed with water for the duration of the summer.

Even under normal climatic conditions, 80% of California's annual rainfall occurs in the winter and is stored in the snowpacks of the various mountain ranges. The warmer temperatures associated with climate change will increase rainstorms and decrease snowstorms, shorten the overall snowfall season, and accelerate the rate of spring snowmelt, ultimately leading to more rapid,

[13] Union of Concerned Scientists and The Ecological Society of America, 1999 Confronting climate change in California.pdf, November 1999.

[14] National Science Foundation, The Potential Consequences of Climate Variability and Change for California, The California Regional Assessment "*A Report of the California Regional Assessment Group*" For the U.S. Global Change Research Program, June 2002.

[15] Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate. http://www.ipcc.ch/pub/reports.htm. 2001.

earlier, and greater spring runoff. The anticipated early spring floods are likely to be followed by excessively dry summers.

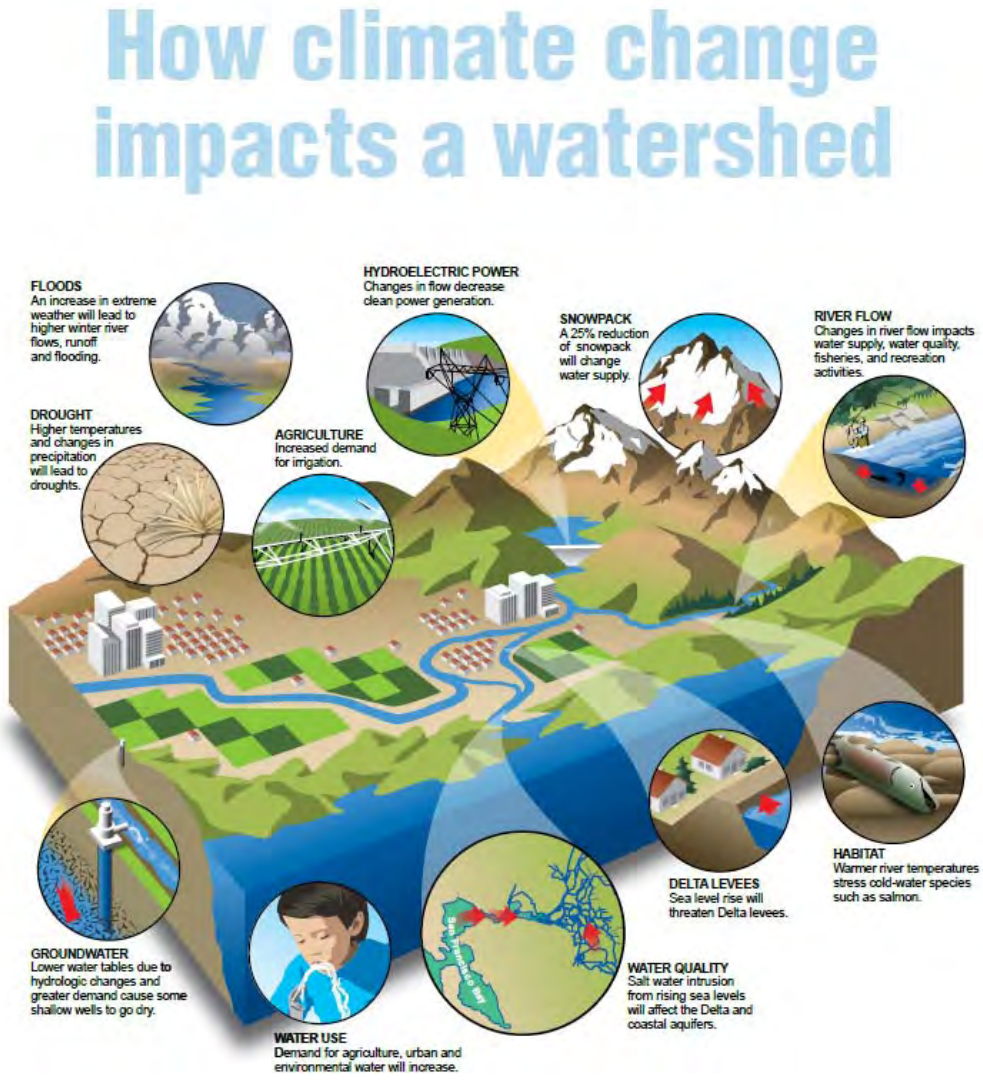
California's water supply is already under stress. According to the Union of Concerned Scientists and The Ecological Society of America, "Currently, every major water supply source in California is at its limit of sustainability, and options for increasing water imports are severely limited"[16]. A combination of natural and human activities is causing this depletion of California water supplies as well as water intrusion and chemical contamination. According to the Union of Concerned Scientists, 95% of the state's wetlands have already been destroyed.

In the past, California Water Resources on a statewide basis has allowed California to meet most of its agricultural and urban water management objectives and flood management objectives in most years. Generally, during a single dry year or two, surface and groundwater storage can maintain most water deliveries, but can result in critically low water reserves. Longer droughts can create numerous problems, including extreme fire danger, economic harm to urban and rural communities, loss of crops, and the potential for species collapse and degraded water quality in some regions. Water demand in California is already increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. Summers with higher temperatures and even less rainfall and runoff than usual will exacerbate demands for water in California.

Climate change magnifies the problems that exist with an aging water infrastructure and growing population. While recent bond measures have provided a down payment for improving California's water and flood systems, climate change presents an ongoing risk that requires a long-term commitment of funding that is properly matched to anticipated expenditures, beneficiaries and responsible parties.

[16] The Union of Concerned Scientists and The Ecological Society of America, Confronting Climate Change in California Ecological Impacts on the Golden State, November 1999.

Figure A-4 – How Climate Change Impacts a Watershed



Source: California Department of Water Resources 2008

Appendix B: Summary, Assumptions and General Formulas

Sutter County
Green House Gas Emissions
Inventory Summary

	Reduced 2020	BAU [1] 2020	% increase from 2008	2008	% increase from 1990	1990
Transportation[2]						
Source:	**MT of CO_2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
1 On-Road Vehicles	348,058	479,486	88.44%	254,455	12.20%	226,778
2 Airport Operations	155	155	0.00%	155	17.65%	132
Total	348,213	479,641	88.38%	254,610	12.21%	226,910
Energy[3]						
Sources:	**MT of CO2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
1 Electric	46,600	83,234	59.49%	52,186	-6.51%	55,823
2 Natural Gas	131,623	150,392	41.29%	106,441	18.03%	90,179
Total	178,223	233,626	47.28%	158,627	8.65%	146,001
Solid Waste[4]						
Source	**MT of CO2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
1 Solid Waste Disposal	9,359	12,006	336.56%	2,750	-69.23%	8,939
2 Green Waste Recycling	DNA					
3 Materials Recycling	DNA					
Total	9,359	12,006	336.56%	2,750	-69.23%	8,939
Landscape Design[5]						
Sources:	**MT of CO2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
1 Landscape Maintenance Emissions	36	36	12.50%	32	20.41%	27
2 Carbon sink from CO_2 sequestration	DNA					
Total	36	36	12.50%	32	20.41%	27
Agriculture[6]						
Sources:	**MT of CO2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
1 Enteric Fermentation	22,572	24,248	0.00%	24,248	-77.14%	106,095
2 Manure Management	27,515	29,780	0.00%	29,780	-77.36%	131,555
3 Rice Cultivation	142,346	177,933	-1.73%	181,067	36.44%	132,703
4 Agricultural Residue Burning	3,011	3,011	-1.33%	3,051	-80.09%	15,329
5 Crop Growth	378,097	378,097	-2.06%	386,054	-2.99%	397,944
6 Animals and Runoff	77,806	77,806	-0.82%	78,453	-25.65%	105,515
7 Fertilizer Use	101,392	101,392	-0.94%	102,351	52.37%	67,173
Total	752,739	792,267	-1.58%	805,005	-15.82%	956,315
Net Total Emissions						
Category	**MT of CO2e**	**MT of CO_2e**		**MT of CO2e**		**MT of CO2e**
Energy	178,223	233,626	47.28%	158,627	8.65%	146,001
Solid Waste	9,359	12,006	336.56%	2,750	-69.23%	8,939
Landscape Design	36	36	12.50%	32	20.41%	27
Agriculture	752,739	792,267	-1.58%	805,005	-15.82%	956,315
Transportation	348,213	479,641	88.38%	254,610	12.20%	226,910
Total	**1,288,571**	**1,517,576**	*24.29%*	**1,221,024**	*-8.76%*	**1,338,192**
Does the County Meet the AB 32 Reduction Goals[7]?	**Yes**					

[1] Business-As-Usual (BAU) refers to continued operations and development of the County without the inclusion of recently-adopted sustainability initiatives. The BAU scenario describes how emissions would be in year 2020, 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.

[2] The relatively small increase in emissions between 1990 and 2008 (12.16%), and between 2008 and 2020 (30.48%) in transportation emissions is due to the increases in efficiency and decreases in emissions from onroad vehicles over the years between 1990 and now. These are incorporated into the emission factors provided by EMFAC for the years modeled. Therefore, although the amount of vehicle miles traveled increased between 1990 and 2008 and then again between 2008 and 2020, the increase in vehicle miles traveled is not directly proportional to the increase in emissions.

Sutter County
Green House Gas Emissions
Inventory Summary

[3] The reduction in emissions from electricity usage between 1990 and 2008 is due to the efficiencies and emission reductions that have been incorporated by PG&E over those 18 years. Electrical usage in 2008 was provided by PG&E at approximately 218 million kWhs. Electrical usage in 1990 was estimated at approximately 208 million kWhs (a 15% change). However, the PG&E specific emission factor for CO2 in 1990 was 620 lbs/MWh, where in 2008 it was 524 lbs/MWh. Therefore, the efficiencies and emission reductions provided by PG&E have resulted in a County wide decrease in emissions even with an increase in electricity use during this period.

[4] The generation of solid waste between 1990 and 2008 increased by approximately 15% due to County growth, however the incorporation of a methane capture system at the landfill has resulted in the decrease in emissions between this same period. The primary source of greenhouse gas emissions from a landfill is the generation of methane from the decomposition of solid waste. In 1990 there was no system in place to capture the methane and therefore the methane was released unchecked into the environment. In the 2008 baseline year, the Recology Ostrom Road Landfill was flaring the methane gas, thereby reducing the amount released into the environment. Further in 2009 The Recology Ostrom Road Landfill began a gas-energy conversion which further reduces the emissions of methane gas which results in even less emissions from waste generation. As the progression of technology increases, there is less methane released to the environment per ton of waste landfilled.

[5] Offroad landscape equipment emissions for the 2008 and 2020 emissions were determined from the URBEMIS model which takes into account the modeling year and projected emissions factors for future years with respect to landscape fuels and technology available. This is the reason for the smaller than expected increase in emissions during this period.

[6] Actual agricultural data was obtained for the County for 1990 and 2008, therefore the resulting decrease in emissions is due to the decrease in the amount of acreage cultivated and the number of animals raised between 1990 and 2008. Agriculture in 2020 was conservatively forecasted. It was assumed that the only reduction in agriculture was as a result of the growth of the Sutter Pointe Community anticipated by 2020. Total growth in 2030 is estimated at 7,527 acres within the Sutter Pointe Specific Plan Area. Approximately 1/3 of that (2,509 acres) is anticipated to be built out by 2020. Given that 70% of the existing Sutter Pointe Specific Plan area is cultivated with rice and the remaining 30% is fallow, it was anticipated that by 2020 there would be a total reduction in rice cultivation of 1,756 acres.

[7] AB 32 sets a statewide reduction goal of achieving greenhouse gas emissions equivalent to 1990 statewide levels by 2020.

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Modeling Assumptions for Greenhouse Gas Emissions

Assumptions

[1] 2008 Electrical Data provided by PG&E for unincorporated Sutter County. Projections for 2030 by PBSJ (2010 GP Update EIR). 1990 historical data and 2020 projections were not available. Electrical usage was estimated for these years as follows:
- 1990 usage estimated as a 0.86% decrease per year for a total of a 15% reduction from existing year usage for all land uses.
- 2020 estimate based on % of total buildout to occur in 2020.

[2] Water is provided by Water Works District NO. 1. This water is supplied to the community of Robbins. There are approximately eighty eight residential connections and approximately five commercial/industrial connections. Other residents of unincorporated Sutter have private wells. Water usage is not metered therefore distribution between residential and commercial was determined based number of connections. Water consumption data was available for 2008 only. Projections for 2030 by PBSJ (2010 GP Update EIR). 1990 and 2020 usage were determined as follows:
- 1990 usage estimated as a 0.86% decrease per year for a total of a 15% reduction from existing year usage for all land uses.
- 2020 estimate based on % of total buildout to occur in 2020.

[3] Sutter County Solid Waste is conducted under a joint powers agreement with Yuba County and the cities of Live Oak, Marysville Wheatland, Yuba City and the City of Gridley in Butte County. Data received from State of California Calrecycle.gov and Recology Ostrom Road Landfill services the Yuba/Sutter JPA. Projections for 2030 by PBSJ (2010 GP Update EIR). Waste generation data only available for 2008. 1990 and 2020 data estimated as follows:
- 1990 generation estimated as a 0.86% decrease per year for a total of a 15% reduction from existing year usage for all land uses.
- 2020 estimate based on % of total buildout to occur in 2020.

[4] Assumes average one way distance of 27.7 miles from waste source to landfill.

[1] 2008 Natural Gas Data provided by PG&E for unincorporated Sutter County. Projections for 2030 by PBSJ (2010 GP Update EIR). 1990 historical data and 2020 projections were not available. Natural Gas usage was estimated for these years as follows:
- 1990 usage estimated as a 0.86% decrease per year for a total of a 15% reduction from existing year usage for all land uses.
- 2020 estimate based on % of total buildout to occur in 2020.

			Growth			
Land Use Data	**2008**	**2020**	**from 2008**	**from 2020**	**2030**	**% total growth in 2020**
Residential Units	9,768	15,181	13,415	8,002	23,183	40.35%
Total com/ind	4,644,200	11,747,232	17,703,400	10,600,368	22,347,600	40.12%

County Data Sources

[1] *Source:* *PG&E John Bohman, Green Communities and Innovator Pilots, received 02/16/2010*

Note: Average estimated per year reduction that will result in the 15% reduction from existing that is standard practice for backcasting from existing to 1990 levels.

[2] *Source:* Department of Water Usage *Sutter County Water Works #1*

[3] *Source:* *Source: State of California, CalRecycle, Disposal Reporting System (DRS),http://www.calrecycle.ca.gov/lgcentral/Reports/ReportViewer.aspx?OriginJurisdictionIDs=593&ReportYear=2008&ReportName=ReportEDRSJurisDisposalByFacility, accessed 03/10/2010*

[4] *Source:* Google Maps; http://maps.google.com/maps?f=d&source=s_d&saddr=Schlag+Rd+%26+Hughes+Rd,+Meridian,+Sutter,+California+95957&daddr=5900+Ostrom+Road,+Wheatland,+CA&hl=en&geocode=&mra=ls&sll=39.093175,-121.567565&sspn=0.398089,0.615921&ie=UTF8&z=11&layer=c&pw=2 ; accessed 4/16/2010

Urbemis deviations from County data:

Trip rates utilized for Urbemis modeling were provided from DKS, Sutter County Traffic Travel Demand Forecast Model Validation and Difference in VMT and ADT due to rounding error in the Urbemis model. Schools and parks have been incorporated into the commercial category in the traffic model. Sutter Airport has been incorporated into the industrial category.

Mobile Source Emissions

	CO_2	CH_4	N_2O	**Abbreviations**
Onroad Emission Factors (g/mile)				
Non Cat passenger Car [5]	480.735	0.1696	0.0197	EF_{MMV}, EF_{NMV}
Cat passenger Car [5]	403.474	0.1355	0.0504	EF_{MMV}, EF_{NMV}
Diesel Passenger Car [5]	373.824	0.0006	0.0012	EF_{MMV}, EF_{NMV}
Non cat light-duty truck [5]	476.139	0.1908	0.0218	EF_{MMV}, EF_{NMV}

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Modeling Assumptions for Greenhouse Gas Emissions

Cat light duty truck [5]	438.471	0.1516	0.0639	EF_{MMV}, EF_{NMV}
Diesel Light duty Truck [5]	358.258	0.0011	0.0017	EF_{MMV}, EF_{NMV}
Non Cat light-duty truck 2 [5]	476.685	0.1908	0.0218	EF_{MMV}, EF_{NMV}
Cat light duty truck 2 [5]	431.99	0.1516	0.0639	EF_{MMV}, EF_{NMV}
Diesel Light duty truck 2 [5]	369.35	0.0011	0.0017	EF_{MMV}, EF_{NMV}
Non Cat Medium duty Truck [5]	605.047	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat med duty truck [5]	649.935	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Med duty truck [5]	362.668	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat lite-heavy duty truck [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat Light-heavy duty truck [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Lite-heavy duty truck [5]	642	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat lite-heavy duty truck 2 [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat Light-heavy duty truck 2 [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Lite-heavy duty truck 2 [5]	642	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat med-heavy duty truck [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat med-heavy duty truck [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel med-heavy duty truck [5]	1505	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non cat Heavy Duty truck [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat heavy duty truck [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel heavy duty truck [5]	1924.234	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat Other Bus [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat other bus [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Other Bus [5]	1505	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat Urban Bus [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat Urban Bus [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Urban Bus [5]	3020.114	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non cat motorcycle [5]	107.73	0.0672	0.0069	EF_{MMV}, EF_{NMV}
Cat motorcycle [5]	0.0000	0.0672	0.0069	EF_{MMV}, EF_{NMV}
Diesel Motorcycle [5]	0.0000	0	0	
Non Cat School Bus [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat School Bus [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel School Bus [5]	1505	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Non Cat Motor home [5]	567.895	0.4181	0.0473	EF_{MMV}, EF_{NMV}
Cat Motor home [5]	567.895	0.2356	0.1317	EF_{MMV}, EF_{NMV}
Diesel Motor home [5]	1505	0.0051	0.0048	EF_{MMV}, EF_{NMV}
Aviation Gasoline (kg/g) [6]	8.32	-	-	EF_{Caf}
Aviation Gasoline (gr/g) [7]	-	7.04	0.11	EF_{Maf}, EF_{Naf}

[5] *Source:* CH_4 & N_2O: EPA Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance: Direct Emissions from Mobile Combustion Sources; May 2008. EPA430-K-08-004 retrieved: http://www.epa.gov/climateleaders/documents/resources/mobilesource_guidance.pdf

Source: CO_2 emission Factors determined by EMFAC for 1990 emissions

Note: CO_2 emissions taken directly from URBEMIS, for 2008 and 2020, shown CO_2 emission factors are for 1990 only.

[6] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.3)*

[7] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.6)*

Landscape and Wood Burning Hearth Emissions

	CO_2	CH_4	N_2O	
gasoline emission factor (lbs/gallon) [8]	19.4			EF_{Cgg}
gasoline emission factor (gr/gallon) [7]		0.50	0.22	EF_{MF}, EF_{NF}
MMBtu/short ton [9]	15.38	-	-	
Kg/MMBtu Residential [9]	93.87	0.316	0.0042	EF_{Cwood}, EF_{Mwood}, EF_{Nwood}
Kg/MMBtu Commercial [9]	93.87	0.316	0.0042	
Kg/MMBtu Manufacturing [9]	93.87	0.032	0.0042	

Abbreviations

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Modeling Assumptions for Greenhouse Gas Emissions

[8] *Source: http://www.epa.gov/oms/climate/420f05001.htm*

[9] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C7) For CO_2, (Table C8) for CH_4 and N_2O)*

Natural Gas

		CO_2	CH_4	N_2O	Abbreviations
Residential (kg/MMBtu)	SFR [9]	53.07	0.005	0.0001	EFCng, EFMng, EFNng
	MFR [9]	53.07	0.005	0.0001	EF_{Cng}, EF_{Mng}, EF_{Nng}
Commercial (kg/MMBtu)	Com [9]	53.07	0.005	0.0001	EF_{Cng}, EF_{Mng}, EF_{Nng}
Industrial (kg/MMBtu)	Ind [9]	53.07	0.001	0.0001	EF_{Cng}, EF_{Mng}, EF_{Nng}

Electricity

		CO_2	CH_4	N_2O	Abbreviations
	1990 [10]	620	0.0067	0.0037	EFCele, EFMele, EFNele
2008+ (lbs/MWh)	2008 [10]	524	0.0302	0.0081	EF_{Cele}, EF_{Mele}, EF_{Nele}
	2020 [10]	524	0.0302	0.0081	EF_{Cele}, EF_{Mele}, EF_{Nele}

[10] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C2,E2-E3)*

Source: PG&E: GHG Data Requests, Fact Sheet GHG Data.pdf, Email from John Bohman January 11, 2010 (CO_2 emission rate 2003-2009)

Solid Waste

	CO_2	CH_4	N_2O	Not Gas Dependent	Abbreviations
Residential (waste tons/cuyd) [11]				0.1125	d
Non-commercial (waste tons/cuyd) [11]				0.225	d
Truck capacity (cy/truck) [12]				33	C_T
Offroad emission factors (lbs/hr) [13]	Composite Values				EF_{CWD}, EF_{MWD}, EF_{NWD}
diesel offroad emission factor (gr/gallon) [14]		0.058	0.026		
diesel emission factor (lbs/gallon) [15]	22.2				EF_{Cdg}
(gr/mile) [14]	3464.1638	0.0051	0.0048		EF_{CWT}, EF_{MWT}, EF_{NWT}
(kg/gallon) [6]	10.15				
miles/gallon [16]	2.93				
Landfill w/o recovery [17]		0.52			EF_{MWF}
Landfill w/ Flaring [17]		0.13			EF_{MWF}
Landfill w/ electric gen [17]		0.07			EF_{MWF}
National Average [17]		0.27			EF_{MWF}
Landfill w/ Combination		0.09			
% CH4 to generate electricity				66.67%	
% CH4 flared				33.33%	

[11] *Source: EPA Standard Volume-to-Weight Conversion Factor obtained from http://www.epa.gov/osw/conserve/tools/recmeas/docs/guide_b.pdf, accessed January 18, 2010.*

[12] *Source: Heil Website (http://www.heil.com/products/python.asp) accessed 1/18/2010 & http://www.tigerdude.com/garbage/frontload/index.html accessed 1/18/2010.*

[13] *Source: SCAQMD OffroadEF07_25.xls (http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html)*

[14] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.4)*

[15] *Source: http://www.epa.gov/oms/climate/420f05001.htm*

[16] *Source: Waste Management's LNG Truck Fleet: Final Results January 2001. (pg 14)*

[17] *Source: EPA Solid Waste Management and Greenhouse Gases; A life-cycle assessment of emissions and Sinks, 3rd edition, September 2006.*

(GWP of CH4 is 21, therefore to convert MTCO2e of Methane to MTCH4 divide MTCO2e by 21)

(all our calculations are in short tons, converted to metric tons after combining)

Sutter County
Modeling Assumptions for Greenhouse Gas Emissions

Standard Conversion Rates:

	CO_2	CH_4	N_2O	Not Gas Dependent		Abbreviations
gr/lb [17]				453.59291		C_2
lbs/short ton [17]				2000		
metric tons/short ton [17]				0.907185		
kg/ short ton [17]				907.18474		
kg/metric ton [17]				1000		C_3
g/metric ton [17]				1,000,000		C_6
lbs/metric ton [17]				2204.62		C_1
therms per MMBTU [17]				0.10		
kWh/Mg (potable water) [18]				3,500		C_4
kWh/MG (waste water) [18]				1,911		C_5
Waste Water % of Potable [19]				% indoor	% outdoor	
SFR				65	35	$\%_{in}$, $\%_{out}$
MFR				82	18	$\%_{in}$, $\%_{out}$
COM				71	29	$\%_{in}$, $\%_{out}$
IND				80	20	$\%_{in}$, $\%_{out}$
GWP	1	21	310			
Gallons/Acre foot [20]				325,851.43		

[17] *Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Appendix B)*

[18] *Source: California Energy Commission "Refining Estimates of Water-related Energy Uses in California", December 2006, CEC-500-2006-118*

[19] *Source: Integrated Water Resources Plan (IRP), MWD Report No. 1107, March 1996. (accessed from http://esce.ucr.edu/soilwater/summer2000.html)*

[20] *Source:* http://onlineconversion.com/volume.htm

Average Square footage for dwelling units		[21]	[21]	[21]	***Schools*** [22]		
Average Square Footage per student	***Year***	***SFR***	***MFR***	***Retire***	***Elem***	***Middle***	***High***
	1990	2160	1000	1000	59	80	95
	2008	2508	1238	1238	73	80	95
	2020	2508	1238	1238	73	80	95

[21] *Source: US Census Bureau retrieved: http://www.census.gov/const/www/charindex.html#multiunit; 2/10/2010 (SFR and MFR*

[21] *Source: Retirement copied MFR until better data is available.*

[22] *Source: California Department of Education Complete Schools Report, May 23 2007. (elementary, junior high, high school)*

		[23]	[23]	[24]	[24]	[25]	[26]
Average Square Footage per student	***Year***	***J. College***	***University***	***Hotel***	***Motel***	***Congregate***	***Hospital***
Average square foot per bed (hotel/motel)	1990	206	206	512.82	512.82	400	357.14
Average square foot per bed (hospital)	2008	238	238	512.82	512.82	400	357.14
Average square foot per bed (congregate ca	2020	238	238	512.82	512.82	400	357.14

[23] *Source: American School & University "Median square footage of building maintained per FTE student, Penton Media 2009. (College & University)*

[24] *Source: Energy Star Space Use Information - Hotel/Motel retrieved: https://www.energystar.gov/istar/pmpam/help/Hotel_Motel_Space_Use_Information.htm 2/11/2010*

[25] *Source: Congregate care based on 2 people per room (State Assisted Living Policy 1998 Section 1, http://aspe.hhs.gov/daltcp/reports/98state1.htm) and*

[26] *Source Energy Star Space Use Information - Hospitals Retrieved: https://www.energystar.gov/istar/pmpam/help/Hospital_(Acute_Care_and_Children_s)_Space_Use_Information.htm 2/11/2010*

Note: since accurate data for 2009 and beyond is not available at this time, it is assumed to remain the same for all future years. Data will be updated as available.

Note: When data was unavailable for individual years, the data for the closest prior year was used.

Sutter County
Modeling Assumptions for Greenhouse Gas Emissions

Agricultural

	CO_2	CH_4	N_2O			Abbreviations
Density of Methane (kg/m^3) [27]		0.678				C_7
# of hectares/acre [27]				0.4046945		C_{10}
Ratio CH_4-C [27]		0.005				R_{CH4-C}
Conversion CH_4-C to Full Mol. Wt. [27]		1.33				C_{11}
Emission factor for liquid systems (kg N_2O-N/kg N) [27]			0.001			EF_{NML}
Emission factor for solid systems (kg N_2O-N/kg N) [27]			0.02			EF_{NMS}
Ratio N_2O:N_2 [C_{10}] [27]			1.57			C_9
Volitazition percent for all non-PRP ag soils [27]			0.2			$\%_{VI}$
Volitazition percent for manure management [27]			0			$\%_{VM}$
Rate NH_3-NO_X [27]			0.01			$EF_{NH3-NOX}$
Emission Factor for pastures, ranges, and paddocks [27]			0.02			EF_{PRP}
Emission factor for ground application [27]			0.0125			EF_{NV}
Cwt (hundred weight)				100	lbs	
Volitazition of synthetic fertilizers [27]			0.1			V_{FS}
Volitazition of organic fertilizers [27]			0.2			V_{FO}
% leached from soils [27]			0.3			$\%_{Leach}$
Leaching Factor (kg N_2O-N / kg N) [27]			0.025			F_{leach}
Nitrogen Content of Non-manure Organics [27]			0.041			N_{ORG}
Emission factor for soils (kg N2O-N/kgN) [27]			0.01			EF_{NDE}
N2O Emissions from Volitazition [27]			0.01			EF_{NIE}
N content of aboveground biomass for N-fixing crop production [27]			0.03			C_8
Emission Factor for Temperate zone Histols (kg N2O-N / ha_yr) [27]			8			EF_{NHT}
Emission Factor for Subtropic zone Histols (kg N_2O-N / ha_yr) [27]			12			EF_{NHS}
N_2O-N Emissions Ratio [R_{N20_N}] [27]			0.007			R_{N2O-N}
% of target year applied [27]			0.65			C_{12}
% of following year applied [27]			0.35			C_{13}
Cotton (lbs/bale) [28]				480	lbs	
average population growth per year [29]				0.40%		
Reduction of acres of rice for 2020 [30]				1756		

[27] *Source:* EPA State Inventory Tool for Agriculture, July 2008.

[28] *Source:* http://www.spectrumcommodities.com/pdf/convfactY2K.pdf

[29] *Source:* State of California, Department of Finance, California County Population Estimates and Components of Change by Year, July 1, 2000-2009. Sacramento, California, December 2009.

[30] *Note:* *In 2009 70% of the Sutter Pointe area is utilized as rice agriculture, the remaining 30% is fallow. 2020 build out of Sutter Pointe is estimated at 1/3 of 2030 buildout acreage (or 2,509 acres). Since 70% of existing is utilized for rice growth, 70% of the Sutter Pointe acreage from 2020 buildout is estimated to be reduced from existing acreage potential for rice.*

Sutter County
Modeling Assumptions for Greenhouse Gas Emissions

Reduction Assumptions

	units		*Square feet* total	total		
	2008	**2020**	**2008**	**2020**	**Growth**	
Total						
SF Residential	5,163	5,804	12,948,804	14,556,432	641	1,607,628
MF Residential	4,605	9,377	5,700,990	11,608,726	4,772	5,907,736
Industrial			3,279,680	7,951,216		4,671,536
Commercial (including mixed use)			1,364,520	3,796,016		2,431,496
Totals	9,768	15,181	23,293,994	37,912,390	5,413	14,618,396
Sutter Pointe						
SF Residential	0	0	0	0	0	0
MF Residential	20	2,610	24,760	3,231,180	2,590	3,206,420
Industrial			233,600	2,708,600		2,475,000
Commercial (including mixed use)			45,600	1,067,933		1,022,333
Totals	20	2,610	303,960	7,007,713	2,590	6,703,753
Unincorporated Sutter County						
SF Residential	5,163	5,804	12,948,804	14,556,432	641	1,607,628
MF Residential	4,585	6,767	5,676,230	8,377,546	2,182	2,701,316
Industrial			3,046,080	5,242,616		2,196,536
Commercial (including mixed use)			1,318,920	2,728,083		1,409,163
Totals	9,748	12,571	22,990,034	30,904,677	2,823	7,914,643

* Residential is split from Commercial/Industrial with respect to utility usage.

	2020
% growth in residential	55.42%
% growth in commercial/industrial	152.94%
%growth in commercial	178.19%
% growth in industrial	142.44%
% of development in 2020 that existed in 2008	61.44%
% of development in 2020 from Growth	38.56%
% of 2020 growth from Sutter Pointe	45.86%
% of 2020 total from Sutter Pointe	18.48%

% total 2020 residential that is growth	35.66%	% total 2020 commercial that is growth	64.05%
% of total 2020 residential development from Sutter Pointe	17.19%	% of total 2020 commercial from Sutter Pointe	28.13%
% of growth from residential within Sutter Pointe	47.85%	% of growth from com within Sutter Pointe	42.05%
% total 2020 commercial & industrial that is growth	60.47%	% total 2020 industrial that is growth	58.75%
% of total 2020 industrial & commercial from Sutter Pointe	32.15%	% of total 2020 industrial from Sutter Pointe	34.07%
% of growth from com/ind within Sutter Pointe	49.24%	% of growth from ind within Sutter Pointe	52.98%
% total 2020 growth that is commercial & ind	16.63%		

Sutter County
Modeling Assumptions for Greenhouse Gas Emissions

Conceptual Transit Plan		
# of dwelling units for Phase 1		7600
# of dwelling uints by 2020		2610
% of Phase 1 completed by 2020	[33]	0.3434211
% of Construction/Demolition waste ir	[34]	0.29

[33] Source HDR 2008. The Sutter Pointe Conceptual Transit Plan
[34] Source CIMWB 2009. California 2008 Statewide Characterization Study, August

Carbon Dixoide Formula Sheet

Sutter County

A. Direct Sources

A1-4. Mobile (Construction Equipment, Motor Vehicles, Landscape Equipment, and Wood Burning Hearth)

Carbon dioxide emissions from construction, motor vehicles, landscape, and wood burning hearth emissions are provided from URBEMIS in short tons per year. Short tons are converted to metric tons by multiplying by 0.09071847.

Emissions from airports:

Emissions of carbon dioxide from airports (in particular airplanes) are calculated using the following equation:

$$\mathbf{E_{Caf} = (U_{Aaf} * EF_{Caf}) / C_3}$$

Where:

E_{caf} = Annual emissions of CO_2 from airport fuel (MT/year).

U_{aaf} = Annual usage of aviation fuel (gallons/year).

EF_{Caf} = Emission factor for aviation fuel (kg/gallon)

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

A5. Stationary Sources (Natural Gas)

Emissions of carbon dioxide from natural gas usage are calculated using the following equation:

$$\mathbf{E_{Cng} = (U_{Ang} * EF_{Cng}) / C_3}$$

Where:

E_{Cng} = Annual emissions of CO_2 from Natural Gas (MT/year).

U_{Ang} = Annual usage of natural gas (MMBTU/year).

EF_{Cng} = Emission factor for natural gas usage (kg/MMbtu)

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

B. Indirect Sources

B1. Electricity

Emissions of carbon dioxide from electricity usage are calculated using the following equation:

$$\mathbf{E_{Cele} = (U_{Ae} * EF_{Cele}) / C_1}$$

Where:

E_{Cele} = Annual emissions of CO_2 from Electricity (MT/year).

U_{Ae} = Annual usage of electricity (MWh/year).

EF_{Cele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Sutter County

B2. Potable Water

Emissions of Carbon Dioxide from potable water treatment and transportation for domestic uses are calculated using the following equation:

$$E_{Cpot} = (U_{epot} * EF_{Cele})/C_1$$

Where:

E_{Cpot} = Annual Emissions of CO_2 from electricity used for potable water treatment and transportation (MT/year).

U_{epot} = Annual electricity usage for potable water treatment and transportation (MWh/year).
= $U_{Apot} * C_4$

U_{Apot} = Annual water usage (MG/yr)

C_4 = Conversion factor for determining kWhs used to treat water.

EF_{Cele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

B3. Solid Waste

Emissions of carbon dioxide from solid waste is a summation of the emissions from solid waste transport, and the use of equipment at disposal sites. CO2 emissions from decomposition (treatment) are considered non-anthropogenic and are not included as part of the emissions inventory. In addition, CO_2 from landfilled waste is partially sequestered and therefore acts as a carbon sink.

$$E_{CTSW} = E_{CWT} + E_{CWD} - E_{CWF}$$

Where:

E_{CTSW} = Annual Emissions of carbon dioxide from solid waste (MT/year).

E_{CWT} = Annual emissions of CO_2 from solid waste transportation (MT/year).

E_{CWD} = Annual emissions of CO_2 from solid waste disposal, (MT/year).

E_{CWF} = Annual emissions of CO_2 from waste disposal (MT/year).

B3a. Anthropogenic Carbon

E_{CWF} = Fugitive emissions of carbon dioxide are considered anthropogenic and are not included in this analysis.

B3b. Exhaust Emissions (Hauling Trucks)

Emissions of carbon dioxide from solid waste transportation are calculated using the following equations:

$$E_{CWT} = (((U_{SW} / d) / C_T) * M * EF_{CWT}) / C_6$$

Where:

E_{CWT} = Annual emissions of CO_2 from solid waste transportation (MT/year).

U_{SW} = Annual waste production for disposal and treatment (tons/year).

d = Average solid waste density, (tons/cubyc yard.)

C_T = Average truck load capacity.

M = Average trip mileage (round trip from source to landfill).

EF_{CWT} = Emission factor for hauling trucks.

C_6 = Conversion factor from gr to metric tons.

Sutter County

B3c. Exhaust Emissions (Disposal Equipment)

Emissions of carbon dioxide from disposal equipment are calculated using the following equation:

$$E_{CWD} = (EF_{CWD} * h * n) / C_1$$

Where:

E_{CWD} = Annual emissions of carbon dioxide from solid waste disposal, MT/year.

EF_{CWD} = Emission factor for disposal equipment, lbs/hr (SCAQMD off-Road Mobile Source Emission Factors, 2007).

h = Operating hours (% of day attributed to project waste generation - Total hours of operation of facility per day times the percentage of total annual waste attributable to Project generation).

n = Days per year. (Number of days per year the landfill is open to disposal).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Note: Emissions from onsite equipment is only relevant if the project has control over landfill operations.

B4. Wastewater

Emissions of carbon dioxide from waste water treatment are calculated using the following equation:

$$E_{CWW} = (U_{eWW} * EF_{Cele})/C_1$$

Where:

E_{CWW} = Annual Emissions of CO_2 from electricity used for potable water treatment and transportation (MT/year).

U_{eWW} = Annual electricity usage for waste water treatment and transportation (MWh/year).
= $(U_{Apot} * \%_{in}) * C_5$

U_{Apot} = Annual potable water used (MG/yr)

$\%_{in}$ = Percentage of potable water used indoors.

C_5 = Conversion factor for determining MWh used per MG of waste water treated.

EF_{Cele} = CO_2 Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Methane Formula Sheet

Sutter County

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of methane from construction vehicles are calculated using the following equations:

$$E_{MCON} = ((U_{AG} * EF_{MHDV}) / C_6)$$

Where:

E_{MCON} = Annual emissions of methane from construction vehicle exhaust (MT/year)

U_{AG} = Annual gallons of gas used by construction vehicles

= $(E_{CCON} * C_1) / EF_{Cdg}$

E_{CCON} = Annual emissions of CO_2 from Construction Vehicles (from URBEMIS).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

EF_{Cdg} = Conversion of CO_2 from lbs to gallons for diesel.

EF_{MHDV} = Emission factor for heavy duty vehicles, gr/gallon.

C_6 = Conversion factor from gr to MT.

A2. Mobile Source (Motor Vehicles)

Emissions of methane from motor vehicles are calculated using the following equations:

$$E_{MMV} = ((M * EF_{MMV}) / C_6)$$

Where:

E_{MMV} = Annual emissions of methane from motor vehicles, MT/year.

M = Annual mileage for motor vehicles, miles/year (from Urbemis2007 9.2.4 output).

EF_{MMV} = Emission factor for motor vehicles, gr/mile by vehicle type

C_6 = Conversion factor from gr to MT.

Emissions from aviation fuel

Emissions of methane from aviation fuel usage are calculated in two steps.

$$E_{Maf} = (U_{Aaf} * EF_{Maf}) / C_6$$

Where:

E_{maf} = Annual emissions of methane from aviation fuel use (MT/year).

U_{aaf} = Gallons of fuel per year

EF_{Maf} = Emission factor for methane for aviation fuel.

C_6 = Conversion factor from gr to MT.

A3. Mobile Source (Landscape Equipment)

Emissions of methane from landscape equipment are calculated in two steps.

$$E_{Mls} = ((G_F * EF_{MF}) / C_6)$$

Where:

E_{Mls} = Annual emissions of methane from landscape equipment (MT/year).

G_F = Gallons of fuel per year

= $(E_{Cls} * C_1) / EF_{Cgg}$

E_{Cls} = Annual emissions of CO_2 from landscaping (from URBEMIS).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

EF_{Cgg} = Conversion of CO_2 from lbs to gallons.

EF_{MF} = Emission factor for methane for motor gasoline.

C_6 = Conversion factor from gr to MT.

A4. Wood Burning Hearth Emissions

Emissions of methane from wood burning hearths are calculated as follows.

$$E_{Mwood} = ((M_{wood} * EF_{Mwood}) / C_3)$$

Where:

E_{Mwood} = Annual emissions of methane from wood burning hearths (MT/year).

M_{wood} = Heat content of the wood in MMBtu

= E_{Cwood} * HC_{Cwood}

E_{Cwood} = Emissions of tons of CO_2 estimated for wood burning hearths.

HC_{Cwood} = MMBTUs per ton of CO_2 from burning wood.

EF_{Mwood} = Emission factor for methane for wood burning;.

C_3 = Conversion factor from kg to MT.

A5. Stationary Source (Cooling and Heating) - Natural Gas

Emissions of methane from natural gas consumption are calculated using the following equation:

$$E_{Mng} = (U_{Ang} * EF_{Mng}) / C_3$$

Where:

E_{Mng} = Annual emissions of methane from natural gas consumption (MT/year).

U_{Ang} = Annual natural gas usage, MMBTUs/year.

EF_{Mng} = Emission factor for natural gas usage.

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

B. Indirect Sources

B1. Electricity

Emissions of methane from electricity usage are calculated using the following equation:

$$E_{Mele} = (U_{Ae} * EF_{Mele}) / C_1$$

Where:

E_{Mele} = Annual emissions of CH_4 from Electricity (MT/year).

U_{Ae} = Annual usage of electricity (MWh/year).

EF_{Mele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

B2. Potable Water

Emissions of methane from potable water treatment and transportation for domestic uses are calculated using the following equation:

$$E_{Mpot} = (U_{epot} * EF_{Mele}) / C_1$$

Where:

E_{Mpot} = Annual Emissions of CH_4 from electricity used for potable water treatment and transportation (MT/year).

U_{epot} = Annual electricity usage for potable water treatment and transportation (MWh/year).

= U_{Apot} * C_4

U_{Apot} = Annual usage of potable water (MG/yr)

C_4 = Conversion factor for determining kWhs used to treat water.

EF_{Mele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

B3. Solid Waste

Emissions of methane from solid waste is a summation of the emissions from solid waste treatment, transport, and the use of equipment at disposal sites

$$\mathbf{E_{MTSW} = E_{MWF} + E_{MWT} + E_{MWD}}$$

Where:

E_{MTSW} = Annual Emissions of CH_4 from solid waste (MT/year).

E_{MWF} = Annual emissions of CH_4 from solid waste disposal and treatment (MT/year).

E_{MWT} = Annual emissions of CH_4 from solid waste transportation (MT/year).

E_{MWD} = Annual emissions of CH_4 from solid waste disposal, (MT/year).

B3a. Fugitive Emissions

Fugitive emissions of methane from solid waste disposal treatment are calculated using the following equation:

$$\mathbf{E_{MWF} = U_{SW} * EF_{MWF}}$$

Where:

E_{MWF} = Annual emissions of CO_2 from solid waste disposal and treatment (MT/year).

U_{SW} = Annual waste production for disposal and treatment (tons/year).

EF_{MWF} = Emission factor for waste production.

B3b. Exhaust Emissions (Hauling Trucks)

Emissions of methane from solid waste transportation are calculated using the following equations:

$$\mathbf{E_{MWT} = ((((U_{SW} / d) / C_T) * M * EF_{MWT}) / C_6)}$$

Where:

E_{MWT} = Annual emissions of CH_4 from solid waste transportation (tons/year).

U_{SW} = Annual waste production for disposal and treatment (tons/year).

d = Average solid waste density (tons/cubic yard).

C_T = Average truck load capacity.

M = Average trip mileage (round trip from source to landfill).

EF_{MWT} = Emission factor for hauling trucks.

C_6 = Conversion factor from gr to MT;.

B3c. Exhaust Emissions (Disposal Equipment)

Emissions of methane from disposal equipment are calculated using the following equation:

$$\mathbf{E_{MWD} = (EF_{MWD} * h * n) / C_1}$$

Where:

E_{MWD} = Annual emissions of methane from solid waste disposal, MT/year.

EF_{MWD} = Emission factor for disposal equipment, lbs/hr (SCAQMD off-Road Mobile Source Emission Factors, 2007). (Equation needs to be repeated for each piece of equipment, then all emissions summed).

h = Operating hours (% of day attributed to project waste generation - Total hours of operation of facility per day times the percentage of total annual waste attributable to Project generation).
n = Days per year. (Number of days per year the landfill is open to disposal).
C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).
Note: Emissions from onsite equipment is only relevant if the project has control over landfill operations.

B4. Wastewater

Emissions of methane from waste water treatment are calculated using the following equation:

$$E_{MWW} = (U_{eWW} * EF_{Mele}) / C_1$$

Where:

E_{MWW} = Annual emissions of methane from waste water treatment, MT/year.
U_{eWW} = Annual electricity usage for transport and treatment of waste water
= $(U_{Apot} * \%_{in}) * C_5$
U_{Apot} = Annual usage of potable water (MG/yr)
$\%_{in}$ = % of potable water used indoors.
C_5 = Conversion factor for determining MWh used per MG of waste water treated.
EF_{Mele} = Emission factor for electrical usage (lbs/MWh).
C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Nitrous Oxide Formula Sheet

Sutter County

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of nitrous oxide from construction vehicles are calculated using the following equations:

$$\mathbf{E_{NCON} = ((U_{AG} * EF_{NHDV}) / C_6)}$$

Where:

E_{NCON} = Annual emissions of nitrous oxide from construction vehicle exhaust (MT/year)

U_{AG} = Annual gallons of gas used by construction vehicles

= $(E_{CCON} * C_1) / EF_{Cdg}$

E_{CCON} = Annual emissions of CO_2 from Construction Vehicles (from URBEMIS).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

EF_{Cdg} = Conversion of CO_2 from lbs to gallons.

EF_{NHDV} = Emission factor for heavy duty vehicles, gr/gallon.

C_6 = Conversion factor from gr to MT.

A2. Mobile Source (Motor Vehicles)

Emissions of nitrous oxide from motor vehicles are calculated using the following equations:

$$\mathbf{E_{NMV} = ((M * EF_{NMV}) / C_6)}$$

Where:

E_{NMV} = Annual emissions of nitrous oxide from motor vehicles, MT/year.

M = Annual mileage for motor vehicles, miles/year (from Urbemis2007 9.2.4 output).

EF_{NMV} = Emission factor for motor vehicles, gr/mile by vehicle type

C_6 = Conversion factor from gr to MT.

Emissions from aviation fuel

Emissions of nitrous oxide from aviation fuel usage are calculated in two steps.

$$\mathbf{E_{Naf} = (U_{Aaf} * EF_{Naf}) / C_6}$$

Where:

E_{naf} = Annual emissions of nitrous oxide from aviation fuel usage (tons/year).

U_{aaf} = Gallons of fuel per year

EF_{Naf} = Emission factor for nitrous oxide for aviation fuel usage.

C_6 = Conversion factor from gr to MT.

A3. Mobile Source (Landscape Equipment)

Emissions of nitrous oxide from landscape equipment are calculated in two steps.

$$\mathbf{E_{Nls} = ((G_F * EF_{NF}) / C_6)}$$

Where:

E_{Nls} = Annual emissions of nitrous oxide from landscape equipment (tons/year).

G_F = Gallons of fuel per year

= $(E_{Cls} * C_1) / EF_{Cgg}$

E_{cls} = Annual emissions of CO_2 from landscaping (from URBEMIS).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

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EF_{Cgg} = Conversion of CO_2 from lbs to gallons.
EF_{NF} = Emission factor for nitrous oxide for motor gasoline.
C_6 = Conversion factor from gr to MT.

A4. Wood Burning Hearth Emissions
Emissions of nitrous oxide from wood burning hearths are calculated as follows.

$$\mathbf{E_{Nwood} = ((M_{wood} * EF_{Nwood}) / C_3)}$$

Where:

E_{Mwood} = Annual emissions of nitrous oxide from wood burning hearths (MT/year).
M_{wood} = Heat content of the wood in MMBtu
= E_{Cwood} * HC_{Cwood}
E_{Cwood} = Emissions of tons of CO_2 estimated for wood burning hearths.
HC_{Cwood} = MMBTUs per ton of CO_2 from burning wood.
EF_{Nwood} = Emission factor for nitrous oxide for wood burning.
C_3 = Conversion factor from kg to MT; 1,000 kg/MT

A5. Stationary Source (Cooling and Heating)
Emissions of nitrous oxide from natural gas consumption are calculated using the following equation:

$$\mathbf{E_{Nng} = (U_{Ang} * EF_{Nng}) / C_3}$$

Where:

E_{Nng} = Annual emissions of nitrous oxide from natural gas consumption (MT/year).
U_{Ang} = Annual natural gas usage, MMBTUs/year.
EF_{Nng} = Emission factor for natural gas usage;
C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

B. Indirect Sources
B1. Electricity
Emissions of nitrous oxide from electricity usage are calculated using the following equation:

$$\mathbf{E_{Nele} = (U_{Ae} * EF_{Nele}) / C_1}$$

Where:

E_{Nele} = Annual emissions of N_2O from Electricity (MT/year).
U_{Ae} = Annual usage of electricity (MWh/year).
EF_{Nele} = Emission factor for electrical usage (lbs/MWh).
C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

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B2. Potable Water

Emissions of nitrous oxide from potable water treatment and transportation for domestic uses are calculated using the following equation:

$$E_{Npot} = (U_{epot} * EF_{Nele})/C_1$$

Where:

E_{Npot} = Annual Emissions of N_2O from electricity used for potable water treatment and transportation (MT/year).

U_{epot} = Annual electricity usage for potable water treatment and transportation (MWh/year).
= $U_{Apot} * C_4$

U_{Apot} = Annual usage of potable water (MG/yr)

C_4 = Conversion factor for determining kWhs used to treat water.

EF_{Nele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

B3. Solid Waste

Emissions of nitrous oxide from solid waste is a summation of the emissions from solid waste transportation, and the use of equipment at disposal sites. There are no fugitive emissions from nitrous oxide with respect to solid waste, therefore emissions from treatment are not included in the emissions inventory.

$$E_{NTSW} = E_{NWT} + E_{NWD}$$

Where:

E_{NTSW} = Annual Emissions of CH_4 from solid waste (MT/year).

E_{NWT} = Annual emissions of CH_4 from solid waste transportation (MT/year).

E_{NWD} = Annual emissions of CH_4 from solid waste disposal, (MT/year).

B3b. Exhaust Emissions (Hauling Trucks)

Emissions of nitrous oxide from solid waste transportation are calculated using the following equation:

$$E_{NWT} = ((((U_{SW} / d) / C_T) * M * EF_{NWT}) / C_6)$$

Where:

E_{NWT} = Annual emissions of N_2O from solid waste transportation (tons/year).

U_{SW} = Annual waste production for disposal and treatment (tons/year).

d = Average solid waste density (tons/cubic yard).

C_T = Average truck load capacity.

M = Average trip mileage (round trip from source to landfill).

EF_{NWT} = Emission factor for hauling trucks.

C_6 = Conversion factor from gr to MT; 1,000,000 gr/MT.

Sutter County

B3c. Exhaust Emissions (Disposal Equipment)

Emissions of nitrous oxide from disposal equipment are calculated using the following equation:

$$E_{NWD} = (EF_{NWD} * h * n) / C_1$$

Where:

E_{NWD} = Annual emissions of nitrous oxide from solid waste disposal, MT/year.

EF_{NWD} = Emission factor for disposal equipment, lbs/hr (derived from SCAQMD off-Road Mobile Source Emission Factors, 2007). (Equation needs to be repeated for each piece of equipment, then all emissions summed).

h = Operating hours (% of day attributed to project waste generation - Total hours of operation of facility per day times the percentage of total annual waste attributable to Project generation).

n = Days per year. (Number of days per year the landfill is open to disposal).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Note: Emissions from onsite equipment is only relevant if the project has control over landfill operations.

B4. Wastewater

Emissions of nitrous oxide from waste water treatment are calculated using the following equation:

$$E_{NWW} = (U_{eWW} * EF_{Nele}) / C_1$$

Where:

E_{NWW} = Annual emissions of nitrous oxide from waste water treatment, MT/year.

U_{eWW} = Annual electricity usage for transport and treatment of waste water

= $(U_{Apot} * \%_{in}) * C_5$

U_{Apot} = Annual usage of potable water (MG/yr)

$\%_{in}$ = % of potable water used indoors.

C_5 = Conversion factor for determining MWh used per MG of waste water treated.

EF_{Nele} = Emission factor for electrical usage (lbs/MWh).

C_1 = Conversion factor from lbs to metric tons (1 MT = 2204.62 lbs).

Agricultural Formula Sheet

Sutter County

CM1: Methane emissions from Enteric Fermentation

$$E_{MEF} = (U_{Aani} * EF_{MEF}) / C_3$$

Where:

E_{MEF} = Emissions of methane from Enteric Fermentation (MT/yr).

U_{Aani} = Number of each type of animal (by type)

EF_{MEF} = Emission Factor for enteric fermentation by year and animal type.

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

CM2: Methane emissions from manure management

$$E_{MMM} = ((U_{Aani}/1000) * TAM * VS * C_6 * B_O * MCF * C_7) / C_3$$

Where:

E_{MMM} = Emissions of methane from manure management (MT/yr).

U_{Aani} = Number of each type of animal (by type)

TAM = Typical animal mass by animal and year (kg/head)

VS = Volatile solids produced in kgVS/1000kg animal mass/day

C_6 = 365 days per year

B_O = Maximum methane producing capacity by animal type

MCF = The extent to which methane producing capacity is realized for a given manure management system (weighted average for state by animal type).

C_7 = Density of methane 0.678 kg/m^3

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

CM3: Methane emissions from rice cultivation

$$E_{MRC} = (U_{AC} * C_{10} * EF_{PS}) / C_3$$

Where:

E_{MRC} = Emissions of methane from rice cultivation.

U_{AC} = Annual rice cultivation in acres

C_{10} = Conversion of acres to hectares.

EF_{PS} = Emission factor for primary season harvest;

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

CM4: Methane emissions from agricultural residue burning

$$E_{MARB} = (U_C * R_{RC} * F_{RB} * F_{DM} * BE * CE * CC) * R_{CH4-C} * C_{11})$$

Where:

E_{MARB} = Emissions of methane from agricultural residue burning (MT/yr).

U_C = Annual crop production in metric tons.

R_{RC} = Residue to crop ratio by crop.

F_{RB} = Fraction of residue burned by crop.

F_{DM} = Fraction of residue from dry matter

BE = Burning efficiency per crop

CE = Combustion efficiency per crop
CC = Carbon content of crop
R_{CH4-C} = Ratio of emissions CH_4-C
C_{11} = Conversion from CH_4-C to full molecular weight of carbon.

CN1: Nitrous Oxide from Manure Management:

$$E_{NMM} = ((((N_T * \%_{AL}) + (N_T * \%_{SS}) + (N_T * \%_{DP})) * EF_{NML}) + (((N_T * \%_{SS}) + (N_T * \%_{DP}) + (N_T * \%_P) * EF_{NMD})) / C_3$$

Where:

E_{NMM} = Emissions of nitrous oxide from manure management (MT/yr).
N_T = Total Nitrogen excreted in kgs
= $U_{Aani} * (TAM/1000) * K_N * C_6$
U_{Aani} = Number of each type of animal (by type)
TAM = Typical animal mass by animal and year (kg/head) divided by 1000
K_N = Nitrogen excreted in kg/ 1000 kg mass/day by animal type.
C_6 = 365 days per year
$\%_{AL}$ = % manure associated with anaerobic lagoons (Relevant to dairy cows, swine, and layers).
$\%_{LS}$ = % manure associated with liquid/slurry (relevant to diary cows, swine, and layers).
$\%_{DP}$ = % manure associated with deep pits (relevant to swine for liquid and dairy cows for solid systems), and for dry lots (relevant for feedlot beef).
$\%_{SS}$ = % manure associated with solid storage (relevant for dairy cows, swine, and layers), and managed solid systems (relevant for dairy heifers), and for sheep on and off feed).
$\%_P$ = % manure associated with pastures (relevant for beef not on feed), and poultry (relevant for layers without bedding, and broilers and turkey with litter).
EF_{NML} = Emission factor for nitrous oxide from liquid systems
EF_{NMS} = Emission factor for nitrous oxide from solid systems
C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

CN2: Nitrous Oxide emissions from animals and runoff:

$$E_{NAAS} = E_{NIA} + E_{NDA} + E_{NL}$$

Where:

E_{NAAS} = Emissions of nitrous oxide from agricultural soils resulting from animal manure and runoff (MT/yr).

E_{NIA} = Emissions of nitrous oxide indirectly from animals (MT/yr).
= $((N_T * \%_{VI} * EF_{NH3-NOX}) / C_3) * C_9$
N_T = Total Nitrogen excreted in kgs
$\%_{VI}$ = % indirect volitazation.
$EF_{NH3-NOX}$ = Rate of conversion from NH_3 to NO_X.
C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)
C_9 = Molecular weight ratio N_2O:N_2

E_{NDA} = Emissions of nitrous oxide directly from animals (MT/yr).
= $((M_{PRP} + M_{AS}) * C_9) + (M_{PRP} * C_9)$
M_{PRP} = Manure from Pasture, Range and Paddocks
= $(N_{UM} * EF_{PRP}) / C_3$
M_{AS} = Manure applied to soils
= $((N_M + N_{DS}) * (1-\%_{VI}) * EF_{NV}) / C_3$
N_{UM} = Unmanaged Nitrogen
= $U_{Aani} * (\text{sum all } \%_{UMS}) * TAM * K_N * C_6$
U_{Aani} = Number of each type of animal (by type)
TAM = Typical animal mass by animal and year (kg/head) divided by 1000
K_N = Nitrogen excreted in kg/ 1000 kg mass/day by animal type.
C_6 = 365 days per year
$\%_{UMS}$ = % of manure from each unmanaged system for each animal type and year.
Dairy Cows: pasture; dairy heifers: pasture, range and paddock; not on feed beef: pasture; swine: pasture; turkey: range; sheep (based on type of feed); goats: pasture; and horses: pasture.
EF_{PRP} = Emission factor for pastures, ranges and paddocks.
N_M = Managed Nitrogen
= $U_{Aani} * (\text{sum all } \%_{MS}) * TAM * K_N * C_6$
$\%_{MS}$ = % of manure from each managed system for each animal type and year.
Dairy Cows: anaerobic lagoons, liquid/slurry, solid storage, deep pit; dairy heifers: managed; feedlot beef: dry lot; swine: solid storage, liquid slurry, anaerobic lagoon, and deep pit; turkey: solid storage, liquid slurry, anaerobic lagoon, and without bedding.
NDS = Unmanaged Nitrogen from daily spread of manure
= $U_{Aani} * (\text{sum all } \%_{DS}) * TAM * K_N * C_7$
$\%_{DS}$ = % of daily spread manure for dairy cows and dairy heifers only.
EF_{NV} = Emission factor for ground application of manure.

E_{NL} = Emissions of nitrous oxide from leaching (MT/yr).
= $([(((N_{UVS} + N_{UVO}) / C_3) * \%_{Leach}) + ((N_T * (1-\%_{VM}) * \%_{Leach}) / C_3)] * F_{Leach}) * C_9$
N_{UVS} = Unvolatilized Nitrogen from synthetic fertilizer. - See CN4: Nitrous Oxide emissions from Fertilizer use.
N_{UVO} = Unvolatilized Nitrogen from organic fertilizer. - See CN4: Nitrous Oxide emissions from Fertilizer use.
$\%_{Leach}$ = Percent leached from soils
F_{Leach} = Leaching Factor (kg N_2O-N / kg N)
$\%_{VM}$ = % volitazation from manure management.

CN3: Nitrous Oxide from Crop Growth:

$$E_{NCG} = E_{NLeg} + E_{NRes} + E_{NHis}$$

Where:

E_{NCG} = Emissions of nitrous oxide from crop growth (MT/yr).

E_{NLeg} = Emissions of nitrous oxide from legumes (nitrogen fixing crops)
= $(F_{NT} / C_3) * EF_{NDE} * C_9$

F_{NT} = Total nitrogen fixed in soil by all crops (formula below is to be repeated for each applicable crop and then totaled.

= $U_C * C_3 * (1 - R_{RC}) * F_{DM} * C_8$

U_C = Total crop production in tons

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

R_{RC} = Residue crop-mass ratio for given crop

F_{DM} = Residue fraction that is dry matter by crop

C_8 = Nitrogen content of aboveground biomass for N-fixing crop production

EF_{NDE} = Emission factor for soils (kg N_2O-N/kg N) 0.01

C_9 = Molecular weight ratio $N_2O:N_2$ 1.57

E_{NRES} = Emissions of nitrous oxides from crop residues (MT/yr).

= $(N_{RS} / C_3) * EF_{DIR} * C_9$

N_{RS} = Total nitrogen returned to soil from crop residue degradation. (Formula below is repeated for each applicable crop then totaled).

= $(U_C * C_3) * R_{RC} * F_{DM} * F_{RA} * NC$

F_{RA} = Fraction of residue applied to soil by crop.

N_{CR} = Nitrogen content of crop residue.

E_{NHIS} = Emissions of nitrous oxide from soil histols (based on climate zone of project) (MT/yr).

= $((((U_{CT} * C_{10}) * EF_{NHT}) + ((U_{CT} * C_{10}) * EF_{NHS}))*C_9) / C_3$

U_{CT} = Total crop production in acres planted

C_{10} = Conversion from acres to hectares 0.40469446 ha/acre

EF_{NHT} = Emission Factor for Temperate zone Histols (kg N_2O-N / ha_yr)

EF_{NHS} = Emission Factor for Subtropic zone Histols (kg N_2O-N / ha_yr)

CN4: Nitrous Oxide emissions from fertilizer use

$$E_{FU} = E_{ND} + E_{NID}$$

Where:

E_{FU} = Emissions of nitrous oxide from fertilizer use (MT/yr)

E_{ND} = Direct emissions of nitrous oxide from fertilizer use (MT/yr).

= $((N_{UVS} + N_{UVO}) / C_3) * EF_{NDE} * C_9$

EF_{NDE} = Emission factor for N_2O in soils (kg N2O-N/kgN) 0.01

C_9 = Molecular weight ratio $N_2O:N_2$

C_3 = Conversion factor from kg to metric tons. (1,000 kg/MT)

N_{UVS} = Unvolitazied nitrogen from application of synthetic fertilizer.

= $((U_{F1S} * C_{12}) + (U_{F2S} * C_{13})) * (1-V_{FS})$

U_{F1S} = Annual synthetic fertilizer use (in kg N) for target year (Determined as a percentage of total state usage based on acres planted)

= $(U_{FS} * \%_P) * \%_{FS} * 1000$

U_{FS} = Total fertilizer use for the state.

$\%_P$ = % of total acres planted. (Total project acres planted divided by total state acres planted) for that year.

$\%_{FS}$ = % usage of synthetic fertilizers for that year.

U_{F2S} = Annual synthetic fertilizer use (in kg N) for next growing year (Determined as a percentage of total state usage based on acres planted). Can be estimated if future year.

= $(U_{FS} * \%_{P}) * \%_{FS} * 1000$

V_{FS} = Volatization of synthetic fertilizers

C_{12} = Constant % of target year applied.

C_{13} = Constant % of following year applied.

N_{UVO} = Unvolitazied nitrogen from application of non-manure organic fertilizer.

= $[((U_{F1DM} * C_{12}) + (U_{F2DM} * 0C_{13})) + ((U_{F1ASS} * C_{12}) + (U_{F2ASS} * C_{13})) + ((U_{F1OO} * C_{12}) + (U_{F2OO} * C_{13}))] * N_{org} * (1-V_{FO})$

U_{F1DM} = Annual dried manure fertilizer use (in kg N) for target year (Determined as a percentage of total state usage based on acres planted)

= $(U_{FS} * \%_{P}) * \%_{FDM} * 1000$

U_{F2DM} = Annual dried manure fertilizer use (in kg N) for next growing year (Determined as a percentage of total state usage based on acres planted). Can be estimated if future year.

= $(U_{FS} * \%_{P}) * \%_{FDM} * 1000$

$\%_{FDM}$ = % of fertilizer from dried manure

U_{F1ASS} = Annual Sewage sludge fertilizer use (in kg N) for target year (Determined as a percentage of total state usage based on acres planted)

= $(U_{FS} * \%_{P}) * \%_{FASS} * 1000$

U_{F2ASS} = Annual sewage sludge fertilizer use (in kg N) for next growing year (Determined as a percentage of total state usage based on acres planted). Can be estimated if future year.

= $(U_{FS} * \%_{P}) * \%_{FASS} * 1000$

$\%_{FASS}$ = % of fertilizer from annual sewage sludge

U_{F1OO} = Annual other organic fertilizer use (in kg N) for target year (Determined as a percentage of total state usage based on acres planted)

= $(U_{FS} * \%_{P}) * \%_{FOO} * 1000$

U_{F2OO} = Annual other organic use (in kg N) for next growing year (Determined as a percentage of total state usage based on acres planted). Can be estimated if future year.

= $(U_{FS} * \%_{P}) * \%_{FOO} * 1000$

$\%_{FOO}$ = % of other organic fertilizers used

N_{ORG} = Nitrogen Content of Non-manure Organics

V_{FO} = Volitazation of organic fertilizers

E_{NID} = Indirect emissions of nitrous oxide from fertilizer use (MT/yr).

= $((N_{VS} + N_{VO}) / C_3) * EF_{NIE} * C_9$

EF_{NIE} = N_2O emissions from volitazation

C_9 = Molecular weight ratio N_2O:N_2

N_{VS} = Volatized nitrogen from application of synthetic fertilizer.

= $((U_{F1S} * C_{12}) + (U_{F2S} * C_{13})) * V_{FS}$

N_{VO} = Volatized nitrogen from application of non-manure organic fertilizer.

= $[((U_{F1DM} * C_{12}) + (U_{F2DM} * C_{13})) + ((U_{F1ASS} * C_{12}) + (U_{F2ASS} * C_{13})) + ((U_{F1OO} * C_{12}) + (U_{F2OO} * C13))] * N_{org} * V_{FO}$

CN5. Emissions on N_2O from agricultural residue burning

$$E_{NARB} = (U_C * R_{RC} * F_{RB} * F_{DM} * BE * CE * CC) * R_{N20\text{-}N} * C_9)$$

Where:

E_{MARB} = Emissions of methane from agricultural residue burning (MT/yr)

U_C = Annual crop production in metric tons

R_{RC} = Residue to Crop ratio by crop.

F_{RB} = Fraction of residue burned by crop.

F_{DM} = Fraction of residue from dry matter

BE = Burning efficiency per crop

CE = Combustion efficiency per crop

NC = Nitrogen content of crop

$R_{N2O\text{-}N}$ = Ratio of emissions N_2O-N

C_9 = Molecular weight ratio N_2O:N_2

Appendix C: 1990 URBEMIS Output and GHG Calculations

Sutter County
Emissions by Source
1990
Inventory
By Source

Transportation		
	Source:	**Metric tons of CO_2e**
1	On-Road Vehicles	226,778
2	Airport Operations	132
	Total	**226,910**

Energy		
	Sources:	**Metric tons of CO_2e**
1	Electric	55,823
2	Natural Gas	90,179
	Total	**146,001**

Solid Waste		
	Source	**Metric tons of CO_2e**
1	Solid Waste Disposal	8,939
2	Green Waste Recycling	No Data Available
3	Materials Recycling	No Data Available
	Total	**8,939**

Landscape Emissions		
	Sources:	**Metric tons of CO_2e**
1	Landscape Emissions	27
2	Carbon sink from CO_2 sequestration	No Data Available
	Total	**27**

Agriculture		
	Sources:	**Metric tons of CO_2e**
1	Enteric Fermentation	106,095
2	Manure Management	131,555
3	Rice Cultivation	132,703
4	Agricultural Residue Burning	15,329
5	Crop Growth	397,944
6	Animals and Runoff	105,515
7	Fertilizer Use	67,173
	Total	**956,315**

Net Total Emissions		
	Category	**Metric tons of CO_2e**
	Energy	146,001
	Solid Waste	8,939
	Landscape Emissions	27
	Agriculture	956,315
	Transportation	226,910
	Total	**1,338,192**

Sutter County
Emissions by Land Use
1990
Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/ER	148,617.83	6,045.92	4,719.60	159,383
	Low Density Residential	51,774.17	2,106.18	1,644.14	55,524
	Medium Density Residential	9,592.99	390.31	304.69	10,288
	High Density Residential	0.00	0.00	0.00	0
	Total Residential	**209,984.98**	**8,542.42**	**6,668.44**	**225,196**
Commercial	Park	165.15	2.91	2.25	170
	Commercial	44,511.23	776.38	600.10	45,888
	Mixed Use	0.00	0.00	0.00	0
	Total Commercial	**44,676.39**	**779.29**	**602.35**	**46,058**
Industrial	Industrial	107,379.26	1,796.24	1,447.66	110,623
	Total Industrial	**107,379.26**	**1,796.24**	**1,447.66**	**110,623**
Agriculture		0.00	373,212.42	583,102.45	956,315
	Total	**362,040.63**	**384,330.36**	**591,820.89**	**1,338,192**

*For consistency with 2008 and 2020 inventories, High Density Residential and Mixed use categories are listed although there is no land designated as such for 1990.

Sutter County
Input data for Green House Gas Emissions
1990

Land Use Type (units)	Total Trips	Total VMT	Total Trips (2008)	Total VMT (2008)	Unit Totals	Unit Type
AG/ER	40,550	447,512	47,706	526,485	4,386	du
Low Density Residential	30,513	336,739	35,897	396,164	3,300	du
Medium Density Residential	5,655	62,407	6,653	73,420	612	du
High Density Residential	0	0	0	0	0	du
Park	5	62	6	73	23,718,729.69	Sq/ft
Commercial	25,550	288,589	30,059	339,516	1,154,864.75	Sq/ft
Mixed Use	0	0	0	0	0.00	du
Industrial	9,729	109,453	11,446	128,768	2,785,973.60	Sq/ft
Total	**112,002.63**	**1,244,762.45**	**131767.8**	**1464426.41**		

Sutter County
Input data for Green House Gas Emissions
1990

Land Use Type (units)	Natural gas usage rate (MMBTU/yr)	Kilowatt-hour/ year	Potable Water Usage (gallons/year)	Solid Waste (lbs/year)	% of square footage - Res/Non-Res	% of Total square footage
AG/ER	161,670.35	59,267,390.8	25,291,790.47	18,510,113.63	0.7078	0.5466
Low Density Residential	56,321.36	20,647,075.8	8,810,941.52	6,448,267.49	0.2466	0.1904
Medium Density Residential	10,436.90	3,826,106.8	1,632,754.37	1,194,976.42	0.0457	0.0353
High Density Residential	0.00	0.0	0.00	0.00	0.0000	0.0000
Park	1,396.03	123,300.6	2,192.81	8,465.40	0.0011	0.0003
Commercial	378,387.76	33,420,178.6	594,353.46	2,256,538.07	0.2927	0.0666
Mixed Use	0.00	0.0	0.00	0.00	0.0000	0.0000
Industrial	912,833.16	80,623,769.0	1,433,834.82	5,443,593.35	0.7062	0.1608
Total	**1,521,045.55**	**197,907,821.60**	**37,765,867.45**	**33,861,954.37**		

Sutter County
Input data for Green House Gas Emissions
1990

City Parks

Year	# of City Parks	Estimated SQ / "building"	Estimated Buildings per
1990	9	500	1
2008	10	500	1

Airports

Year	# of planes	Gallons fuel per day	Annual days of operation	Annual Fuel Usage (g/yr)
1990	65	43	365	15,513
2008	77	50	365	18,250

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	(lbs/day)	Winter (lbs/day)	tons/Year	Summer	Winter	Year	
1990	1,169,087.35	1,033,279.91	205,096.82	0.00	0.00	0.00	205,096.82
2008	1,375,396.88	1,215,623.42	241,290.38	0.00			241,290.38

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
1990	322.66	0.00	29.04	0.00	223,467.50	9,162.17
2008	379.60	0.00	34.16	0.00	262,902.94	10,779.02

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	39.50	0.3950	2.00	0.0200	97.50	0.9750	0.50	0.0050
Light Truck <3,750 lbs	19.30	0.1930	4.10	0.0410	85.50	0.8550	10.40	0.1040
Light Truck 3,751-5,750 lbs	19.70	0.1970	2.00	0.0200	97.50	0.9750	0.50	0.0050
Med Truck 5,751-8,500 lbs	9.30	0.0930	1.10	0.0110	97.80	0.9780	1.10	0.0110
Lite-Heavy Truck 8,501-10,000 lbs	2.50	0.0250	0.00	0.0000	64.00	0.6400	36.00	0.3600
Lite-Heavy Truck 10,001-14,000 lbs	0.90	0.0090	0.00	0.0000	44.40	0.4440	55.60	0.5560
Med-Heavy Truck 14,001 - 33,000 lbs	1.50	0.0150	6.70	0.0670	20.00	0.2000	73.30	0.7330
Heavy-Heavy Truck 33,001-60,000 lbs	1.90	0.0190	0.00	0.0000	5.30	0.0530	94.70	0.9470
Other bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Urban bus	0.00	0.0000	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motorcycle	4.00	0.0400	70.00	0.7000	30.00	0.3000	0.00	0.0000
School Bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motor Home	1.20	0.0120	8.30	0.0830	75.00	0.7500	16.70	0.1670

Disposal Facility	Jurisdiction?	No		Type of Facility:	Landfill w/o recovery		year began:	?
Landfill	Landfill Total Annual (tons)	City's % of Total	Daily Hours of Facility	Hours attributed to	Days per year of operation	% Waste delivered	Distance (one way)	Round Trip Distance (miles)
Recology Landfill	16,930.81	1.00	9	9.00	313.00	100	4.81	9.62
		0.00		0.00		0		
		0.00		0.00		0		
		0.00		0.00		0		
		0.00		0.00		0		
				9.00	313.00	**Total**		**9.62**

Sutter County
Input data for Green House Gas Emissions
1990

Electrical Usage (kWh/yr)

83,739,736 Total Residential Electrical Usage 1990
114,168,493 Total Non-Residential Electrical Usage 1990

1990	*% decrease*	*2008*	
		Residential	
31,989	15.00%	37,634	County facilities located in Yuba City
182	15.00%	214	County facilities located in Live Oak City
21,654	15.00%	25,475	County facilities located in Unincorporated Sutter
71,124,951	15.00%	83,676,413	Residential in Unincorporated Sutter County
		Non-Residential	
5,153,007	15.00%	6,062,361	County facilities located in Yuba City
75,107	15.00%	88,361	County facilities located in Live Oak City
674,059	15.00%	793,010	County facilities located in Unincorporated Sutter
108,266,321	15.00%	127,372,142	Commercial in Unincorporated Sutter County

Water Usage

Total Gal/Yr	*% decrease*	*2008*	
35,735,097	15.00%	42,041,290.32	Residential (gallons per year)
2,030,403	15.00%	2,388,710	Non-Residential (gallons/year)

Solid Waste for Unincorporated Sutter County

33,861,616 lbs/year - 1990
39,837,195.00 2006 lbs/year

Natural Gas Data (Provided by PG&E)

228,426 Total Natural gas usage rate (MMBTU/yr) - Residential
1,292,631 Total Natural gas usage rate (MMBTU/yr) - Non-Residential

1990	*2008*		
228,426	268,737	TotalResidential Natural gas usage rate (MMBTU/yr)	
		MMBTU	***Therms***
		14	135
		0	2
		0	0
		268,723	2687229
1,292,631	1,520,742	Total Commercial Natural gas usage rate (MMBTU/yr)	
		MMBTU	***Therms***
		14,856	148564
		312	3116
		501	5014
		1,505,073	15050730

Sutter County
Input data for Agriculture
1990

	Enteric Fermentation Emission Factor (EF_{MEF})	Typical Animal Mass - kg- (TAM)	Volatile Solids -kg VS/1000kg mass/day- (VS)	Max CH_4 Capacity - m^3CH_4/kg VS- (B_O)	K-Nitrogen - kg/day/1000kg animal mass- (K_N)	Number of Head
	EF used	EF used	EF used	EF used	EF used	
Dairy Cow						
Dairy Cows	138.4	604.0	10.2	0.2	0.4	31,625
Swine						
Market 120-179 lbs	1.5	67.8	5.4	0.5	0.4	8591
Poultry						
Hens > 1 yr	N/A	1.8	10.8	0.4	0.8	215630
Turkeys	N/A	6.8	9.7	0.4	0.7	94177.5
Other						
Sheep on Feed	8.0	27.0	9.2	0.4	0.4	23965
Goats	5.0	64.0	9.5	0.2	0.5	94177.5

Sutter County
Input data for Agriculture
1990

	Residue/Crop Ratio (R_{RC})	Fraction Residue Burned (F_{RB})	Fraction Dry Matter (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (NC)
	EF used	EF used	EF used	EF used	EF used	EF used	EF used	EF used
Hay (inc Alfalfa)	0.0	0.00	0.85	0.00	0.00	0.00	0.00	N/A
Barley	1.2	0.03	0.93	0.93	0.88	0.45	0.90	0.01
Dry Edible Beans	2.1	0.00	0.87	0.00	0.00	0.00	1.60	0.02
Corn	1.0	0.03	0.91	0.93	0.88	0.45	0.90	0.01
Corn for Grain	1.0	0.00	0.91	0.00	0.00	0.00	0.90	0.01
Oats	1.3	0.00	0.92	0.00	0.00	0.00	0.90	0.01
Rice	1.4	0.75	0.91	0.93	0.88	0.38	1.00	0.01
Sorghum	1.4	0.00	0.91	0.00	0.00	0.00	0.90	0.01
All Wheat	1.3	0.03	0.93	0.93	0.88	0.44	0.90	0.01
Sugar Beet	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable Crops & Fruit Trees	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safflower & Sunflower	2.1	0.03	0.87	0.93	0.88	0.45	0.90	0.02

Sutter County
Input data for Agriculture
1990

		Growing Season Emission Factor		
Primary		**EF used**	**Entered**	**Default**
		210		210
Rattoon		780		780
		State	***Project***	***% of State ($\%_P$)***
Total acres	1990	8,093,357	230,466.00	0.0284759
Total acres	1991	7,600,890	210,639.19	0.0277124
Climate Zone	Temperate	Yes	Sub Tropic	No

	1990					1991				
	Primary (Acres Harvested)	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**	**Primary (Acres Harvested)**	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**
Hay (inc Alfalfa)	10,953	40,350	tons	36,605	1,630,000	11,289	41,588	tons	37,728	1,680,000
Barley	4,996	5,959	tons	5,406	230,000	3,475	4,145	tons		160,000
Dry Edible Beans	19,984	15,977	tons	14,494	166,000	18,058	14,437	tons	13,097	150,000
Corn	3,500	70,000	tons	63,503	210,000	3,500	70,000	tons	63,503	210,000
Corn for Grain	2,200	7,898	tons	7,165	160,000	1,581	5,677	tons	5,150	115,000
Oats	2,114	2,169	tons	1,968	45,000	2,114	2,169	tons	1,968	45,000
Rice	74,356	273,237	tons	247,877	395,000	67,015	246,259	tons	223,403	356,000
Sorghum	802	2,005	tons	1,819	9,000	802	2,005	tons	1,819	9,000
All Wheat	18,090	44,483	tons	40,354	619,000	12,917	31,763	tons	28,815	442,000
Sugar Beet	5,371	131,590	tons	119,376	169,000	5,339	130,811	tons	118,670	168,000
Vegetable Crops & Fruit Trees	77,020	711,612	tons	645,564	3,211,479	74,422	687,607	tons	623,787	3,103,145
Safflower & Sunflower	11,080	12,033	tons	10,916	74,778	10,127	10,997	tons	9,977	68,345

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Carbon Dioxide

A. Direct Sources

A1-4. Mobile (Construction Equipment, Motor Vehicles, Landscape Equipment, and wood burning Hearths)

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth	MT/yr
0.00	217,009.87	26.34	8,311.78	**225,347.99**
0.00	0.96	0.00		

Fuel emissions from Airports

Annual Fuel Usage (U_{AAF})	kg/gallon (EF_{CAF})	kg/MT (C_3)	MT/yr (E_{CAF})
15,512.50	8.32	1,000.00	**129.06**

Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{CMV})	gr/MT (C_6)	tons/yr (E_{CMV})
Non Cat passenger Car	3,589,273	480.74	1,000,000	1,725.49
Cat passenger Car	174,977,035	403.47	1,000,000	70,598.68
Diesel Passenger Car	897,318	373.82	1,000,000	335.44
Non cat light-duty truck	3,595,179	476.14	1,000,000	1,711.80
Cat light duty truck	74,972,634	438.47	1,000,000	32,873.33
Diesel Light duty Truck	9,119,478	358.26	1,000,000	3,267.13
Non Cat light-duty truck 2	1,790,093	476.69	1,000,000	853.31
Cat light duty truck 2	87,267,028	431.99	1,000,000	37,698.48
Diesel Light duty truck 2	447,523	369.35	1,000,000	165.29
Non Cat Medium duty Truck	464,788	605.05	1,000,000	281.22
Cat med duty truck	41,323,885	649.94	1,000,000	26,857.84
Diesel Med duty truck	464,788	362.67	1,000,000	168.56
Non Cat lite-heavy duty truck	0	567.90	1,000,000	0.00
Cat Light-heavy duty truck	7,269,413	567.90	1,000,000	4,128.26
Diesel Lite-heavy duty truck	4,089,045	642.00	1,000,000	2,625.17
Non Cat lite-heavy duty truck 2	0	567.90	1,000,000	0.00
Cat Light-heavy duty truck 2	1,815,536	567.90	1,000,000	1,031.03
Diesel Lite-heavy duty truck 2	2,273,509	642.00	1,000,000	1,459.59
Non Cat med-heavy duty truck	456,610	567.90	1,000,000	259.31
Cat med-heavy duty truck	1,363,015	567.90	1,000,000	774.05
Diesel med-heavy duty truck	4,995,450	1,505.00	1,000,000	7,518.15
Non cat Heavy Duty truck	0	567.90	1,000,000	0.00
Cat heavy duty truck	457,519	567.90	1,000,000	259.82
Diesel heavy duty truck	8,174,909	1,924.23	1,000,000	15,730.44
Non Cat Other Bus	0	567.90	1,000,000	0.00
Cat other bus	0	567.90	1,000,000	0.00
Diesel Other Bus	454,338	1,505.00	1,000,000	683.78
Non Cat Urban Bus	0	567.90	1,000,000	0.00
Cat Urban Bus	0	567.90	1,000,000	0.00
Diesel Urban Bus	0	3,020.11	1,000,000	0.00
Non cat motorcycle	12,721,472	107.73	1,000,000	1,370.48
Cat motorcycle	5,452,060	0.00	1,000,000	0.00
Diesel Motorcycle	0	0.00	1,000,000	0.00
Non Cat School Bus	0	567.90	1,000,000	0.00
Cat School Bus	0	567.90	1,000,000	0.00
Diesel School Bus	454,338	1,505.00	1,000,000	683.78
Non Cat Motor home	452,521	567.90	1,000,000	256.98
Cat Motor home	4,089,045	567.90	1,000,000	2,322.15
Diesel Motor home	910,494	1,505.00	1,000,000	1,370.29
			Total (MT/year)	**217,009.87**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Carbon Dioxide

A5. Stationary Sources (Natural Gas)

Unit Type	MMBTU/yr (U_{Ang})	kg/MMBTU (EF_{Cng})	kg/MT (C_3)	MT/yr (E_{Cng})
AG/ER	161,670	53.07	1,000.00	8,579.85
Low Density Residential	56,321	53.07	1,000.00	2,988.97
Medium Density Residential	10,437	53.07	1,000.00	553.89
High Density Residential	0	53.07	1,000.00	0.00
Park	1,396	53.07	1,000.00	74.09
Commercial	378,388	53.07	1,000.00	20,081.04
Mixed Use	0	53.07	1,000.00	0.00
Industrial	912,833	53.07	1,000.00	48,444.06
			Total (MT/year)	**80,721.89**

B. Indirect Sources

B1. Electricity

Unit Type	kWh/yr	Unit	Unit type	MWh/yr (U_{Ae})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cele})
AG/ER	59267390.8	4,386	du	59,267.39	620.00	2,204.62	16,667.63
Low Density Residential	20647075.8	3,300	du	20,647.08	620.00	2,204.62	5,806.53
Medium Density Residential	3826106.8	612	du	3,826.11	620.00	2,204.62	1,076.01
High Density Residential	0	0	du	0.00	620.00	2,204.62	0.00
Park	123300.628	23,718,730	Sq/ft	123.30	620.00	2,204.62	34.68
Commercial	33420178.6	1,154,865	Sq/ft	33,420.18	620.00	2,204.62	9,398.68
Mixed Use	0	0	Sq/ft	0.00	620.00	2,204.62	0.00
Industrial	80623769	2,785,974	Sq/ft	80,623.77	620.00	2,204.62	22,673.63
						Total (MT/year)	**55,657.14**

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWh/yr (U_{epot})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cpot})
AG/ER	du	4,386	25.2918	3.50	88.52	620.00	2,204.62	24.89
Low Density Residential	du	3,300	8.8109	3.50	30.84	620.00	2,204.62	8.67
Medium Density Residential	du	612	1.6328	0.01	0.02	804.54	2,000	0.01
High Density Residential	du	0	0.0000	0.01	0.00	804.54	2,000	0.00
Park	Sq/ft	23,718,730	0.0022	3.50	0.01	620.00	2,204.62	0.00
Commercial	Sq/ft	1,154,865	0.5944	3.50	2.08	620.00	2,204.62	0.59
Mixed Use	Sq/ft	0	0.0000	3.50	0.00	620.00	2,204.62	0.00
Industrial	Sq/ft	2,785,974	1.4338	3.50	5.02	620.00	2,204.62	1.41
							Total (MT/year)	**35.57**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Carbon Dioxide

B3. Solid Waste

B3a. Anthropogenic Carbon

CO_2 emissions are considered anthropogenic and are not counted in this inventory.

Source: EPA Solid Waste Management and Greenhouse Gases; A life-cycle assessment of emissions and Sinks, 3rd edition, September 2006.

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{CWT})	g/MT (C_6)	tons/yr (E_{CWT})
AG/ER	9,255.06	0.1125	33	9.62	3,464.164	1,000,000	83.08
Low Density Residential	3,224.13	0.1125	33	9.62	3,464.164	1,000,000	28.94
Medium Density Residential	597.49	0.1125	33	9.62	3,464.164	1,000,000	5.36
High Density Residential	0.00	0.1125	33	9.62	3,464.164	1,000,000	0.00
Park	4.23	0.2250	33	9.62	3,464.164	1,000,000	0.02
Commercial	1,128.27	0.2250	33	9.62	3,464.164	1,000,000	5.06
Mixed Use	0.00	0.2250	33	9.62	3,464.164	1,000,000	0.00
Industrial	2,721.80	0.2250	33	9.62	3,464.164	1,000,000	12.22
						Total (MT/year)	**134.68**

B4. Wastewater

Unit Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG	MWh/yr (U_{eWW})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{CWW})
AG/ER	25.2918	0.65	16.43967	1.911	31.4162094	620.00	2,205	8.84
Low Density Residential	8.8109	0.82	7.224938	1.911	13.8068565	620.00	2,205	3.88
Medium Density Residential	1.6328	0.82	1.338896	1.911	2.55863026	620.00	2,205	0.72
High Density Residential	0.0000	0.82	0	1.911	0	620.00	2,205	0.00
Park	0.0022	0.71	0.001562	1.911	0.00298498	620.00	2,205	0.00
Commercial	0.5944	0.71	0.422024	1.911	0.80648786	620.00	2,205	0.23
Mixed Use	0.0000	0.71	0	1.911	0	620.00	2,205	0.00
Industrial	1.4338	0.8	1.14704	1.911	2.19199344	620.00	2,205	0.62
							Total (MT/year)	14.28

C. Reserved for AG emissions for CH_4 and N_2O, not applicable for CO_2.

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Carbon Dioxide

D. Summary Table

Source Type		Emissions, MT /yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aircraft	217138.93	217,138.93
	Landscape equipment	26.34	26.34
	Cooling and heating	89033.67	89,033.67
Total direct, tons/yr		**306198.94**	**306198.94**
Indirect	Electricity	55657.14	55,657.14
	Potable water	35.57	35.57
	Solid waste	134.68	134.68
	Wastewater	14.28	14.28
Total indirect, tons/yr		**55,841.68**	**55,841.68**
Total, tons/yr		**362,040.62**	**362,040.62**
Global warming potential index		**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/ER	148,617.83	148,617.83
	Low Density Residential	51,774.17	51,774.17
	Medium Density Residential	9,592.99	9,592.99
	High Density Residential	0.00	0.00
	Total Residential	**209,984.98**	**209,984.98**
Commercial	Park	165.15	165.15
	Commercial	44,511.23	44,511.23
	Mixed Use	0.00	0.00
	Total Commercial	**44,676.39**	**44,676.39**
Industrial	Industrial	107,379.26	107,379.26
	Total Industrial	**107,379.26**	**107,379.26**
Total, tons/yr		**362,040.63**	**362,040.63**
Global warming potential index		1	

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{MHDV})	gr/MT (C_6)	MT/yr (E_{MCON})
Construction Equipment	0.00	0.0580	1,000,000	**0.00**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{MMV})	gr/MT (C_6)	tons/yr (E_{MMV})
Non Cat passenger Car	3,589,273	0.1696	1,000,000	0.61
Cat passenger Car	174,977,035	0.1355	1,000,000	23.71
Diesel Passenger Car	897,318	0.0006	1,000,000	0.00
Non cat light-duty truck	3,595,179	0.1908	1,000,000	0.69
Cat light duty truck	74,972,634	0.1516	1,000,000	11.37
Diesel Light duty Truck	9,119,478	0.0011	1,000,000	0.01
Non Cat light-duty truck 2	1,790,093	0.1908	1,000,000	0.34
Cat light duty truck 2	87,267,028	0.1516	1,000,000	13.23
Diesel Light duty truck 2	447,523	0.0011	1,000,000	0.00
Non Cat Medium duty Truck	464,788	0.4181	1,000,000	0.19
Cat med duty truck	41,323,885	0.2356	1,000,000	9.74
Diesel Med duty truck	464,788	0.0051	1,000,000	0.00
Non Cat lite-heavy duty truck	0	0.4181	1,000,000	0.00
Cat Light-heavy duty truck	7,269,413	0.2356	1,000,000	1.71
Diesel Lite-heavy duty truck	4,089,045	0.0051	1,000,000	0.02
Non Cat lite-heavy duty truck 2	0	0.4181	1,000,000	0.00
Cat Light-heavy duty truck 2	1,815,536	0.2356	1,000,000	0.43
Diesel Lite-heavy duty truck 2	2,273,509	0.0051	1,000,000	0.01
Non Cat med-heavy duty truck	456,610	0.4181	1,000,000	0.19
Cat med-heavy duty truck	1,363,015	0.2356	1,000,000	0.32
Diesel med-heavy duty truck	4,995,450	0.0051	1,000,000	0.03
Non cat Heavy Duty truck	0	0.4181	1,000,000	0.00
Cat heavy duty truck	457,519	0.2356	1,000,000	0.11
Diesel heavy duty truck	8,174,909	0.0051	1,000,000	0.04
Non Cat Other Bus	0	0.4181	1,000,000	0.00
Cat other bus	0	0.2356	1,000,000	0.00
Diesel Other Bus	454,338	0.0051	1,000,000	0.00
Non Cat Urban Bus	0	0.4181	1,000,000	0.00
Cat Urban Bus	0	0.2356	1,000,000	0.00
Diesel Urban Bus	0	0.0051	1,000,000	0.00
Non cat motorcycle	12,721,472	0.0672	1,000,000	0.85
Cat motorcycle	5,452,060	0.0672	1,000,000	0.37
Diesel Motorcycle	0	0	1,000,000	0.00
Non Cat School Bus	0	0.4181	1,000,000	0.00
Cat School Bus	0	0.2356	1,000,000	0.00
Diesel School Bus	454,338	0.0051	1,000,000	0.00
Non Cat Motor home	452,521	0.4181	1,000,000	0.19
Cat Motor home	4,089,045	0.2356	1,000,000	0.96
Diesel Motor home	910,494	0.0051	1,000,000	0.00
			Total (MT/yr)	**65.12**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Methane

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{AAF})	gr/gallon (EF_{Maf})	gr/MT (C_6)	MT/yr (E_{Maf})
15,512.50	7.04	1,000,000	**0.11**

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year (G_F)	gr/gallon (EF_{MF})	gr/MT (C_6)	MT/yr (E_{Mls})
2,993.40	0.50	1,000,000	**0.0015**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
127,835.18	0.32	1,000	**40.40**

A5. Stationary Source (Cooling and Heating) - Natural Gas

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Mng})	kg/MT (C_3)	MT/yr (E_{Mng})
AG/ER	du	4,386	161,670.35	0.005	1,000	0.8084
Low Density Residential	du	3,300	56,321.36	0.005	1,000	0.2816
Medium Density Residential	du	612	10,436.90	0.005	1,000	0.0522
High Density Residential	du	0	0.00	0.005	1,000	0.0000
Park	Sq/ft	23,718,730	1,396.03	0.005	1,000	0.0070
Commercial	Sq/ft	1,154,865	378,387.76	0.005	1,000	1.8919
Mixed Use	Sq/ft	0	0.00	0.005	1,000	0.0000
Industrial	Sq/ft	2,785,974	912,833.16	0.001	1,000	0.9128
					Total (MT/yr)	**3.95**

B. Indirect Sources
B1. Electricity

Land Use Type	Unit Type	Units	kWh/year	MWh/yr (U_{Ae})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mele})
AG/ER	du	4,386	59,267,391	59,267	0.0067	2,205	0.180
Low Density Residential	du	3,300	20,647,076	20,647	0.0067	2,205	0.063
Medium Density Residential	du	612	3,826,107	3,826	0.0067	2,205	0.012
High Density Residential	du	0	0	0	0.0067	2,205	0.000
Park	Sq/ft	23,718,730	123,301	123	0.0067	2,205	0.000
Commercial	Sq/ft	1,154,865	33,420,179	33,420	0.0067	2,205	0.102
Mixed Use	Sq/ft	0	0	0	0.0067	2,205	0.000
Industrial	Sq/ft	2,785,974	80,623,769	80,624	0.0067	2,205	0.245
						Total (MT/yr)	**0.601**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Methane

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mpot})
AG/ER	du	4,386	25.29179	3.50	88.52	0.0067	2,205	0.00
Low Density Residential	du	3,300	8.81094	3.50	30.84	0.0067	2,205	0.00
Medium Density Residential	du	612	1.63275	3.50	5.71	0.0067	2,205	0.00
High Density Residential	du	0	0.00000	3.50	0.00	0.0067	2,205	0.00
Park	Sq/ft	23,718,730	0.00219	3.50	0.01	0.0067	2,205	0.00
Commercial	Sq/ft	1,154,865	0.59435	3.50	2.08	0.0067	2,205	0.00
Mixed Use	Sq/ft	0	0.00000	3.50	0.00	0.0067	2,205	0.00
Industrial	Sq/ft	2,785,974	1.43383	3.50	5.02	0.0067	2,205	0.00
							Total (MT/yr)	**0.00**

B3. Solid Waste
B3a. Fugitive Emissions

Unit Type	Unit Type	unit	tons/yr (U_{SW})	MT CO_2e/ton (EF_{MWF})	MT CO_2e/yr (E_{MWF})
AG/ER	du	4,386	9,255.06	0.520000	4,812.63
Low Density Residential	du	3,300	3,224.13	0.520000	1,676.55
Medium Density Residential	du	612	597.49	0.520000	310.69
High Density Residential	du	0	0.00	0.520000	0.00
Park	Sq/ft	23,718,730	4.23	0.520000	2.20
Commercial	Sq/ft	1,154,865	1,128.27	0.520000	586.70
Mixed Use	Sq/ft	0	0.00	0.520000	0.00
Industrial	Sq/ft	2,785,974	2,721.80	0.520000	1,415.33
				Total (MT/yr)	**8,804.11**

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{MWT})	gr/MT (C_6)	tons/yr (E_{MWT})
AG/ER	9,255.0568	0.1125	33	9.62	0.00510	1,000,000	0.000122
Low Density Residential	3,224.1337	0.1125	33	9.62	0.00510	1,000,000	0.000043
Medium Density Residential	597.4882	0.1125	33	9.62	0.00510	1,000,000	0.000008
High Density Residential	0.0000	0.1125	33	9.62	0.00510	1,000,000	0.000000
Park	4.2327	0.2250	33	9.62	0.00510	1,000,000	0.000000
Commercial	1,128.2690	0.2250	33	9.62	0.00510	1,000,000	0.000007
Mixed Use	0.0000	0.2250	33	9.62	0.00510	1,000,000	0.000000
Industrial	2,721.7967	0.2250	33	9.62	0.00510	1,000,000	0.000018
						Total (MT/yr)	**0.000198**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Methane

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{MWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{MWD})
Excavator	0	0.0164	9.00	313	2,205	0.00
Grader	0	0.0185	9.00	313	2,205	0.00
Off-Highway Tractor	0	0.0243	9.00	313	2,205	0.00
Off-Highway Truck	0	0.0260	9.00	313	2,205	0.00
Rubber Tired Dozer	0	0.0342	9.00	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/yr)	**0.00**

B4. Wastewater

Land Use Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	MT/yr (E_{MWW})
AG/ER	25.29179	65	16.44	1.91	31.42	0.0067	2,205	0.000095
Low Density Residential	8.81094	82	7.22	1.91	13.81	0.0067	2,205	0.000042
Medium Density Residential	1.63275	82	1.34	1.91	2.56	0.0067	2,205	0.000008
High Density Residential	0.00000	82	0.00	1.91	0.00	0.0067	2,205	0.000000
Park	0.00219	71	0.00	1.91	0.00	0.0067	2,205	0.000000
Commercial	0.59435	71	0.42	1.91	0.81	0.0067	2,205	0.000002
Mixed Use	0.00000	71	0.00	1.91	0.00	0.0067	2,205	0.000000
Industrial	1.43383	80	1.15	1.91	2.19	0.0067	2,205	0.000007
							Total (MT/yr)	0.000154

C. See Methane Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Methane

D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aviation Fuel	65.2292	1369.8132
	Landscape equipment	0.0015	0.0315
	Cooling and heating	44.3498	931.3458
	Industrial		
Total direct, tons/yr		**109.58**	**2,301.19**
Indirect	Electricity	0.6015	12.6315
	Potable water	0.0004	0.0084
	Solid waste	8,804.1083	8,804.1123
	Wastewater	0.0002	0.0032
Total indirect, tons/yr		**8,804.71**	**8,816.76**
Total from Agriculture		**17,772.02**	**373,212.42**
Total, tons/yr		***26,686.31***	***384,330.37***
Global warming potential index		**21**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/ER	4,871.2985	6,045.92
	Low Density Residential	1,696.9878	2,106.18
	Medium Density Residential	314.4814	390.31
	High Density Residential	0.0000	0.00
	Total Residential	**6,882.77**	**8,542.42**
Commercial	Park	2.2347	2.91
	Commercial	595.7251	776.38
	Mixed Use	0.0000	0.00
	Total Commercial	**597.96**	**779.29**
Industrial	Industrial	1,433.4551	1,796.24
Total Industrial		**1,433.4551**	**1,796.24**
Total from Agriculture		**17,772.02**	**373,212.42**
Total, tons/yr		***26,686.20***	***384,330.36***
Global warming potential index		21	

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Nitrous Oxide

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{NHDV})	gr/MT (C_6)	MT/yr (E_{NCON})
Non cat heavy-duty truck	0.00	0.0260	1,000,000	**0.00000**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{NMV})	gr/MT (C_6)	MT/yr (E_{NMV})
Non Cat passenger Car	3,589,273	0.0197	1,000,000	0.07071
Cat passenger Car	174,977,035	0.0504	1,000,000	8.81884
Diesel Passenger Car	897,318	0.0012	1,000,000	0.00108
Non cat light-duty truck	3,595,179	0.0218	1,000,000	0.07837
Cat light duty truck	74,972,634	0.0639	1,000,000	4.79075
Diesel Light duty Truck	9,119,478	0.0017	1,000,000	0.01550
Non Cat light-duty truck 2	1,790,093	0.0218	1,000,000	0.03902
Cat light duty truck 2	87,267,028	0.0639	1,000,000	5.57636
Diesel Light duty truck 2	447,523	0.0017	1,000,000	0.00076
Non Cat Medium duty Truck	464,788	0.0473	1,000,000	0.02198
Cat med duty truck	41,323,885	0.1317	1,000,000	5.44236
Diesel Med duty truck	464,788	0.0048	1,000,000	0.00223
Non Cat lite-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck	7,269,413	0.1317	1,000,000	0.95738
Diesel Lite-heavy duty truck	4,089,045	0.0048	1,000,000	0.01963
Non Cat lite-heavy duty truck 2	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck 2	1,815,536	0.1317	1,000,000	0.23911
Diesel Lite-heavy duty truck 2	2,273,509	0.0048	1,000,000	0.01091
Non Cat med-heavy duty truck	456,610	0.0473	1,000,000	0.02160
Cat med-heavy duty truck	1,363,015	0.1317	1,000,000	0.17951
Diesel med-heavy duty truck	4,995,450	0.0048	1,000,000	0.02398
Non cat Heavy Duty truck	0	0.0473	1,000,000	0.00000
Cat heavy duty truck	457,519	0.1317	1,000,000	0.06026
Diesel heavy duty truck	8,174,909	0.0048	1,000,000	0.03924
Non Cat Other Bus	0	0.0473	1,000,000	0.00000
Cat other bus	0	0.1317	1,000,000	0.00000
Diesel Other Bus	454,338	0.0048	1,000,000	0.00218
Non Cat Urban Bus	0	0.0473	1,000,000	0.00000
Cat Urban Bus	0	0.1317	1,000,000	0.00000
Diesel Urban Bus	0	0.0048	1,000,000	0.00000
Non cat motorcycle	12,721,472	0.0069	1,000,000	0.08778
Cat motorcycle	5,452,060	0.0069	1,000,000	0.03762
Diesel Motorcycle	0	0	1,000,000	0.00000
Non Cat School Bus	0	0.0473	1,000,000	0.00000
Cat School Bus	0	0.1317	1,000,000	0.00000
Diesel School Bus	454,338	0.0048	1,000,000	0.00218
Non Cat Motor home	452,521	0.0473	1,000,000	0.02140
Cat Motor home	4,089,045	0.1317	1,000,000	0.53853
Diesel Motor home	910,494	0.0048	1,000,000	0.00437
			Total (MT/yr)	**27.10**

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Emissions from Aviation Fuel

Gasoline gallons/ year (U_{Aaf})	gr/gallon (EF_{Naf})	gr/lbs (C_6)	MT/yr (E_{Nls})
15,512.50	0.11000	1000000	**0.001706**

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year	gr/gallon (EF_{Nls})	gr/lbs (C_6)	MT/yr (E_{Nls})
2,993.40	0.22000	1000000	**0.000659**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
127,835.18	0.00420	1000	**0.536908**

A5. Stationary Source (Cooling and Heating)

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Nng})	kg/MT (C_3)	MT/yr (E_{Nng})
AG/ER	du	4,386	161,670.35	0.0001	1,000	0.016167
Low Density Residential	du	3,300	56,321.36	0.0001	1,000	0.005632
Medium Density Residential	du	612	10,436.90	0.0001	1,000	0.001044
High Density Residential	du	0	0.00	0.0001	1,000	0.000000
Park	Sq/ft	23718729.69	1,396.03	0.0001	1,000	0.000140
Commercial	Sq/ft	1154864.75	378,387.76	0.0001	1,000	0.037839
Mixed Use	Sq/ft	0.00	0.00	0.0001	1,000	0.000000
Industrial	Sq/ft	2785973.60	912,833.16	0.0001	1,000	0.091283
					Total (MT/yr)	**0.152105**

B. Indirect Sources
B1. Electricity

Land Use Type	Unit Type	Units	kWh/yr	MWh/yr (U_{Ae})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Nele})
AG/ER	du	4385.79	59,267,391	59,267	0.0037	2,205	0.09947
Low Density Residential	du	3300.17	20,647,076	20,647	0.0037	2,205	0.03465
Medium Density Residential	du	611.61	3,826,107	3,826	0.0037	2,205	0.00642
High Density Residential	du	0.00	0	0	0.0037	2,205	0.00000
Park	Sq/ft	23718729.69	123,301	123	0.0037	2,205	0.00021
Commercial	Sq/ft	1154864.75	33,420,179	33,420	0.0037	2,205	0.05609
Mixed Use	Sq/ft	0.00	0	0	0.0037	2,205	0.00000
Industrial	Sq/ft	2785973.60	80,623,769	80,624	0.0037	2,205	0.13531
						Total (MT/yr)	**0.33215**

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B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Npot})
AG/ER	du	4385.79	25.2917905	3.50	88.52	0.0037	2,205	0.000
Low Density Residential	du	3300.17	8.8109415	3.50	30.84	0.0037	2,205	0.000
Medium Density Residential	du	611.61	1.6327544	3.50	5.71	0.0037	2,205	0.000
High Density Residential	du	0.00	0.0000000	3.50	0.00	0.0037	2,205	0.000
Park	Sq/ft	23718729.69	0.0021928	3.50	0.01	0.0037	2,205	0.000
Commercial	Sq/ft	1154864.75	0.5943535	3.50	2.08	0.0037	2,205	0.000
Mixed Use	Sq/ft	0.00	0.0000000	3.50	0.00	0.0037	2,205	0.000
Industrial	Sq/ft	2785973.60	1.4338348	3.50	5.02	0.0037	2,205	0.000
							Total (MT/yr)	**0.000**

B3. Solid Waste
B3a. Fugitive Emissions No Fugitive Nitrous Oxide Emissions

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{NWT})	gr/MT (C_6)	MT/yr (E_{NWT})
AG/ER	9,255.06	0.1125	33	9.62	0.0048	1,000,000	0.000115
Low Density Residential	3,224.13	0.1125	33	9.62	0.0048	1,000,000	0.000040
Medium Density Residential	597.49	0.1125	33	9.62	0.0048	1,000,000	0.000007
High Density Residential	0.00	0.1125	33	9.62	0.0048	1,000,000	0.000000
Park	4.23	0.2250	33	9.62	0.0048	1,000,000	0.000000
Commercial	1,128.27	0.2250	33	9.62	0.0048	1,000,000	0.000007
Mixed Use	0.00	0.2250	33	9.62	0.0048	1,000,000	0.000000
Industrial	2,721.80	0.2250	33	9.62	0.0048	1,000,000	0.000017
						Total (MT/yr)	**0.000187**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip.	lbs/hr (EF_{NWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	tons/yr (E_{NWD})
Excavator	0	0.0074	9.00	313	2,205	0.00
Grader	0	0.0083	9.00	313	2,205	0.00
Off-Highway Tractor	0	0.0109	9.00	313	2,205	0.00
Off-Highway Truck	0	0.0117	9.00	313	2,205	0.00
Rubber Tired Dozer	0	0.0153	9.00	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total, tons/yr	**0.00**

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B4. Wastewater

Land Use Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{NWW})
AG/ER	25.29	65	16.44	1.91	31.4162	0.0037	2204.62	0.0000527
Low Density Residential	8.81	82	7.22	1.91	13.8069	0.0037	2204.62	0.0000232
Medium Density Residential	1.63	82	1.34	1.91	2.5586	0.0037	2204.62	0.0000043
High Density Residential	0.00	82	0.00	1.91	0.0000	0.0037	2204.62	0.0000000
Park	0.00	71	0.00	1.91	0.0030	0.0037	2204.62	0.0000000
Commercial	0.59	71	0.42	1.91	0.8064	0.0037	2204.62	0.0000014
Mixed Use	0.00	71	0.00	1.91	0.0000	0.0037	2204.62	0.0000000
Industrial	1.43	80	1.15	1.91	2.1920	0.0037	2204.62	0.0000037
							Total (MT/yr)	**0.0000852**

C. See Nitrous Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2e metric tons/yr
Direct	Construction equipment	0.00000	0.00
	Motor vehicles + aviation fuel	27.1017	8,401.53
	Landscape equipment	0.0007	0.20
	Cooling and heating	0.6890	213.59
Total direct, tons/yr		**27.7914**	**8,615.33**
Indirect	Electricity	0.3321	102.97
	Potable water	0.0002	0.07
	Solid waste	0.0002	0.06
	Wastewater	0.0001	0.03
Total indirect, tons/yr		**0.3326**	**103.12**
Total From Agriculture		**1,880.98**	**583,102.45**
Total, tons/yr		***1,909.10***	***591,820.89***
Global warming potential index		**310**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/ER	15.2238	4,719.60
	Low Density Residential	5.3034	1,644.14
	Medium Density Residential	0.9828	304.69
	High Density Residential	0.0000	0.00
	Total Residential	**21.5100**	**6,668.44**
Commercial	Park	0.0073	2.25
	Commercial	1.9357	600.10
	Mixed Use	0.0000	0.00
	Total Commercial	**1.9430**	**602.35**
Industrial	Industrial	4.6696	1,447.66
	Total Industrial	**4.6696**	**1,447.66**
Total from Agriculture		**1,880.98**	**583,102.45**
Total, tons/yr		**1,909.10**	**591,820.89**
Global warming potential index		310	

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CM. Methane

CM1. Enteric Fermentation

Source	Number - Head/year (U_{Aani})	Emission Factor kg CH_4/head (EF_{MEF})	Conversion factor kg to MT (C_3)	MT CH_4/year (E_{MEF})
Dairy Cow				
Dairy Cows	31,625.00	138.39	1000.0	4,376.67
Others				
Sheep	23,965.00	8.00	1000.0	191.72
Goats	94,177.50	5.00	1000.0	470.89
Swine	8,591.00	1.50	1000.0	12.89
			Total	**5,052.16**

CM2. Manure Management

Source	Number - 1000s Head/year (U_{Aani})	Typical Animal Mass kg/head (TAM)	Volatile Solids Produced kgVS/1000kg/year (VS)	Max CH_4 capacity m^3CH_4/kgVS (B_O)	Extent Capacity Realized (MCF)	Density of Methane (C_8)	MT CH_4/year (E_{MMM})
Dairy Cow							
Dairy Cows	31.625	604.0	3722.3	0.24	0.488	0.678	5,646.70
Market 120-179 lbs	8.591	67.8	1971.0	0.48	0.471	0.678	175.9764243
Poultry							
Layers							
Hens > 1 yr	215.63	1.8	3942.0	0.39	0.088	0.678	35.51676336
Turkeys	94.1775	6.8	3540.5	0.36	0.015	0.678	8.301262033
Other							
Sheep on Feed	23.965	27.0	3361.7	0.36	0.012	0.678	6.370993072
Goats	94.1775	64.0	3478.5	0.17	0.012	0.678	28.99831466
						Total	**5,901.86**

CM3. Rice Cultivation

Season	Acres (U_{AC})	Conversion hectares/acre (C_{11})	Emission Factor (EF_{PS})	Conversion kg/MT (C_3)	MT/year (E_{MRC})
Primary	74,356	0.40	210	1,000	6,319.21
Rattoon	0	0.40	780	1,000	0.00
				Total	**6,319.21**

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CM4. Agricultural Residue Burning

Source	Production - Tons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combust. Efficiency (CE)	Carbon Content (CC)	Ratio CH_4-C (R_{CH4-C})	CH_4- to Mol.Wt. (C_{11})	Emissions Tons/year (E_{MARB})
Hay (inc Alfalfa)	36,604.91	0	0.000	0.85	0	0.00	0.00	0.005	1.33	0.00
Barley	5,405.92	1.2	0.030	0.93	0.93	0.88	0.45	0.005	1.33	0.44
Dry Edible Beans	14,493.77	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Corn	63,502.95	1	0.030	0.91	0.93	0.88	0.45	0.005	1.33	4.23
Corn for Grain	7,164.95	1	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Oats	1,967.57	1.3	0.000	0.92	0	0.00	0.00	0.005	1.33	0.00
Rice	247,876.59	1.4	0.750	0.91	0.93	0.88	0.38	0.005	1.33	490.59
Sorghum	1,818.91	1.4	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
All Wheat	40,354.35	1.3	0.030	0.93	0.93	0.88	0.44	0.005	1.33	3.53
Sugar Beet	119,376.47	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
Vegetable Crops & Fruit Trees	645,563.72	0	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Safflower & Sunflower	10,915.85	2.1	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
									Total	**498.79**

CN. Nitrous Oxide

CN1. Manure Management

Source	Total Nitrogen Excreted (N_T)	Manure Anaerobic Lagoons ($\%_{AL}$)	Manure Liquid/Slurry ($\%_S$)	Manure Deep Pit ($\%_{DP}$)	Emission Factor for Liquid System (EF_{NML})	N_2O Emissions from Liquid System Mgt.	Manure Solid Storage/ Managed ($\%_{SS}$)	Manure Deep Pit / DryLot ($\%_{DP}$)	Manure Pasture / Poultry ($\%_P$)	Emission Factor for Solid System (EF_{NMS})	N_2O from solid system Mgt.	Total N_2O MT/yr (E_{NMM})
Dairy Cow												
Dairy Cows	3,067,701	1,665,142	691,130	*N/A*	0.001	*3,702.71*	278,706	14,445	*N/A*	0.02	*9,213.34*	12.92
Beef Cow												
Swine												
Market 120-179 lbs	89,293	41,750	7,132	12,277	0.001	*96.11*	2,980	*N/A*	*N/A*	0.02	*93.66*	0.19
Poultry												
Layers												
Hens > 1 yr	117,585	8,231	3,528	*N/A*	0.001	*18.48*	52,913	*N/A*	52,913	0.02	*3,325.98*	3.34
Turkeys	172,974	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	160,866	0.02	*5,055.78*	5.06
Other												
Sheep on Feed	99,194	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	97,453	*N/A*	*N/A*	0.02	*3,062.82*	3.06
											Total	**24.57**

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CN2. Emissions from Animals and Runoff

Indirect emissions from animals

Source	Total Nitrogen Excreted (N_T)	% of Indirect Volitazition ($\%_{VI}$)	conversion from NH_3 to NO_X ($EF_{NH3-NOX}$)	Conversion factor for kg to MT (C_3)	Tons/year (E_{NIA})
Dairy Cow					
Dairy Cows	3,067,701	0.20	0.01	1,000	9.64
Swine					
Market 120-179 lbs	89,293	0.20	0.01	1,000	0.28
Poultry					
Hens > 1 yr	117,585	0.20	0.01	1,000	0.37
Turkeys	172,974	0.20	0.01	1,000	0.54
Other					
Sheep on Feed	99,194	0.20	0.01	1,000	0.31
Goats	989,994	0.20	0.01	1,000	3.11
				Total	**14.26**

Direct emissions from animals

Source	Unmanaged Nitrogen (N_{UM})	Emission Factor for Pastures, Ranges and Paddocks (EF_{PRP})	Conversion factor for kg to MT (C_3)	Manure for Pasture, Range and Paddock (M_{PRP})	Managed Nitrogen (N_M)	Unmanaged Daily Spread (N_{DS})	% of Indirect Volit. ($\%_{VI}$)	Emission Factor for ground App. (EF_{NV})	Manure applied to Soils (M_{AS})	MT/year (E_{NDA})
Dairy Cow										
Dairy Cows	57,904.64	0.02	1,000	1.158	2,649,424	360,373	0.20	0.0125	30.098	50.937
Swine										
Market 120-179 lbs	11,173.60	0.02	1,000	0.223	78,119	*N/A*	0.20	0.0125	0.781	1.930
Poultry										
Hens > 1 yr	*N/A*	0.02	1,000	*0.000*	117,585	*N/A*	0.20	0.0125	1.176	1.848
Turkeys	12,108.18	0.02	1,000	0.242	160,866	*N/A*	0.20	0.0125	1.609	3.289
Other										
Sheep on Feed	97,453.29	0.02	1,000	1.949	1,740	*N/A*	0.20	0.0125	0.017	6.153
Goats	989,993.88	0.02	1,000	19.800	*N/A*	*N/A*	0.20	0.0125	*0.000*	62.228
									Total	**126.384**

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Emissions from Leaching

Source	Unvolatized Synthetic Nitrogen (N_{UVS})	Unvolatized Non-Manure Organic Nitrogen (N_{UVO})	Conversion factor for kg to MT (C_3)	Leaching % of Soil ($\%_{Leach}$)	Leaching Factor - kg N2O-N / kg N (F_{Leach})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Total Leaching from non-manure Fertilizer (L_{fert})	Total Nitrogen Excreted (N_T)	% of Volitazation from Manure ($\%_{VM}$)	Total Leaching from Manure (L_{man})	Total from Leaching MT/yr (E_{NL})
Total emissions of N_2O from Leaching	12,407,050	2789.83	1,000	0.3000	0.025	1.57	146.26	4,536,740	0.00	53.47	**199.73**

CN3: Nitrous Oxide from Crop Growth:

Source	Crop Production MTs	Conversion factor for kg to tons (C_3)	Residue/Crop Ratio (R_{RC})	Fraction Dry (F_{DM})	Nitrogen Content of biomass	Nitrogen Fixed by Crops (FN)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (N_{CR})	Nitrogen Returned to Soil (N_{RS})
Hay (inc Alfalfa)	36,604.91	1,000	0.0	0.8500	0.03	933,425	0.00	*N/A*	*0*
Barley	5,405.92	1,000	1.2	0.9300	*N/A*	*0.00*	0.90	0.01	41,809
Dry Edible Beans	14,493.77	1,000	2.1	0.8700	0.03	1,172,691	1.60	0.02	711,786
Corn	63,502.95	1,000	1.0	0.9100	*N/A*	*0.00*	0.90	0.01	301,652
Corn for Grain	7,164.95	1,000	1.0	0.9100	*N/A*	*0.00*	0.90	0.01	34,035
Oats	1,967.57	1,000	1.3	0.9200	*N/A*	*0.00*	0.90	0.01	14,825
Rice	247,876.59	1,000	1.4	0.9100	*N/A*	*0.00*	1.00	0.01	2,273,722
Sorghum	1,818.91	1,000	1.4	0.9100	*N/A*	*0.00*	0.90	0.01	22,524
All Wheat	40,354.35	1,000	1.3	0.9300	*N/A*	*0.00*	0.90	0.01	272,239
Sugar Beet	119,376.47	1,000	0.0	0.0000	0.03	0.00	0.00	0.00	0
Vegetable Crops & Fruit Trees	645,563.72	1,000	0.0	0.0000	0.03	0.00	0.00	0.00	0
Safflower & Sunflower	10,915.85	1,000	2.1	0.8700	0.03	883,201	0.90	0.02	412,825
Total						2,989,317			4,085,417

Source	Crop Production (Hectares)	Nitrogen Fixed by Crops (FN_T)	Nitrogen Returned to Soil (N_{RST})	Conversion factor for kg to tons (C_3)	factor for soils (kg N2O-N/kgN) (EF_{DIR})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Emission factor kg N_2O-N / ha_yr	Emissions in MT (N_{CG})
N2O emissions from Legumes	-	2,989,317	-	1,000	0.0100	1.57	-	46.97
N2O emissions from Residues	-	-	4,085,417	1,000	0.0100	1.57	-	64.20
N_2O from Histols (Temperate Zone)	93,268.31	-	-	1,000	-	1.57	8	1,172.52
							Total	**1,283.69**

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CN4. Emissions from Fertilizers

Source	Target Year Total Fertilizer Use (kg N)	Following Year Total Fertilizer Use (kg N)	Total N in Fertilizers (Calendar Year)	Unvol. N (kg) (NUV)	Volatized N (kg) (NV)	Direct N_2O Emissions (metric tons)	N_2O Emissions (metric tons)	Total Emissions from Fertilizers
Synthetic	14,235,595	12,949,928	13,785,611	12,407,050	1,378,561	195.01	21.67	**216.69**
Organic	84,053	89,459	85,945	2,790	697.46			
Dried Manure	924	824	889					
Activated Sewage Sludge	72,148	72,826	72,385					
Other	10,981	15,808	12,671					
Dried Manure %	1.10%	0.92%	1.03%					
Non-Manure Organics	83,129	88,635	85,056					

CN5. Emissions on N_2O from agricultural residue burning

Source	Production - MTTons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combust. Efficiency (CE)	Nitrogen Content (NC)	Ratio N2O-N (R_{N2O-N})	Conv. to Mol.Wt. (C_{10})	Emissions MT/year (E_{NARB})
Hay (inc Alfalfa)	36,604.91	0.0000	0.000	0.85	0.000	0.00	*N/A*	0.007	1.57	*0.00*
Barley	5,405.92	1.2000	0.030	0.93	0.930	0.88	0.008	0.007	1.57	0.01
Dry Edible Beans	14,493.77	2.1000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Corn	63,502.95	1.0000	0.030	0.91	0.930	0.88	0.006	0.007	1.57	0.09
Corn for Grain	7,164.95	1.0000	0.000	0.91	0.000	0.00	0.006	0.007	1.57	0.00
Oats	1,967.57	1.3000	0.000	0.92	0.000	0.00	0.007	0.007	1.57	0.00
Rice	247,876.59	1.4000	0.750	0.91	0.930	0.88	0.007	0.007	1.57	15.35
Sorghum	1,818.91	1.4000	0.000	0.91	0.000	0.00	0.011	0.007	1.57	0.00
All Wheat	40,354.35	1.3000	0.030	0.93	0.930	0.88	0.006	0.007	1.57	0.08
Sugar Beet	119,376.47	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Vegetable Crops & Fruit Trees	645,563.72	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Safflower & Sunflower	10,915.85	2.1000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.12
									Total	**15.66**

Sutter County
Input data for Green House Gas Emissions
1990
Inventory
Agricultural Emissions

D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Methane	Enteric Fermentation	5,052.16	106,095.45
	Manure Management	5,901.86	123,939.07
	Rice Cultivation	6,319.21	132,703.34
	Agricultural Residue Burning	498.79	10,474.55
Total Methane		17,772.02	**373,212.42**
Nitrous Oxide	Manure Management	24.57	7,616.35
	Animals and Runoff	340.37	105,514.77
	Crop Growth	1,283.69	397,944.00
	Fertilizer Use	216.69	67,172.61
	Agricultural Residue Burning	15.66	4,854.71
Total Nitrous Oxide		1,880.98	**583,102.45**
	Total emissions from Agriculture		**956,314.87**

Appendix D:2008 URBEMIS Output and GHG Calculations

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	CO2
Natural Gas	
Hearth - No Summer Emissions	
Landscape	379.60
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, unmitigated)	379.60

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Area Source Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Winter Pounds Per Day, Unmitigated)

Source	CO2
Natural Gas	
Hearth	262,902.94
Landscaping - No Winter Emissions	
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, unmitigated)	262,902.94

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Area Source Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Natural Gas	
Hearth	10,779.02
Landscape	34.16
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	10,813.18

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	420,605.71
Apartments low rise	304,568.02
Apartments mid rise	54,101.44
City park	75.46
General office building	396,974.89
General light industry	199,071.36
TOTALS (lbs/day, unmitigated)	1,375,396.88

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

4/14/2010 2:20:34 PM

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,700.00	7.16	dwelling units	5,100.00	36,516.00	402,990.57
Apartments low rise	230.81	7.16	dwelling units	3,693.00	26,441.88	291,812.58
Apartments mid rise	17.26	7.16	dwelling units	656.00	4,696.96	51,835.65
City park		0.01	acres	641.00	6.41	72.98
General office building		24.88	1000 sq ft	1,359.52	33,824.86	382,051.75
General light industry		5.18	1000 sq ft	3,279.68	16,988.74	191,123.34
					118,474.85	1,319,886.87

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.5	2.0	97.5	0.5
Light Truck < 3750 lbs	19.3	4.1	85.5	10.4
Light Truck 3751-5750 lbs	19.7	2.0	97.5	0.5
Med Truck 5751-8500 lbs	9.3	1.1	97.8	1.1
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	64.0	36.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	1.5	6.7	20.0	73.3
Heavy-Heavy Truck 33,001-60,000 lbs	1.9	0.0	5.3	94.7
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	70.0	30.0	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	8.3	75.0	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	11.0	11.2	11.0	11.2	11.2	11.4
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 11 miles

Home-based shop rural trip length changed from 7.1 miles to 11.2 miles

Home-based other rural trip length changed from 7.9 miles to 11 miles

Commercial-based commute rural trip length changed from 14.7 miles to 11.2 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 11.2 miles

Operational Changes to Defaults

Commercial-based customer rural trip length changed from 6.6 miles to 11.4 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Winter Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	371,823.35
Apartments low rise	269,243.85
Apartments mid rise	47,826.69
City park	66.63
General office building	350,727.19
General light industry	175,935.71
TOTALS (lbs/day, unmitigated)	1,215,623.42

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,700.00	7.16	dwelling units	5,100.00	36,516.00	402,990.57
Apartments low rise	230.81	7.16	dwelling units	3,693.00	26,441.88	291,812.58
Apartments mid rise	17.26	7.16	dwelling units	656.00	4,696.96	51,835.65
City park		0.01	acres	641.00	6.41	72.98
General office building		24.88	1000 sq ft	1,359.52	33,824.86	382,051.75
General light industry		5.18	1000 sq ft	3,279.68	16,988.74	191,123.34
					118,474.85	1,319,886.87

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.5	2.0	97.5	0.5
Light Truck < 3750 lbs	19.3	4.1	85.5	10.4
Light Truck 3751-5750 lbs	19.7	2.0	97.5	0.5
Med Truck 5751-8500 lbs	9.3	1.1	97.8	1.1
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	64.0	36.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	1.5	6.7	20.0	73.3
Heavy-Heavy Truck 33,001-60,000 lbs	1.9	0.0	5.3	94.7
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	70.0	30.0	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	8.3	75.0	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	11.0	11.2	11.0	11.2	11.2	11.4
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 11 miles

Home-based shop rural trip length changed from 7.1 miles to 11.2 miles

Home-based other rural trip length changed from 7.9 miles to 11 miles

Commercial-based commute rural trip length changed from 14.7 miles to 11.2 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 11.2 miles

Operational Changes to Defaults

Commercial-based customer rural trip length changed from 6.6 miles to 11.4 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2009 - Existing 04-14-2010.urb924

Project Name: Sutter County 2009 Existing

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Single family housing	73,792.95
Apartments low rise	53,434.78
Apartments mid rise	9,491.80
City park	13.23
General office building	69,634.52
General light industry	34,923.10
TOTALS (tons/year, unmitigated)	241,290.38

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,700.00	7.16	dwelling units	5,100.00	36,516.00	402,990.57
Apartments low rise	230.81	7.16	dwelling units	3,693.00	26,441.88	291,812.58
Apartments mid rise	17.26	7.16	dwelling units	656.00	4,696.96	51,835.65
City park		0.01	acres	641.00	6.41	72.98
General office building		24.88	1000 sq ft	1,359.52	33,824.86	382,051.75
General light industry		5.18	1000 sq ft	3,279.68	16,988.74	191,123.34
					118,474.85	1,319,886.87

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.5	2.0	97.5	0.5
Light Truck < 3750 lbs	19.3	4.1	85.5	10.4
Light Truck 3751-5750 lbs	19.7	2.0	97.5	0.5
Med Truck 5751-8500 lbs	9.3	1.1	97.8	1.1
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	64.0	36.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	1.5	6.7	20.0	73.3
Heavy-Heavy Truck 33,001-60,000 lbs	1.9	0.0	5.3	94.7
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	70.0	30.0	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	8.3	75.0	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	11.0	11.2	11.0	11.2	11.2	11.4
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 11 miles

Home-based shop rural trip length changed from 7.1 miles to 11.2 miles

Home-based other rural trip length changed from 7.9 miles to 11 miles

Commercial-based commute rural trip length changed from 14.7 miles to 11.2 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 11.2 miles

Operational Changes to Defaults

Commercial-based customer rural trip length changed from 6.6 miles to 11.4 miles

Sutter County Base Year Climate Action Plan
Emissions by Source
2008
Inventory
By Source

Transportation		
Source:		**Metric tons of CO_2e**
1 On-Road Vehicles		254,455
2 Airport Operations		155
	Total	**254,610**

Energy		
Sources:		**Metric tons of CO_2e**
1 Electric		52,186
2 Natural Gas		106,441
	Total	**158,627**

Solid Waste		
Source		**Metric tons of CO_2e**
1 Solid Waste Disposal		2,750
2 Green Waste Recycling		Data Not Available
3 Materials Recycling		Data Not Available
	Total	**2,750**

Landscape Emissions		
Sources:		**Metric tons of CO_2e**
1 Landscape Emissions		32
2 Carbon sink from CO_2 sequestration		Data Not Available
	Total	**32**

Agriculture		
Sources:		**Metric tons of CO_2e**
1 Enteric Fermentation		24,248
2 Manure Management		29,780
3 Rice Cultivation		181,067
4 Agricultural Residue Burning		3,051
5 Crop Growth		386,054
6 Animals and Runoff		78,453
7 Fertilizer Use		102,351
	Total	**805,005**

Net Total Emissions		
Category		**Metric tons of CO_2e**
Energy		158,627
Solid Waste		2,750
Landscape Emissions		32
Agriculture		805,005
Transportation		254,610
	Total	**1,221,024**

Sutter County Base Year Climate Action Plan
Emissions by Land Use
2008
Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/RAN/ER	164,546	2,943	5,680	173,170
	Low Density Residential	61,120	1,093	2,110	64,323
	Medium Density Residential	11,326	203	389	11,917
	High Density Residential	0	0	0	0
	Total Residential	**236,992**	**4,239**	**8,179**	**249,410**
Commercial	Park	175	1	2	178
	Commercial	47,742	363	647	48,753
	Mixed Use	0	0	0	0
	Total Commercial	**47,917**	**365**	**650**	**48,931**
Industrial	Industrial	115,327	789	1,562	117,678
	Total Industrial	**115,327**	**789**	**1,562**	**117,678**
Agriculture		0	235,461	569,544	805,005
	Total	**400,236**	**240,854**	**579,935**	**1,221,024**

*For consistency with 2008 and 2020 inventories, High Density Residential and Mixed use categories are listed although there is no land designated as such for 1990.

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008 Inventory

Land Use Type (units)	Total Trips	Total VMT	Total Trips	Total VMT	Unit Totals	Unit Type
AG/RAN/ER	47,706.12	526484.73	47706.12	526484.73	5163	du
Low Density Residential	35897.4	396163.7	35897.4	396163.7	3885	du
Medium Density Residential	6652.8	73420.3	6652.8	73420.3	720	du
High Density Residential	0	0	0	0	0	du
Park	6.41	72.98	6.41	72.98	27,921,960.00	Sq/ft
Commercial	30058.99	339516.27	30058.99	339516.27	1,359,520.00	Sq/ft
Mixed Use	0	0	0	0	0.00	Sq/ft
Industrial	11446.08	128768.43	11446.08	128768.43	3,279,680.00	Sq/ft
Total	**131,767.80**	**1,464,426.41**	**131767.8**	**1464426.41**		

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008 Inventory

Land Use Type (units)	Natural gas usage rate (MMBTU/yr)	Kilowatt-hour/ year	Potable Water Usage (gallons/year)	Solid Waste (lbs/year)	% of Total square SFR/MFR/Non-Res
AG/RAN/ER	186,544	58,141,918	29,189,980	22,144,877	100.00%
Low Density Residential	69,289	21,595,856	10,842,137	8,225,502	84.37%
Medium Density Residential	12,840	4,001,962	2,009,173	1,524,554	15.64%
High Density Residential	0	0	0	0	0.00%
Park	1,642	145,060	2,580	8,366	0.11%
Commercial	445,071	39,319,236	699,264	2,324,875	29.27%
Mixed Use	0	0	0	0	0.00%
Industrial	1,073,666	94,851,579	1,686,866	5,609,021	70.62%
Total	**1,789,051**	**218,055,610**	**44,430,000**	**39,837,195**	

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008 Inventory

City Parks

# of City Parks	Estimated SQ / "building"	Estimated Buildings per
10	500	1

Airports

# of planes	Gallons fuel per day	Annual days of operation	Annual Fuel Usage (g/yr)
77	50	365	18,250

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle +
	Summer (lbs/day)	(lbs/day)	tons/Year	Summer	Winter	Year	
2008	1,526,584.72	1,349,314.62	267,817.78	0.00	0.00	0.00	267,817.78

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
2008	384.11	0.00	34.57	0.00	271,778.59	11,142.92

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	39.50	0.3950	2.00	0.0200	97.50	0.9750	0.50	0.0050
Light Truck <3,750 lbs	19.30	0.1930	4.10	0.0410	85.50	0.8550	10.40	0.1040
Light Truck 3,751-5,750 lbs	19.70	0.1970	2.00	0.0200	97.50	0.9750	0.50	0.0050
Med Truck 5,751-8,500 lbs	9.30	0.0930	1.10	0.0110	97.80	0.9780	1.10	0.0110
Lite-Heavy Truck 8,501-10,(	2.50	0.0250	0.00	0.0000	64.00	0.6400	36.00	0.3600
Lite-Heavy Truck 10,001-14	0.90	0.0090	0.00	0.0000	44.40	0.4440	55.60	0.5560
Med-Heavy Truck 14,001 - 1	1.50	0.0150	6.70	0.0670	20.00	0.2000	73.30	0.7330
Heavy-Heavy Truck 33,001-	1.90	0.0190	0.00	0.0000	5.30	0.0530	94.70	0.9470
Other bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Urban bus	0.00	0.0000	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motorcycle	4.00	0.0400	70.00	0.7000	30.00	0.3000	0.00	0.0000
School Bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motor Home	1.20	0.0120	8.30	0.0830	75.00	0.7500	16.70	0.1670
	100.00	1.00						

Disposal Facility	Have Jurisdiction?	No		Type of Facility:	Landfill w/ Flaring		year began:	?
Landfill	**Landfill Total Annual (tons)**	**City's % of Total**	**Daily Hours of Facility Operation**	**Hours attributed to City**	**Days per year of operation**	**% Waste delivered**	**Distance (one way)**	**Round Trip Distance (miles)**
Recology Landfill	19,918.60	1.00	9	9.00	325.00	100	4.81	9.62
		0.00	6	0.00		0		
		0.00		0.00		0		
		0.00		0.00		0		
		0.00		0.00		0		
				9.00	325.00	**Total**		**9.62**

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008 Inventory

Electrical Usage (Provided by PG&E)

83,739,736		Total Residential Electrical Usage
134,315,874		Total Non-Residential Electrical Usage
	Residential	
	37,634	County facilities located in Yuba City
	214	County facilities located in Live Oak City
	25,475	County facilities located in Unincorporated Sutter
	83,676,413	Residential in Unincorporated Sutter County
	Non-Residential	
	6,062,361	County facilities located in Yuba City
	88,361	County facilities located in Live Oak City
	793,010	County facilities located in Unincorporated Sutter
	127,372,142	Commercial in Unincorporated Sutter County

Water Usage (Provided by Department of Water Resources)

42,041,290	42,041,290.32	Residential (gallons per year)
2,388,710	2,388,710	Commercial/Institutional/Industrial (gallons/year)

Solid Waste for Unincorporated Sutter County(Provided by CalRecycle and Yuba Sutter JPA - Reference #3 on Assumptions Page)

39,837,195	39,837,195	lbs/year

Natural Gas Data (Provided by PG&E)

268,672			Total Residential Natural gas usage rate (MMBTU/yr)
1,520,379			Total Non-Residential Natural gas usage rate (MMBTU/yr)
			Residential Natural gas usage rate (MMBTU/yr)
	MMBTU	Therms	
	13	135	County facilities located in Yuba City
	0	2	County facilities located in Live Oak City
	0	0	County facilities located in Unincorporated Sutter
	268,659	2687229	Residential in Unincorporated Sutter County
			Commercial Natural gas usage rate (MMBTU/yr)
	MMBTU	Therms	
	14,853	148564	County facilities located in Yuba City
	312	3116	County facilities located in Live Oak City
	501	5014	County facilities located in Unincorporated Sutter
	1,504,713	15050730	Commercial in Unincorporated Sutter County

Sutter County
Input data for Agriculture
2008

	Enteric Fermentation Emission Factor (EF_{MEF})	Typical Animal Mass - kg- (TAM)	Volatile Solids -kg VS/1000kg mass/day-	Max CH_4 Capacity - m^3CH_4/kg VS- (B_O)	K-Nitrogen - kg/day/1000kg animal mass- (K_N)	Number of Head
	EF used	EF used	EF used	EF used	EF used	
Dairy Cow						
Dairy Cows	123.4	604.0	9.0	0.2	0.4	8,293
Other						
Sheep on Feed	8.0	27.0	9.2	0.4	0.4	16,397

Sutter County
Input data for Agriculture
2008

	Residue/Crop Ratio (R_{RC})	Fraction Residue Burned (F_{RB})	Fraction Dry Matter (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (NC)
	EF used	EF used	EF used	EF used	EF used	EF used	EF used	EF used
Hay (inc Alfalfa)	0.0	0.00	0.85	0.00	0.00	0.00	0.00	N/A
Barley	1.2	0.03	0.93	0.93	0.88	0.45	0.90	0.01
Dry Edible Beans	2.1	0.00	0.87	0.00	0.00	0.00	1.60	0.02
Corn	1.0	0.03	0.91	0.93	0.88	0.45	0.90	0.01
Corn for Grain	1.0	0.00	0.91	0.00	0.00	0.00	0.90	0.01
Oats	1.3	0.00	0.92	0.00	0.00	0.00	0.90	0.01
Rice	1.4	0.10	0.91	0.93	0.88	0.38	1.00	0.01
Sorghum	1.4	0.00	0.91	0.00	0.00	0.00	0.90	0.01
All Wheat	1.3	0.03	0.93	0.93	0.88	0.44	0.90	0.01
Potatoes (inc Sweet)	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cotton	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar Beet	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable Crops & Fruit Trees	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safflower & Sunflower	2.1	0.03	0.87	0.93	0.88	0.45	0.90	0.02

Sutter County
Input data for Agriculture
2008

		Growing Season Emission Factor		
Primary		**EF used**	**Entered**	**Default**
		210		210
Rattoon		780		780
		State	***Project***	***% of State*** ($\%_P$)
Total acres	2008	7,667,570	220,038.00	0.0286972
Total acres	2009	7,667,570	220,918.15	0.028812
Climate Zone	Temperate	Yes	Sub Tropic	No

	2008					2009				
	Primary (Acres Harvested)	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**	**Primary (Acres Harvested)**	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**
Hay (inc Alfalfa)	11,138	66,983	tons	60,766	1,610,000	11,183	67,251	tons	61,009	1,610,000
Barley			tons		60,000	0	0	tons		60,000
Dry Edible Beans	8,446	8,459	tons	7,674	51,900	8,480	8,493	tons	7,704	51,900
Corn			tons	0	495,000	0	0	tons	0	495,000
Corn for Grain	7,720	47,941	tons	43,491	170,000	7,751	48,133	tons	43,665	170,000
Oats	2,035	24,223	tons	21,975	25,000	2,043	24,320	tons	22,063	25,000
Rice	101,455	409,137	tons	371,163	517,000	101,861	410,774	tons	372,648	517,000
Sorghum	572	2,168	tons	1,967	9,000	574	2,177	tons	1,975	9,000
All Wheat	7,631	48,493	tons	43,992	545,000	7,662	48,687	tons	44,168	545,000
Potatoes (inc Sweet)			tons	0	53,200	0	0	tons	0	53,200
Cotton			bales		268,000	0	0	bales		268,000
Sugar Beet					25,300	0	0			25,300
Vegetable Crops & Fru	66,815	511,775	tons	464,274	3,734,170	67,082	513,822	tons	466,132	3,734,170
Safflower & Sunflower	14,226	12,673	tons	11,497	104,000	14,283	12,724	tons	11,543	104,000

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008
Inventory
Carbon Dioxide

A. Direct Sources

A1-4. Mobile (Construction Equipment, Motor Vehicles, Landscape Equipment, and Wood Burning Hearth)

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Wood Burning Hearth (MT/yr)	MT/yr
0.00	242,960.27	31.36	10,108.69	**253,100.32**
0.00	0.96	0.00		

Fuel emissions from Airports

Annual Fuel Usage (U_{AAF})	kg/gallon (EF_{CAF})	kg/MT (C_3)	MT/yr (E_{CAF})
18,250.00	8.32	1,000.00	**151.84**

A5. Stationary Sources (Natural Gas)

Unit Type	MMBTU/yr (U_{Ang})	kg/MMBTU (EF_{Cng})	kg/MT (C_3)	MT/yr (E_{Cng})
AG/RAN/ER	186,543.79	53.07	1,000.00	9,899.88
Low Density Residential	69,288.61	53.07	1,000.00	3,677.15
Medium Density Residential	12,839.98	53.07	1,000.00	681.42
High Density Residential	0.00	53.07	1,000.00	0.00
Park	1,641.99	53.07	1,000.00	87.14
Commercial	445,071.28	53.07	1,000.00	23,619.93
Mixed Use	0.00	53.07	1,000.00	0.00
Industrial	1,073,665.67	53.07	1,000.00	56,979.44
			Total (MT/year)	**94,944.95**

B. Indirect Sources

B1. Electricity

Unit Type	kWh/yr	Unit	Unit type	MWh/yr (U_{Ae})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cele})
AG/RAN/ER	58141917.52	5,163	du	58,141.92	524.00	2,204.62	13,819.33
Low Density Residential	21595856.47	3,885	du	21,595.86	524.00	2,204.62	5,132.96
Medium Density Residential	4001962.003	720	du	4,001.96	524.00	2,204.62	951.20
High Density Residential	0	0	du	0.00	524.00	2,204.62	0.00
Park	145059.6934	27,921,960	Sq/ft	145.06	524.00	2,204.62	34.48
Commercial	39319235.78	1,359,520	Sq/ft	39,319.24	524.00	2,204.62	9,345.50
Mixed Use	0	0	Sq/ft	0.00	524.00	2,204.62	0.00
Industrial	94851578.58	3,279,680	Sq/ft	94,851.58	524.00	2,204.62	22,544.58
						Total (MT/year)	**51,828.05**

Sutter County Base Year Climate Action Plan
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Inventory
Carbon Dioxide

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWh/yr (U_{epot})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cpot})
AG/RAN/ER	du	5163.00	29.1900	3.50	102.17	524.00	2,204.62	24.28
Low Density Residential	du	3885.00	10.8421	3.50	37.95	524.00	2,204.62	9.02
Medium Density Residential	du	720.00	2.0092	0.01	0.02	804.54	2,000	0.01
High Density Residential	du	0.00	0.0000	0.01	0.00	804.54	2,000	0.00
Park	Sq/ft	27921960.00	0.0026	3.50	0.01	524.00	2,204.62	0.00
Commercial	Sq/ft	1359520.00	0.6993	3.50	2.45	524.00	2,204.62	0.58
Mixed Use	Sq/ft	0.00	0.0000	3.50	0.00	524.00	2,204.62	0.00
Industrial	Sq/ft	3279680.00	1.6869	3.50	5.90	524.00	2,204.62	1.40
							Total (MT/year)	**35.29**

B3. Solid Waste

B3a. Anthropogenic Carbon

CO_2 emissions are considered anthropogenic and are not counted in this inventory.

Source: EPA Solid Waste Management and Greenhouse Gases; A life-cycle assessment of emissions and Sinks, 3rd edition, September 2006.

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{CWT})	g/MT (C_6)	tons/yr (E_{CWT})
AG/RAN/ER	11,072.44	0.1125	33	9.62	3,464.164	1,000,000	99.39
Low Density Residential	4,112.75	0.1125	33	9.62	3,464.164	1,000,000	36.92
Medium Density Residential	762.28	0.1125	33	9.62	3,464.164	1,000,000	6.84
High Density Residential	0.00	0.1125	33	9.62	3,464.164	1,000,000	0.00
Park	4.18	0.2250	33	9.62	3,464.164	1,000,000	0.02
Commercial	1,162.44	0.2250	33	9.62	3,464.164	1,000,000	5.22
Mixed Use	0.00	0.2250	33	9.62	3,464.164	1,000,000	0.00
Industrial	2,804.51	0.2250	33	9.62	3,464.164	1,000,000	12.59
						Total (MT/year)	**160.98**

B4. Wastewater

Unit Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG	MWh/yr (U_{eWW})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{CWW})
AG/RAN/ER	29.1900	0.65	18.9735	1.911	36.25836	524.00	2,205	8.62
Low Density Residential	10.8421	0.82	8.890522	1.911	16.98979	524.00	2,205	4.04
Medium Density Residential	2.0092	0.82	1.647544	1.911	3.148457	524.00	2,205	0.75
High Density Residential	0.0000	0.82	0	1.911	0	524.00	2,205	0.00
Park	0.0026	0.71	0.001846	1.911	0.003528	524.00	2,205	0.00
Commercial	0.6993	0.71	0.496503	1.911	0.948817	524.00	2,205	0.23
Mixed Use	0.0000	0.71	0	1.911	0	524.00	2,205	0.00
Industrial	1.6869	0.8	1.34952	1.911	2.578933	524.00	2,205	0.61
							Total (MT/year)	14.24

Sutter County Base Year Climate Action Plan
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Inventory
Carbon Dioxide

C. Reserved for AG emissions for CH_4 and N_2O, not applicable for CO_2.

D. Summary Table

Source Type		Emissions, MT /yr	CO_2E metric tons/yr
Direct	Motor vehicles & Aircraft	243112.11	243,112.11
	Landscape equipment	31.36	31.36
	Cooling and heating	105053.64	105,053.64
	Total direct, tons/yr	**348197.12**	**348197.12**
Indirect	Electricity	51828.05	51,828.05
	Potable water	35.29	35.29
	Solid waste	160.98	160.98
	Wastewater	14.24	14.24
	Total indirect, tons/yr	**52,038.56**	**52,038.56**
	Total, tons/yr	**400,235.68**	**400,235.68**
	Global warming potential index	**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	164,546.03	164,546.03
	Low Density Residential	61,119.72	61,119.72
	Medium Density Residential	11,326.27	11,326.27
	High Density Residential	0.00	0.00
	Total Residential	**236,992.02**	**236,992.02**
Commercial	Park	174.79	174.79
	Commercial	47,742.25	47,742.25
	Mixed Use	0.00	0.00
	Total Commercial	**47,917.04**	**47,917.04**
Industrial	Industrial	115,326.63	115,326.63
	Total Industrial	**115,326.63**	**115,326.63**
	Total, tons/yr	**400,235.68**	**400,235.68**
	Global warming potential index	1	

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008
Inventory
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{MHDV})	gr/MT (C_6)	MT/yr (E_{MCON})
Construction Equipment	0.00	0.0580	1,000,000	**0.00**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{MMV})	gr/MT (C_6)	tons/yr (E_{MMV})
Non Cat passenger Car	4222673.56	0.1696	1,000,000	0.72
Cat passenger Car	205855335.86	0.1355	1,000,000	27.89
Diesel Passenger Car	1055668.39	0.0006	1,000,000	0.00
Non cat light-duty truck	4229622.26	0.1908	1,000,000	0.81
Cat light duty truck	88203098.33	0.1516	1,000,000	13.37
Diesel Light duty Truck	10728797.93	0.0011	1,000,000	0.01
Non Cat light-duty truck 2	2105991.62	0.1908	1,000,000	0.40
Cat light duty truck 2	102667091.55	0.1516	1,000,000	15.56
Diesel Light duty truck 2	526497.91	0.0011	1,000,000	0.00
Non Cat Medium duty Truck	546809.50	0.4181	1,000,000	0.23
Cat med duty truck	48616335.52	0.2356	1,000,000	11.45
Diesel Med duty truck	546809.50	0.0051	1,000,000	0.00
Non Cat lite-heavy duty truck	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck	8552250.24	0.2356	1,000,000	2.01
Diesel Lite-heavy duty truck	4810640.76	0.0051	1,000,000	0.02
Non Cat lite-heavy duty truck 2	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck 2	2135924.50	0.2356	1,000,000	0.50
Diesel Lite-heavy duty truck 2	2674716.26	0.0051	1,000,000	0.01
Non Cat med-heavy duty truck	537188.22	0.4181	1,000,000	0.22
Cat med-heavy duty truck	1603546.92	0.2356	1,000,000	0.38
Diesel med-heavy duty truck	5876999.46	0.0051	1,000,000	0.03
Non cat Heavy Duty truck	0.00	0.4181	1,000,000	0.00
Cat heavy duty truck	538257.25	0.2356	1,000,000	0.13
Diesel heavy duty truck	9617539.91	0.0051	1,000,000	0.05
Non Cat Other Bus	0.00	0.4181	1,000,000	0.00
Cat other bus	0.00	0.2356	1,000,000	0.00
Diesel Other Bus	534515.64	0.0051	1,000,000	0.00
Non Cat Urban Bus	0.00	0.4181	1,000,000	0.00
Cat Urban Bus	0.00	0.2356	1,000,000	0.00
Diesel Urban Bus	0.00	0.0051	1,000,000	0.00
Non cat motorcycle	14966437.92	0.0672	1,000,000	1.01
Cat motorcycle	6414187.68	0.0672	1,000,000	0.43
Diesel Motorcycle	0.00	0.0000	1,000,000	0.00
Non Cat School Bus	0.00	0.4181	1,000,000	0.00
Cat School Bus	0.00	0.2356	1,000,000	0.00
Diesel School Bus	534515.64	0.0051	1,000,000	0.00
Non Cat Motor home	532377.58	0.4181	1,000,000	0.22
Cat Motor home	4810640.76	0.2356	1,000,000	1.13
Diesel Motor home	1071169.34	0.0051	1,000,000	0.01
			Total (MT/yr)	**76.59**

Sutter County Base Year Climate Action Plan
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Inventory
Methane

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{AAF})	gr/gallon (EF_{Maf})	gr/MT (C_6)	MT/yr (E_{Maf})
18,250.00	7.04	1,000,000	**0.13**

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year (G_F)	gr/gallon (EF_{MF})	gr/MT (C_6)	MT/yr (E_{Mls})
3,563.91	0.50	1,000,000	**0.00**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
155,471.65	0.32	1,000	**49.13**

A5. Stationary Source (Cooling and Heating) - Natural Gas

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Mng})	kg/MT (C_3)	MT/yr (E_{Mng})
AG/RAN/ER	du	5163.00	186,544	0.005	1,000	0.9327
Low Density Residential	du	3885.00	69,289	0.005	1,000	0.3464
Medium Density Residential	du	720.00	12,840	0.005	1,000	0.0642
High Density Residential	du	0.00	0	0.005	1,000	0.0000
Park	Sq/ft	27921960.00	1,642	0.005	1,000	0.0082
Commercial	Sq/ft	1359520.00	445,071	0.005	1,000	2.2254
Mixed Use	Sq/ft	0.00	0	0.005	1,000	0.0000
Industrial	Sq/ft	3279680.00	1,073,666	0.001	1,000	1.0737
					Total (MT/yr)	**4.65**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/year	MWh/yr (U_{Ae})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mele})
AG/RAN/ER	du	5163.00	58141917.5	58,141.92	0.0302	2,205	0.796
Low Density Residential	du	3885.00	21595856.5	21,595.86	0.0302	2,205	0.296
Medium Density Residential	du	720.00	4001962	4,001.96	0.0302	2,205	0.055
High Density Residential	du	0.00	0	0.00	0.0302	2,205	0.000
Park	Sq/ft	27921960.00	145059.693	145.06	0.0302	2,205	0.002
Commercial	Sq/ft	1359520.00	39319235.8	39,319.24	0.0302	2,205	0.539
Mixed Use	Sq/ft	0.00	0	0.00	0.0302	2,205	0.000
Industrial	Sq/ft	3279680.00	94851578.6	94,851.58	0.0302	2,205	1.299
						Total (MT/yr)	**2.987**

Sutter County Base Year Climate Action Plan
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Methane

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mpot})
AG/RAN/ER	du	5163.00	29.18998	3.50	102.16	0.0302	2,205	0.00140
Low Density Residential	du	3885.00	10.84214	3.50	37.95	0.0302	2,205	0.00052
Medium Density Residential	du	720.00	2.00917	3.50	7.03	0.0302	2,205	0.00010
High Density Residential	du	0.00	0.00000	3.50	0.00	0.0302	2,205	0.00000
Park	Sq/ft	27921960.00	0.00258	3.50	0.01	0.0302	2,205	0.00000
Commercial	Sq/ft	1359520.00	0.69926	3.50	2.45	0.0302	2,205	0.00003
Mixed Use	Sq/ft	0.00	0.00000	3.50	0.00	0.0302	2,205	0.00000
Industrial	Sq/ft	3279680.00	1.68687	3.50	5.90	0.0302	2,205	0.00008
							Total (MT/yr)	**0.00213**

B3. Solid Waste
B3a. Fugitive Emissions

Unit Type	Unit Type	unit	tons/yr (U_{SW})	MT CO_2e/ton (EF_{MWF})	MT CO_2e/yr (E_{MWF})
AG/RAN/ER	du	5163.00	11,072.44	0.130000	1,439.42
Low Density Residential	du	3885.00	4,112.75	0.130000	534.66
Medium Density Residential	du	720.00	762.28	0.130000	99.10
High Density Residential	du	0.00	0.00	0.130000	0.00
Park	Sq/ft	27921960.00	4.18	0.130000	0.54
Commercial	Sq/ft	1359520.00	1,162.44	0.130000	151.12
Mixed Use	Sq/ft	0.00	0.00	0.130000	0.00
Industrial	Sq/ft	3279680.00	2,804.51	0.130000	364.59
				Total (MT/yr)	**2,589.42**

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{MWT})	gr/MT (C_6)	tons/yr (E_{MWT})
AG/RAN/ER	11,072.4384	0.1125	33	9.62	0.00510	1,000,000	0.000146
Low Density Residential	4,112.7509	0.1125	33	9.62	0.00510	1,000,000	0.000054
Medium Density Residential	762.2771	0.1125	33	9.62	0.00510	1,000,000	0.000010
High Density Residential	0.0000	0.1125	33	9.62	0.00510	1,000,000	0.000000
Park	4.1829	0.2250	33	9.62	0.00510	1,000,000	0.000000
Commercial	1,162.4377	0.2250	33	9.62	0.00510	1,000,000	0.000008
Mixed Use	0.0000	0.2250	33	9.62	0.00510	1,000,000	0.000000
Industrial	2,804.5105	0.2250	33	9.62	0.00510	1,000,000	0.000019
						Total (MT/yr)	**0.000237**

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B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{MWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{MWD})
Excavator	0	0.0164	9.00	325	2,205	0.00
Grader	0	0.0185	9.00	325	2,205	0.00
Off-Highway Tractor	0	0.0243	9.00	325	2,205	0.00
Off-Highway Truck	0	0.0260	9.00	325	2,205	0.00
Off-Highway Heavy Truck	0	0.0342	9.00	325	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/yr)	**0.00**

B4. Wastewater

Land Use Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	MT/yr (E_{MWW})
AG/RAN/ER	29.18998	65	18.97	1.91	36.26	0.0302	2,205	0.000497
Low Density Residential	10.84214	82	8.89	1.91	16.99	0.0302	2,205	0.000233
Medium Density Residential	2.00917	82	1.65	1.91	3.15	0.0302	2,205	0.000043
High Density Residential	0.00000	82	0.00	1.91	0.00	0.0302	2,205	0.000000
Park	0.00258	71	0.00	1.91	0.00	0.0302	2,205	0.000000
Commercial	0.69926	71	0.50	1.91	0.95	0.0302	2,205	0.000013
Mixed Use	0.00000	71	0.00	1.91	0.00	0.0302	2,205	0.000000
Industrial	1.68687	80	1.35	1.91	2.58	0.0302	2,205	0.000035
							Total (MT/yr)	0.000821

C. See Methane Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)

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D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aviation Fuel	76.72	1,611.09
	Landscape equipment	0.00	0.04
	Cooling and heating	53.78	1,129.37
Total direct, tons/yr		**130.50**	**2,740.50**
Indirect	Electricity	2.99	62.73
	Potable water	0.00	0.04
	Solid waste	2,589.42	2,589.42
	Wastewater	0.00	0.02
Total indirect, tons/yr		**2,592.41**	**2,652.21**
Total from Agriculture		**11,212.42**	**235,460.91**
Total, tons/yr		***13,935.33***	***240,853.62***
Global warming potential index		**21**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	1,511.0352	2,943.38
	Low Density Residential	561.2595	1,093.29
	Medium Density Residential	104.0265	202.64
	High Density Residential	0.0000	0.00
	Total Residential	**2,176.32**	**4,239.31**
Commercial	Park	0.5804	1.31
	Commercial	161.2180	363.24
	Mixed Use	0.0000	0.00
	Total Commercial	**161.80**	**364.55**
Industrial	Industrial	384.7895	788.85
Total Industrial		**384.7895**	**788.85**
Total from Agriculture		**11,212.42**	**235,460.91**
Total, tons/yr		***13,935.33***	***240,853.62***
Global warming potential index		21	

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A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{NHDV})	gr/MT (C_6)	MT/yr (E_{NCON})
Non cat heavy-duty truck	0.00	0.0260	1,000,000	**0.00000**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{NMV})	gr/MT (C_6)	MT/yr (E_{NMV})
Non Cat passenger Car	4,222,674	0.0197	1,000,000	0.08319
Cat passenger Car	205,855,336	0.0504	1,000,000	10.37511
Diesel Passenger Car	1,055,668	0.0012	1,000,000	0.00127
Non cat light-duty truck	4,229,622	0.0218	1,000,000	0.09221
Cat light duty truck	88,203,098	0.0639	1,000,000	5.63618
Diesel Light duty Truck	10,728,798	0.0017	1,000,000	0.01824
Non Cat light-duty truck 2	2,105,992	0.0218	1,000,000	0.04591
Cat light duty truck 2	102,667,092	0.0639	1,000,000	6.56043
Diesel Light duty truck 2	526,498	0.0017	1,000,000	0.00090
Non Cat Medium duty Truck	546,809	0.0473	1,000,000	0.02586
Cat med duty truck	48,616,336	0.1317	1,000,000	6.40277
Diesel Med duty truck	546,809	0.0048	1,000,000	0.00262
Non Cat lite-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck	8,552,250	0.1317	1,000,000	1.12633
Diesel Lite-heavy duty truck	4,810,641	0.0048	1,000,000	0.02309
Non Cat lite-heavy duty truck 2	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck 2	2,135,924	0.1317	1,000,000	0.28130
Diesel Lite-heavy duty truck 2	2,674,716	0.0048	1,000,000	0.01284
Non Cat med-heavy duty truck	537,188	0.0473	1,000,000	0.02541
Cat med-heavy duty truck	1,603,547	0.1317	1,000,000	0.21119
Diesel med-heavy duty truck	5,876,999	0.0048	1,000,000	0.02821
Non cat Heavy Duty truck	0	0.0473	1,000,000	0.00000
Cat heavy duty truck	538,257	0.1317	1,000,000	0.07089
Diesel heavy duty truck	9,617,540	0.0048	1,000,000	0.04616
Non Cat Other Bus	0	0.0473	1,000,000	0.00000
Cat other bus	0	0.1317	1,000,000	0.00000
Diesel Other Bus	534,516	0.0048	1,000,000	0.00257
Non Cat Urban Bus	0	0.0473	1,000,000	0.00000
Cat Urban Bus	0	0.1317	1,000,000	0.00000
Diesel Urban Bus	0	0.0048	1,000,000	0.00000
Non cat motorcycle	14,966,438	0.0069	1,000,000	0.10327
Cat motorcycle	6,414,188	0.0069	1,000,000	0.04426
Diesel Motorcycle	0	0.0000	1,000,000	0.00000
Non Cat School Bus	0	0.0473	1,000,000	0.00000
Cat School Bus	0	0.1317	1,000,000	0.00000
Diesel School Bus	534,516	0.0048	1,000,000	0.00257
Non Cat Motor home	532,378	0.0473	1,000,000	0.02518
Cat Motor home	4,810,641	0.1317	1,000,000	0.63356
Diesel Motor home	1,071,169	0.0048	1,000,000	0.00514
			Total (MT/yr)	**31.89**

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Emissions from Aviation Fuel

Gasoline gallons/ year (U_{Aaf})	gr/gallon (EF_{Naf})	gr/lbs (C_6)	MT/yr (E_{Nls})
18,250.00	0.11000	1000000	**0.002008**

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year	gr/gallon (EF_{Nls})	gr/lbs (C_6)	MT/yr (E_{Nls})
3,563.91	0.22000	1000000	**0.000784**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
155,471.65	0.00420	1000	**0.652981**

A5. Stationary Source (Cooling and Heating)

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	TU (EF_{Nng})	kg/MT (C_3)	MT/yr (E_{Nng})
AG/RAN/ER	du	5,163	186,544	0.0001	1,000	0.018654
Low Density Residential	du	3,885	69,289	0.0001	1,000	0.006929
Medium Density Residential	du	720	12,840	0.0001	1,000	0.001284
High Density Residential	du	0	0	0.0001	1,000	0.000000
Park	Sq/ft	27,921,960	1,642	0.0001	1,000	0.000164
Commercial	Sq/ft	1,359,520	445,071	0.0001	1,000	0.044507
Mixed Use	Sq/ft	0	0	0.0001	1,000	0.000000
Industrial	Sq/ft	3,279,680	1,073,666	0.0001	1,000	0.107367
					Total (MT/yr)	**0.178905**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/yr	MWh/yr (U_{Ae})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Nele})
AG/RAN/ER	du	5,163	58141918	58,142	0.0081	2,205	0.21362
Low Density Residential	du	3,885	21595856	21,596	0.0081	2,205	0.07935
Medium Density Residential	du	720	4001962	4,002	0.0037	2,205	0.00672
High Density Residential	du	0	0	0	0.0037	2,205	0.00000
Park	Sq/ft	27,921,960	145059.69	145	0.0081	2,205	0.00053
Commercial	Sq/ft	1,359,520	39319236	39,319	0.0081	2,205	0.14446
Mixed Use	Sq/ft	0	0	0	0.0081	2,205	0.00000
Industrial	Sq/ft	3,279,680	94851579	94,852	0.0081	2,205	0.34849
						Total (MT/yr)	**0.79317**

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B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Npot})
AG/RAN/ER	du	5,163	29.1899802	3.50	102.16	0.0081	2,205	0.000
Low Density Residential	du	3,885	10.8421368	3.50	37.95	0.0081	2,205	0.000
Medium Density Residential	du	720	2.0091734	3.50	7.03	0.0081	2,205	0.000
High Density Residential	du	0	0.0000000	3.50	0.00	0.0081	2,205	0.000
Park	Sq/ft	27,921,960	0.0025798	3.50	0.01	0.0081	2,205	0.000
Commercial	Sq/ft	1,359,520	0.6992639	3.50	2.45	0.0081	2,205	0.000
Mixed Use	Sq/ft	0	0.0000000	3.50	0.00	0.0081	2,205	0.000
Industrial	Sq/ft	3,279,680	1.6868660	3.50	5.90	0.0081	2,205	0.000
							Total (MT/yr)	**0.001**

B3. Solid Waste

B3a. Fugitive Emissions No Fugitive Nitrous Oxide Emissions

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{NWT})	gr/MT (C_6)	MT/yr (E_{NWT})
AG/RAN/ER	11,072.44	0.1125	33	9.62	0.0048	1,000,000	0.00013772
Low Density Residential	4,112.75	0.1125	33	9.62	0.0048	1,000,000	0.00005115
Medium Density Residential	762.28	0.1125	33	9.62	0.0048	1,000,000	0.00000948
High Density Residential	0.00	0.1125	33	9.62	0.0048	1,000,000	0.00000000
Park	4.18	0.2250	33	9.62	0.0048	1,000,000	0.00000003
Commercial	1,162.44	0.2250	33	9.62	0.0048	1,000,000	0.00000723
Mixed Use	0.00	0.2250	33	9.62	0.0048	1,000,000	0.00000000
Industrial	2,804.51	0.2250	33	9.62	0.0048	1,000,000	0.00001744
						Total (MT/yr)	**0.000223**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip.	lbs/hr (EF_{NWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	tons/yr (E_{NWD})
Excavator	0	0.0074	9.00	325	2,205	0.00
Grader	0	0.0083	9.00	325	2,205	0.00
Off-Highway Tractor	0	0.0109	9.00	325	2,205	0.00
Off-Highway Truck	0	0.0117	9.00	325	2,205	0.00
Rubber Tired Dozer	0	0.0153	9.00	325	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total, tons/yr	**0.00**

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B4. Wastewater

AG/RAN/ER	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{NWW})
AG/RAN/ER	29.19	65	18.97	1.91	36.2583	0.0081	2204.62	0.00013322
Low Density Residential	10.84	82	8.89	1.91	16.9898	0.0081	2204.62	0.00006242
Medium Density Residential	2.01	82	1.65	1.91	3.1484	0.0037	2204.62	0.00000528
High Density Residential	0.00	82	0.00	1.91	0.0000	0.0037	2204.62	0.00000000
Park	0.00	71	0.00	1.91	0.0035	0.0081	2204.62	0.00000001
Commercial	0.70	71	0.50	1.91	0.9488	0.0081	2204.62	0.00000349
Mixed Use	0.00	71	0.00	1.91	0.0000	0.0081	2204.62	0.00000000
Industrial	1.69	80	1.35	1.91	2.5789	0.0081	2204.62	0.00000948
							Total (MT/yr)	**0.00021390**

C. See Nitrous Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2e metric tons/yr
Direct	Construction equipment	0.00000	0.00
	Motor vehicles + aviation fuel	31.8920	9,886.52
	Landscape equipment	0.0008	0.24
	Cooling and heating	0.8319	257.88
	Industrial		
Total direct, tons/yr		**32.7247**	**10,144.65**
Indirect	Electricity	0.7932	245.88
	Potable water	0.0006	0.18
	Solid waste	0.0002	0.07
	Wastewater	0.0002	0.07
	Industrial		
Total indirect, tons/yr		**0.7942**	**246.20**
Total From Agriculture		**1,837.24**	**569,543.93**
Total, tons/yr		***1,870.76***	***579,934.77***
Global warming potential index		**310**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	18.3237	5,680.28
	Low Density Residential	6.8062	2,109.89
	Medium Density Residential	1.2535	388.58
	High Density Residential	0.0000	0.00
	Total Residential	**26.3833**	**8,178.75**
Commercial	Park	0.0075	2.33
	Commercial	2.0882	647.35
	Mixed Use	0.0000	0.00
	Total Commercial	**2.0958**	**649.68**
Industrial	Industrial	5.0401	1,562.41
	Total Industrial	**5.0401**	**1,562.41**
Total from Agriculture		**1,837.24**	**569,543.93**
Total, tons/yr		**1,870.76**	**579,934.77**
Global warming potential index		310	

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CM. Methane

CM1. Enteric Fermentation

Source	Number - Head/year (U_{Aani})	Emission Factor kg CH_4/head (EF_{MEF})	Conversion factor kg to MT (C_3)	MT CH_4/year (E_{MEF})
Dairy Cow				
Dairy Cows	8,293.00	123.42	1000.0	1,023.51
Others				
Sheep	16,397.00	8.00	1000.0	131.18
			Total	**1,154.68**

CM2. Manure Management

Source	Number - 1000s Head/year (U_{Aani})	Typical Animal Mass kg/head (TAM)	Volatile Solids Produced kgVS/1000kg /year (VS)	Max CH_4 capacity m^3CH_4/kgVS (B_O)	Extent Capacity Realized (MCF)	Density of Methane (C_8)	MT CH_4/year (E_{MMM})
Dairy Cow							
Dairy Cows	8.293	604.0	3278.5	0.24	0.499	0.678	1,332.76
Other							
Sheep on Feed	16.397	27.0	3361.7	0.36	0.012	0.678	4.36
						Total	**1,337.11**

CM3. Rice Cultivation

Season	Acres (U_{AC})	Conversion hectares/acre (C_{11})	Emission Factor (EF_{PS})	Conversion kg/MT (C_3)	MT/year (E_{MRC})
Primary	101,455	0.40	210	1,000	8,622.24
Rattoon	0	0.40	780	1,000	0.00
				Total	**8,622.24**

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CM4. Agricultural Residue Burning

Source	Production - Tons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Ratio CH_4-C (R_{CH4-C})	Conversion CH_4- to Mol.Wt. (C_{11})	Tons/year (E_{MARB})
Hay (inc Alfalfa)	60,765.97	0	0.000	0.85	0	0.00	0.00	0.005	1.33	0.00
Dry Edible Beans	7,673.75	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Corn for Grain	43,491.36	1	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Oats	21,974.74	1.3	0.000	0.92	0	0.00	0.00	0.005	1.33	0.00
Rice	371,163.14	1.4	0.097	0.91	0.93	0.88	0.38	0.005	1.33	94.54
Sorghum	1,966.78	1.4	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
All Wheat	43,991.75	1.3	0.030	0.93	0.93	0.88	0.44	0.005	1.33	3.85
Vegetable Crops & Fruit Trees	464,274.43	0	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Safflower & Sunflower	11,496.73	2.1	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
									Total	**98.39**

CN. Nitrous Oxide

CN1. Manure Management

Source	Total Nitrogen Excreted (N_T)	Manure Anaerobic Lagoons ($\%_{AL}$)	Manure Liquid/Slurry ($\%_S$)	Manure Deep Pit ($\%_{DP}$)	Emission Factor for Liquid System (EF_{NML})	N_2O Emissions from Liquid System Mgt.	Manure Solid Storage/ Managed ($\%_{SS}$)	Manure Deep Pit / DryLot ($\%_{DP}$)	Manure Pasture / Poultry ($\%_P$)	Emission Factor for Solid System (EF_{NMS})	N_2O from solid system Mgt.	Total N_2O MT/yr (E_{NMM})
Dairy Cow												
Dairy Cows	804,440.90	467,234	166,683	*N/A*	0.001	*996.16*	74,355	1,830	*N/A*	0.02	*2,394.41*	3.39
Other												
Sheep on Feed	67,868.82	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	66,678	*N/A*	*N/A*	0.02	*2,095.60*	2.10
											Total	**5.49**

CN2. Emissions from Animals and Runoff

Indirect emissions from animals

Source	Total Nitrogen Excreted (N_T)	% of Indirect Volitazition ($\%_{VI}$)	Rate of conversion from NH_3 to NO_X ($EF_{NH3-NOX}$)	Conversion factor for kg to MT (C_3)	Tons/year (E_{NIA})
Dairy Cow					
Dairy Cows	804,440.90	0.20	0.01	1,000	2.53
Other					
Sheep on Feed	67,868.82	0.20	0.01	1,000	0.21
				Total	**2.74**

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Direct emissions from animals

Source	Unmanaged Nitrogen (N_{UM})	Emission Factor for Pastures, Ranges and Paddocks (EF_{PRP})	Conversion factor for kg to MT (C_3)	Manure for Pasture, Range and Paddock (M_{PRP})	Managed Nitrogen (N_M)	Unmanaged Daily Spread (N_{DS})	% of Indirect Vol. ($\%_{VI}$)	Emission Factor for ground Applications (EF_{NV})	Manure applied to Soils (M_{AS})	MT/year (E_{NDA})
Dairy Cow										
Dairy Cows	7,442.98	0.02	1,000	0.149	710,102.83	86,895.10	0.20	0.0125	7.970	12.992
Other										
Sheep on Feed	66,678.14	0.02	1,000	1.334	1,190.68	*N/A*	0.20	0.0125	0.012	4.210
									Total	**17.202**

Emissions from Leaching

Source	Unvolatized Synthetic Nitrogen (N_{UVS})	Unvolatized Non-Manure Organic Nitrogen (N_{UVO})	Conversion factor for kg to MT (C_3)	Leaching % of Soil ($\%_{Leach}$)	Leaching Factor - kg N2O-N / kg N (F_{Leach})	Molecular Weight Ratio N_2O:N_2 (C_{10})	Total Leaching from non-manure Fertilizer (L_{fert})	Total Nitrogen Excreted (N_T)	% of Volitazation from Manure ($\%_{VM}$)	Total Leaching from Manure (L_{man})	Total from Leaching MT/yr (E_{NL})
Total emissions of N_2O from Leaching	18,900,484	7927.61	1,000	0.3000	0.025	1.57	222.85	872,310	0.00	10.28	**233.13**

CN3: Nitrous Oxide from Crop Growth:

Source	Crop Production MTs	Conversion factor for kg to tons (C_3)	Residue/Crop Ratio (R_{RC})	Fraction Dry (F_{DM})	Nitrogen Content of biomass	Nitrogen Fixed by Crops (FN)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (N_{CR})	Nitrogen Returned to Soil (N_{RS})
Hay (inc Alfalfa)	60,765.97	1,000	0.0	0.8500	0.03	1,549,532	0.00	*N/A*	*0*
Dry Edible Beans	7,673.75	1,000	2.1	0.8700	0.03	620,883	1.60	0.02	376,856
Corn for Grain	43,491.36	1,000	1.0	0.9100	*N/A*	*0*	0.90	0.01	206,593
Oats	21,974.74	1,000	1.3	0.9200	*N/A*	*0*	0.90	0.01	165,575
Rice	371,163.14	1,000	1.4	0.9100	*N/A*	*0*	1.00	0.01	3,404,605
Sorghum	1,966.78	1,000	1.4	0.9100	*N/A*	*0*	0.90	0.01	24,355
All Wheat	43,991.75	1,000	1.3	0.9300	*N/A*	*0*	0.90	0.01	296,778
Vegetable Crops & Fruit Trees	464,274.43	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Safflower & Sunflower	11,496.73	1,000	2.1	0.8700	0.03	930,201	0.90	0.02	434,794
Total						3,100,616			4,909,556

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008
Inventory
Agricultural Emissions

Source	Crop Production (Hectares)	Nitrogen Fixed by Crops (FN_T)	Nitrogen Returned to Soil (N_{RST})	Conversion factor for kg to tons (C_3)	Emission factor for soils (kg N2O-N/kgN) (EF_{DIR})	Molecular Weight Ratio N_2O:N_2 (C_{10})	Emission factor kg N_2O-N / ha_yr	Emissions in MT (N_{CG})
N2O emissions from Legumes	-	3,100,616.40	-	1,000	0.0100	1.57	-	48.72
N2O emissions from Residues	-	-	4,909,556	1,000	0.0100	1.57	-	77.15
N_2O from Histols (Temperate Zone)	89,048.16	-	-	1,000	-	1.57	8	1,119.46
N_2O from Histols (Sub tropic Zone)	0.00	-	-	1,000	-	1.57	12	0.00
							Total	**1,245.34**

CN4. Emissions from Fertilizers

Source	Target Year Total Fertilizer Use (kg N)	Following Year Total Fertilizer Use (kg N)	Total N in Fertilizers (Calendar Year)	Unvolatized N (kg) (NUV)	Volatized N (kg) (NV)	Direct N_2O Emissions (metric tons)	N_2O Emissions (metric tons)	Total Emissions from Fertilizers
Synthetic	20,971,178	21,055,063	21,000,538	18,900,484	2,100,054	297.13	33.03	**330.16**
Organic	242,587	243,558	242,927	7,928	1,982			
Dried Manure	1,230	1,234	1,231					
Activated Sewage Sludge	209,887	210,727	210,181					
Other	31,471	31,597	31,515					
Dried Manure %	0.51%	0.51%	0.51%					
Non-Manure Organics	241,358	242,323	241,696					

CN5. Emissions on N_2O from agricultural residue burning

Source	Production - MTTons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combust.. Efficiency (CE)	Nitrogen Content (NC)	Ratio N2O-N (R_{N2O-N})	Conversion to Mol.Wt. (C_{10})	Emissions MT/year (E_{NARB})
Hay (inc Alfalfa)	60,765.97	0.0000	0.000	0.85	0.000	0.00	*N/A*	0.007	1.57	*0.00*
Dry Edible Beans	7,673.75	2.1000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Corn for Grain	43,491.36	1.0000	0.000	0.91	0.000	0.00	0.006	0.007	1.57	0.00
Oats	21,974.74	1.3000	0.000	0.92	0.000	0.00	0.007	0.007	1.57	0.00
Rice	371,163.14	1.4000	0.097	0.91	0.930	0.88	0.007	0.007	1.57	2.96
Sorghum	1,966.78	1.4000	0.000	0.91	0.000	0.00	0.011	0.007	1.57	0.00
All Wheat	43,991.75	1.3000	0.030	0.93	0.930	0.88	0.006	0.007	1.57	0.09
Vegetable Crops & Fruit Trees	464,274.43	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Safflower & Sunflower	11,496.73	2.1000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.13
									Total	**3.18**

Sutter County Base Year Climate Action Plan
Input data for Green House Gas Emissions
2008
Inventory
Agricultural Emissions

D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Methane	Enteric Fermentation	1,154.68	24,248.37
	Manure Management	1,337.11	28,079.41
	Rice Cultivation	8,622.24	181,067.00
	Agricultural Residue Burning	98.39	2,066.13
Total Methane		11,212.42	**235,460.91**
Nitrous Oxide	Manure Management	5.49	1,700.71
	Animals and Runoff	253.07	78,452.78
	Crop Growth	1,245.34	386,054.38
	Fertilizer Use	330.16	102,350.89
	Agricultural Residue Burning	3.18	985.17
Total Nitrous Oxide		1,837.24	**569,543.93**
	Total emissions from Agriculture		**805,004.84**

Appendix E: 2020 BAU URBEMIS Output and GHG Calculations

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Mitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

Source	CO2
Natural Gas	
Hearth - No Summer Emissions	
Landscape	435.67
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, mitigated)	435.67

Area Source Mitigation Measures Selected

Mitigation Description	Percent Reduction
For Residential Interior Use Low VOC Coating	10.00
For Residential Exterior Use Low VOC Coating	10.00
For Nonresidential Interior Use Low VOC Coating	10.00
For Nonresidential Exterior Use Low VOC Coating	10.00

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Area Source Mitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Winter Pounds Per Day, Mitigated)

Source	CO2
Natural Gas	
Hearth	422,386.44
Landscaping - No Winter Emissions	
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, Mitigated)	422,386.44

Area Source Mitigation Measures Selected

Mitigation Description	Percent Reduction
For Residential Interior Use Low VOC Coating	10.00
For Residential Exterior Use Low VOC Coating	10.00
For Nonresidential Interior Use Low VOC Coating	10.00
For Nonresidential Exterior Use Low VOC Coating	10.00

Area Source Changes to Defaults

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Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Area Source Mitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

Source	CO2
Natural Gas	
Hearth	17,317.84
Landscape	39.21
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, mitigated)	17,357.05

Area Source Mitigation Measures Selected

Mitigation Description	Percent Reduction
For Residential Interior Use Low VOC Coating	10.00
For Residential Exterior Use Low VOC Coating	10.00
For Nonresidential Interior Use Low VOC Coating	10.00
For Nonresidential Exterior Use Low VOC Coating	10.00

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	614,717.26
Apartments low rise	661,424.76
Apartments mid rise	235,973.48
Apartments high rise	95,745.07
City park	72.82
General office building	827,526.76
Office park	129,583.22
General light industry	317,548.57
TOTALS (lbs/day, unmitigated)	2,882,591.94

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,934.67	9.24	dwelling units	5,804.00	53,628.96	584,555.63
Apartments low rise	390.31	9.24	dwelling units	6,245.00	57,703.80	628,971.38
Apartments mid rise	58.63	9.24	dwelling units	2,228.00	20,586.72	224,395.23
Apartments high rise	14.58	9.24	dwelling units	904.00	8,352.96	91,047.26
City park		0.01	acres	641.00	6.41	69.87
General office building		22.11	1000 sq ft	3,278.68	72,491.62	790,158.58
Office park		22.11	1000 sq ft	512.33	11,327.62	123,471.02
General light industry		3.49	1000 sq ft	7,951.22	27,749.76	302,472.36
					251,847.85	2,745,141.33

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.6	0.0	100.0	0.0
Light Truck < 3750 lbs	19.3	0.0	95.9	4.1
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	72.0	28.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	40.0	60.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	10.9	10.9	10.9	10.9	10.9	10.9
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 10.9 miles

Home-based shop rural trip length changed from 7.1 miles to 10.9 miles

Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 10.9 miles

Commercial-based commute rural trip length changed from 14.7 miles to 10.9 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 10.9 miles

Commercial-based customer rural trip length changed from 6.6 miles to 10.9 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Winter Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	537,445.95
Apartments low rise	578,282.21
Apartments mid rise	206,311.09
Apartments high rise	83,709.71
City park	63.58
General office building	723,077.18
Office park	113,261.81
General light industry	277,565.31
TOTALS (lbs/day, unmitigated)	2,519,716.84

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,934.67	9.24	dwelling units	5,804.00	53,628.96	584,555.63
Apartments low rise	390.31	9.24	dwelling units	6,245.00	57,703.80	628,971.38
Apartments mid rise	58.63	9.24	dwelling units	2,228.00	20,586.72	224,395.23
Apartments high rise	14.58	9.24	dwelling units	904.00	8,352.96	91,047.26
City park		0.01	acres	641.00	6.41	69.87
General office building		22.11	1000 sq ft	3,278.68	72,491.62	790,158.58
Office park		22.11	1000 sq ft	512.33	11,327.62	123,471.02
General light industry		3.49	1000 sq ft	7,951.22	27,749.76	302,472.36
					251,847.85	2,745,141.33

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.6	0.0	100.0	0.0
Light Truck < 3750 lbs	19.3	0.0	95.9	4.1
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	72.0	28.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	40.0	60.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	10.9	10.9	10.9	10.9	10.9	10.9
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 10.9 miles

Home-based shop rural trip length changed from 7.1 miles to 10.9 miles

Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 10.9 miles

Commercial-based commute rural trip length changed from 14.7 miles to 10.9 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 10.9 miles

Commercial-based customer rural trip length changed from 6.6 miles to 10.9 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\Sutter County 2020 - Projected 6-23-2010.urb924

Project Name: Sutter County 2020 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Single family housing	107,485.23
Apartments low rise	115,652.18
Apartments mid rise	41,260.70
Apartments high rise	16,741.32
City park	12.73
General office building	144,669.62
Office park	22,656.05
General light industry	55,520.30
TOTALS (tons/year, unmitigated)	503,998.13

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,934.67	9.24	dwelling units	5,804.00	53,628.96	584,555.63
Apartments low rise	390.31	9.24	dwelling units	6,245.00	57,703.80	628,971.38
Apartments mid rise	58.63	9.24	dwelling units	2,228.00	20,586.72	224,395.23
Apartments high rise	14.58	9.24	dwelling units	904.00	8,352.96	91,047.26
City park		0.01	acres	641.00	6.41	69.87
General office building		22.11	1000 sq ft	3,278.68	72,491.62	790,158.58
Office park		22.11	1000 sq ft	512.33	11,327.62	123,471.02
General light industry		3.49	1000 sq ft	7,951.22	27,749.76	302,472.36
					251,847.85	2,745,141.33

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.6	0.0	100.0	0.0
Light Truck < 3750 lbs	19.3	0.0	95.9	4.1
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	72.0	28.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	40.0	60.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	10.9	10.9	10.9	10.9	10.9	10.9
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 10.9 miles

Home-based shop rural trip length changed from 7.1 miles to 10.9 miles

Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 10.9 miles

Commercial-based commute rural trip length changed from 14.7 miles to 10.9 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 10.9 miles

Commercial-based customer rural trip length changed from 6.6 miles to 10.9 miles

Sutter County
Emissions by Source
2020
Business As Usual (BAU) Inventory
By Source

Transportation		
	Source:	**Metric tons of CO_2e**
1	On-Road Vehicles	479,486
2	Airport Operations	155
	Total	**479,641**

Energy		
	Sources:	**Metric tons of CO_2e**
1	Electric	83,234
2	Natural Gas	150,392
	Total	**233,626**

Solid Waste		
	Source	**Metric tons of CO_2e**
1	Solid Waste Disposal	12,006
2	Green Waste Recycling	Data Not Available
3	Materials Recycling	Data Not Available
	Total	**12,006**

Landscape Emissions		
	Sources:	**Metric tons of CO_2e**
1	Landscape Emissions	36
2	Carbon sink from CO_2 sequestration	Data Not Available
	Total	**36**

Agriculture		
	Sources:	**Metric tons of CO_2e**
1	Enteric Fermentation	24,248
2	Manure Management	29,780
3	Rice Cultivation	177,933
4	Agricultural Residue Burning	3,011
5	Crop Growth	378,097
6	Animals and Runoff	77,806
7	Fertilizer Use	101,392
	Total	**792,267**

Net Total Emissions	
Category	**Metric tons of CO_2e**
Energy	233,626
Solid Waste	12,006
Landscape Emissions	36
Agriculture	792,267
Transportation	479,641
Total	**1,517,575**

Sutter County
Emissions by Land Use
2020
Business As Usual (BAU) Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/RAN/ER	219,378.12	6,099.99	7,589.19	233,067
	Low Density Residential	116,520.47	3,239.93	4,030.90	123,791
	Medium Density Residential	41,563.80	1,155.81	1,430.05	44,150
	High Density Residential	16,865.03	469.00	580.28	17,914
	Total Residential	**394,327.41**	**10,964.73**	**13,630.43**	**418,923**
Commercial	Park	125.32	2.15	2.67	130
	Commercial	82,333.87	1,430.43	1,776.54	85,541
	Mixed Use	12,863.58	223.46	277.54	13,365
	Total Commercial	**95,322.76**	**1,656.04**	**2,056.75**	**99,036**
Industrial	Industrial	199,673.58	3,367.89	4,308.44	207,350
	Total Industrial	**199,673.58**	**3,367.89**	**4,308.44**	**207,350**
Agriculture		0.00	232,326.97	559,940.39	792,267
	Total	**689,323.76**	**248,315.64**	**579,936.01**	**1,517,575**

Sutter County
Input data for Green House Gas Emissions
2020 Inventory

Land Use Type (units)	Total Trips	Total VMT	Total Trips	Total VMT	2020 Unit Totals	Unit Type
AG/RAN/ER	**53,628.96**	**584555.63**	**53628.96**	**584555.63**	**5804**	**du**
Low Density Residential	**57703.8**	**628971.38**	**57703.8**	**628971.38**	**6245**	**du**
Medium Density Residential	**20586.72**	**224395.23**	**20586.72**	**224395.23**	**2228**	**du**
High Density Residential	**8352.96**	**91047.26**	**8352.96**	**91047.26**	**904**	**du**
Park	**6.41**	**69.87**	**6.41**	**69.87**	**27,921,960.00**	**Sq/ft**
Commercial	**72491.62**	**790158.58**	**72491.62**	**790158.58**	**3,278,683.00**	**Sq/ft**
Mixed Use	**11327.62**	**123471.02**	**11327.62**	**123471.02**	**512,333.00**	**Sq/ft**
Industrial	**27749.76**	**302472.36**	**27749.76**	**302472.36**	**7,951,216.00**	**Sq/ft**
Total	251847.85	2745141.33	251847.85	2745141.33		

Sutter County
Input data for Green House Gas Emissions
2020 Inventory

Land Use Type (units)	Natural gas usage rate (MMBTU/yr)	Electricity (kWh/yr)	Potable Water Usage (gallons/year)	Solid Waste (lbs/year)	% Total Square Foot - SFR/MFR/Non-Res	% Total Square Foot - Res/Non-Res	% Total Square Foot
AG/RAN/ER	399,431	67,615,633	28,235,012	94,469,228	100.00%	55.63%	38.40%
Low Density Residential	212,147	35,912,260	14,996,281	50,176,090	66.60%	29.55%	20.39%
Medium Density Residential	75,689	12,812,611	5,350,305	17,899,821	23.76%	10.54%	7.28%
High Density Residential	30,708	5,198,211	2,170,675	7,263,268	9.64%	4.28%	2.95%
Park	765	97,340	1,240	31,986	0.04%	0.04%	0.01%
Commercial	496,573	63,180,195	804,827	21,278,028	27.91%	27.91%	8.65%
Mixed Use	77,591	9,872,047	125,756	3,324,077	4.36%	4.36%	1.35%
Industrial	1,204,266	153,221,593	1,951,829	51,603,155	67.69%	67.69%	20.97%
Total	2,497,170	347,909,889	53,635,924	246,045,652			

Sutter County
Input data for Green House Gas Emissions
2020 Inventory

City Parks

Year	# of City Parks	Estimated SQ / "building"	Estimated Buildings per
2020	10	500	1
2009	10	500	1

Airport

Year	# of planes	Gallons fuel per day	Annual days of operation	Annual Fuel Usage (g/yr)
2020	77	50.00	365	18,250
2009	77	50	365	18,250

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	Summer	Winter	tons/Year	Summer	Winter	Year	
2020	2,882,591.94	2,519,716.84	503,998.13	0.00	0.00	0.00	503,998.13
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
2020	435.67	422,386.44	39.21	0.00	0.00	17,317.84
2009	0.00	0.00	0.00	0.00	0.00	0.00

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	39.60	0.3960	0.00	0.0000	100.00	1.0000	0.00	0.0000
Light Truck <3,750 lbs	19.30	0.1930	0.00	0.0000	95.90	0.9590	4.10	0.0410
Light Truck 3,751-5,750 lbs	19.70	0.1970	0.00	0.0000	100.00	1.0000	0.00	0.0000
Med Truck 5,751-8,500 lbs	9.30	0.0930	0.00	0.0000	100.00	1.0000	0.00	0.0000
Lite-Heavy Truck 8,501-10,000 lbs	2.50	0.0250	0.00	0.0000	72.00	0.7200	28.00	0.2800
Lite-Heavy Truck 10,001-14,000 lbs	0.90	0.0090	0.00	0.0000	55.60	0.5560	44.40	0.4440
Med-Heavy Truck 14,001 - 33,000 lbs	1.60	0.0160	0.00	0.0000	18.80	0.1880	81.20	0.8120
Heavy-Heavy Truck 33,001-60,000 lbs	1.70	0.0170	0.00	0.0000	0.00	0.0000	100.00	1.0000
Other bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Urban bus	0.00	0.0000	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motorcycle	4.00	0.0400	40.00	0.4000	60.00	0.6000	0.00	0.0000
School Bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motor Home	1.20	0.0120	0.00	0.0000	83.30	0.8330	16.70	0.1670

Disposal Facility	Jurisdiction?	No		Type of Facility:	Landfill w/ Combination		year began:	2009
Landfill	Landfill Total	City's % of	Daily Hours of	Hours	Days per year	% Waste	Distance (one	Round Trip
Recology Landfill	123,022.83	30.06%	9	2.71	313.00	100	4.81	9.62
		0.00%		0.00		0		
		0.00%		0.00		0		
		0.00%		0.00		0		
				2.71	313.00	**Total**		**9.62**

Sutter County
Input data for Green House Gas Emissions
2020 Inventory

Electrical Usage

121,538,715 Total 2020 Residential Electrical Usage
226,371,174 Total 2020 Non-Residential Electrical Usage

	total 2020	2020 total growth	% total growth	GP area 2030	2008	
					37,634	County facilities located in Yuba City
					214	County facilities located in Live Oak City
					25,475	County facilities located in Unincorporated Sutte
					83,676,413	Residential in Unincorporated Sutter County
	121,538,715	**37,798,979**	**40.35%**	**93,676,945**	**83,739,736**	**Total Residential**
					6,062,361	County facilities located in Yuba City
					88,361	County facilities located in Live Oak City
					793,010	County facilities located in Unincorporated Sutte
					38,211,643	Commercial in Unincorporated Sutter County
					89,160,499	Industrial in Unincorporated Sutter County
	226,371,174	**92,055,300**	**40.12%**	**229,436,077**	**134,315,874**	**Total commercial/industrail**

Water Usage

	total 2020	2020 total growth	% total growth	GP area 2030	2008	gallons/year
50,752,272	50,752,272	8,710,982			42,041,290	Residential (gallons per year)
2,883,652	2,883,652	494,942			2,388,710	Commercial/Institutional/Industrial (gallons/year)
		9,205,924	**40.24%**	**22,879,600**	**44,430,000**	total water usage

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Solid Waste for Unincorporated Sutter County

	total 2020	2020 total growth	% total growth	2030 County	2008	
246,045,652					**39,837,195**	**lbs/year**
	49,932,599	41,566,788	40.35%	103,014,680	8,365,811	Residential in Unincorporated Sutter County
	196,113,053	164,641,669	40.12%	410,348,330	31,471,384	Non-Residential in Unincorporated Sutter Count

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Natural Gas Data

717,975 Total Residential Natural gas usage rate (MMBTU/yr)
1,779,195 Total Non-Residential Natural gas usage rate (MMBTU/yr)

	total 2020	2020 total growth	% total growth	2030 GP area	2008	MMBTU
					13.50	County facilities located in Yuba City
					0.20	County facilities located in Live Oak City
					0.00	County facilities located in Unincorporated Sutte
					268,658.68	Residential in Unincorporated Sutter County
	717,975	**449,302**	**40.35%**	**1,113,502**	**268,672**	**Total Residential**
					14,853	County facilities located in Yuba City
					312	County facilities located in Live Oak City
					501	County facilities located in Unincorporated Sutte
					1,504,713	Commercial in Unincorporated Sutter County
	1,779,195	**258,817**	**40.12%**	**645,067**	**1,520,379**	**Total Commercial**

Sutter County
Input data for Agriculture
2020

	Enteric Fermentation Emission Factor (EF_{MEF})	Typical Animal Mass - kg- (TAM)	Volatile Solids -kg VS/1000kg mass/day-	Max CH_4 Capacity - m^3CH_4/kg VS- (B_O)	K-Nitrogen - kg/day/1000kg animal mass- (K_N)	Number of Head
	EF used	EF used	EF used	EF used	EF used	
Dairy Cow						
Dairy Cows	123.4	604.0	9.0	0.2	0.4	**8,293**
Other						
Sheep on Feed	8.0	27.0	9.2	0.4	0.4	16,397

Sutter County
Input data for Agriculture
2020

	Residue/Crop Ratio (R_{RC})	Fraction Residue Burned (F_{RB})	Fraction Dry Matter (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (NC)
	EF used	EF used	EF used	EF used	EF used	EF used	EF used	EF used
Hay (inc Alfalfa)	0.0	0.00	0.85	0.00	0.00	0.00	0.00	N/A
Barley	1.2	0.03	0.93	0.93	0.88	0.45	0.90	0.01
Dry Edible Beans	2.1	0.00	0.87	0.00	0.00	0.00	1.60	0.02
Corn	1.0	0.03	0.91	0.93	0.88	0.45	0.90	0.01
Corn for Grain	1.0	0.00	0.91	0.00	0.00	0.00	0.90	0.01
Oats	1.3	0.00	0.92	0.00	0.00	0.00	0.90	0.01
Rice	1.4	0.10	0.91	0.93	0.88	0.38	1.00	0.01
Sorghum	1.4	0.00	0.91	0.00	0.00	0.00	0.90	0.01
All Wheat	1.3	0.03	0.93	0.93	0.88	0.44	0.90	0.01
Potatoes (inc Sweet)	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cotton	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar Beet	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable Crops & Fruit Trees	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safflower & Sunflower	0.0	0.03	0.87	0.93	0.88	0.45	0.90	0.02

Sutter County
Input data for Agriculture
2020

		Growing Season Emission Factor		
Primary		EF used	Entered	Default
		210		210
Rattoon		780		780
		State	*Project*	*% of State ($\%_P$)*
Total acres	2020	7,667,570	218,282.00	0.0284682
Total acres	2021	7,667,570	218,282.00	0.0284682
Climate Zone	Temperate	Yes	Sub Tropic	No

	2020					2021				
	Primary (Acres Harvested)	Annual Yield	Unit of Yield	Annual Yield (MT/yr)	State Acres Harvested	Primary (Acres Harvested)	Annual Yield	Unit of Yield	Annual Yield (MT/yr)	State Acres Harvested
Hay (inc Alfalfa)	11,138	66,983	tons	60,766	1,610,000	11,138	66,983	tons	60,766	1,610,000
Barley			tons		60,000	0	0	tons		60,000
Dry Edible Beans	8,446	8,459	tons	7,674	51,900	8,446	8,459	tons	7,674	51,900
Corn			tons	0	495,000	0	0	tons	0	495,000
Corn for Grain	7,720	47,941	tons	43,491	170,000	7,720	47,941	tons	43,491	170,000
Oats	2,035	24,223	tons	21,975	25,000	2,035	24,223	tons	21,975	25,000
Rice	99,699	409,137	tons	371,163	517,000	99,699	409,137	tons	371,163	517,000
Sorghum	572	2,168	tons	1,967	9,000	572	2,168	tons	1,967	9,000
All Wheat	7,631	48,493	tons	43,992	545,000	7,631	48,493	tons	43,992	545,000
Potatoes (inc Sweet)			tons	0	53,200	0	0	tons	0	53,200
Cotton			bales		268,000	0	0	bales		268,000
Sugar Beet					25,300	0	0			25,300
Vegetable Crops & Fruit T	66,815	511,775	tons	464,274	3,734,170	66,815	511,775	tons	464,274	3,734,170
Safflower & Sunflower	14,226	12,673	tons	11,497	104,000	14,226	12,673	tons	11,497	104,000

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Carbon Dioxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment)

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})	MT/yr
0.00	457,219.54	35.57	15,710.48	**472,965.60**
0.00	0.97	0.00		

Fuel emissions from Airports

Annual Fuel Usage (U_{AAF})	kg/gallon (EF_{CAF})	kg/MT (C_3)	MT/yr (E_{CAF})
18,250.00	8.32	1,000.00	**151.84**

A4. Stationary Sources (Natural Gas)

Unit Type	MMBTU/yr (U_{Ang})	kg/MMBTU (EF_{Cng})	kg/MT (C_3)	MT/yr (E_{Cng})
AG/RAN/ER	399,431	53.07	1,000.00	21,197.8
Low Density Residential	212,147	53.07	1,000.00	11,258.6
Medium Density Residential	75,689	53.07	1,000.00	4,016.8
High Density Residential	30,708	53.07	1,000.00	1,629.7
Park	765	53.07	1,000.00	40.6
Commercial	496,573	53.07	1,000.00	26,353.2
Mixed Use	77,591	53.07	1,000.00	4,117.7
Industrial	1,204,266	53.07	1,000.00	63,910.4
			Total (MT/year)	**132,524.8**

B. Indirect Sources

B1. Electricity

Unit Type	kWh/yr	Unit	Unit type	MWh/yr (U_{Ae})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cele})
AG/RAN/ER	67615633	5,804	du	67,616	524.00	2,204.62	16,071.06
Low Density Residential	35912260	6,245	du	35,912	524.00	2,204.62	8,535.72
Medium Density Residential	12812611	2,228	du	12,813	524.00	2,204.62	3,045.34
High Density Residential	5198210.8	904	du	5,198	524.00	2,204.62	1,235.52
Park	97339.605	27,921,960	Sq/ft	97	524.00	2,204.62	23.14
Commercial	63180195	3,278,683	Sq/ft	63,180	524.00	2,204.62	15,016.84
Mixed Use	9872046.9	512,333	Sq/ft	9,872	524.00	2,204.62	2,346.42
Industrial	153221593	7,951,216	Sq/ft	153,222	524.00	2,204.62	36,418.12
						Total (MT/year)	**82,692.16**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Carbon Dioxide

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWh/yr (U_{epot})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cpot})
AG/RAN/ER	du	5,804	28.2350	3.50	98.82	524.00	2,204.62	23.49
Low Density Residential	du	6,245	14.9963	3.50	52.49	524.00	2,204.62	12.48
Medium Density Residential	du	2,228	5.3503	0.01	0.05	804.54	2,000	0.02
High Density Residential	du	904	2.1707	0.01	0.02	804.54	2,000	0.01
Park	Sq/ft	27,921,960	0.0012	3.50	0.00	524.00	2,204.62	0.00
Commercial	Sq/ft	3,278,683	0.8048	3.50	2.82	524.00	2,204.62	0.67
Mixed Use	Sq/ft	512,333	0.1258	3.50	0.44	524.00	2,204.62	0.10
Industrial	Sq/ft	7,951,216	1.9518	3.50	6.83	524.00	2,204.62	1.62
							Total (MT/year)	**38.39**

B3. Solid Waste

B3a. Anthropogenic Carbon
CO_2 emissions are considered anthropogenic and are not counted in this inventory.
B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{CWT})	g/MT (C_6)	tons/yr (E_{CWT})
AG/RAN/ER	47,234.61	0.1125	33	9.62	3,464.164	1,000,000	424.00
Low Density Residential	25,088.04	0.1125	33	9.62	3,464.164	1,000,000	225.20
Medium Density Residential	8,949.91	0.1125	33	9.62	3,464.164	1,000,000	80.34
High Density Residential	3,631.63	0.1125	33	9.62	3,464.164	1,000,000	32.60
Park	15.99	0.2250	33	9.62	3,464.164	1,000,000	0.07
Commercial	10,639.01	0.2250	33	9.62	3,464.164	1,000,000	47.75
Mixed Use	1,662.04	0.2250	33	9.62	3,464.164	1,000,000	7.46
Industrial	25,801.58	0.2250	33	9.62	3,464.164	1,000,000	115.80
						Total (MT/year)	**933.22**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{CWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{CWD})
Excavator	0	119.60	2.71	313	2,205	0.00
Grader	0	132.70	2.71	313	2,205	0.00
Off-Highway Tractor	0	151.50	2.71	313	2,205	0.00
Off-Highway Truck	0	260.10	2.71	313	2,205	0.00
Rubber Tired Dozer	0	239.00	2.71	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/year)	**0.00**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Carbon Dioxide

B4. Wastewater

Unit Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG	MWh/yr (U_{eWW})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{CWW})
AG/RAN/ER	28.2350	0.65	18.35275	1.911	35.072105	524.00	2,205	8.34
Low Density Residential	14.9963	0.82	12.296966	1.911	23.499502	524.00	2,205	5.59
Medium Density Residential	5.3503	0.82	4.387246	1.911	8.3840271	524.00	2,205	1.99
High Density Residential	2.1707	0.82	1.779974	1.911	3.4015303	524.00	2,205	0.81
Park	0.0012	0.71	0.000852	1.911	0.0016282	524.00	2,205	0.00
Commercial	0.8048	0.71	0.571408	1.911	1.0919607	524.00	2,205	0.26
Mixed Use	0.1258	0.71	0.089318	1.911	0.1706867	524.00	2,205	0.04
Industrial	1.9518	0.8	1.56144	1.911	2.9839118	524.00	2,205	0.71
							Total (MT/year)	17.73

C. Reserved for AG emissions for CH_4 and N_2O, not applicable for CO_2.

D. Summary Table

Source Type		Emissions, MT /yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aircraft	457371.38	457,371.38
	Landscape equipment	35.57	35.57
	Cooling and heating	148235.30	148,235.30
	Total direct, tons/yr	**605642.25**	**605642.25**
Indirect	Electricity	82692.16	82,692.16
	Potable water	38.39	38.39
	Solid waste	933.22	933.22
	Wastewater	17.73	17.73
	Total indirect, tons/yr	**83,681.50**	**83,681.50**
	Total, tons/yr	**689,323.76**	**689,323.76**
	Global warming potential index	**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	219,378.12	219,378.12
	Low Density Residential	116,520.47	116,520.47
	Medium Density Residential	41,563.80	41,563.80
	High Density Residential	16,865.03	16,865.03
	Total Residential	**394,327.41**	**394,327.41**
Commercial	Park	125.32	125.32
	Commercial	82,333.87	82,333.87
	Mixed Use	12,863.58	12,863.58
	Total Commercial	**95,322.76**	**95,322.76**
Industrial	Industrial	199,673.58	199,673.58
	Total Industrial	**199,673.58**	**199,673.58**
	Total, tons/yr	**689,323.76**	**689,323.76**
	Global warming potential index	1	

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{MHDV})	gr/MT (C_6)	MT/yr (E_{MCON})
Construction Equipment	0.00	0.0580	1,000,000	**0.00**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{MMV})	gr/MT (C_6)	tons/yr (E_{MMV})
Non Cat passenger Car	0.00	0.1696	1,000,000	0.00
Cat passenger Car	396782727.66	0.1355	1,000,000	53.76
Diesel Passenger Car	0.00	0.0006	1,000,000	0.00
Non cat light-duty truck	0.00	0.1908	1,000,000	0.00
Cat light duty truck	185452840.19	0.1516	1,000,000	28.11
Diesel Light duty Truck	7928640.72	0.0011	1,000,000	0.01
Non Cat light-duty truck 2	0.00	0.1908	1,000,000	0.00
Cat light duty truck 2	197389387.25	0.1516	1,000,000	29.92
Diesel Light duty truck 2	0.00	0.0011	1,000,000	0.00
Non Cat Medium duty Truck	0.00	0.4181	1,000,000	0.00
Cat med duty truck	93183822.41	0.2356	1,000,000	21.95
Diesel Med duty truck	0.00	0.0051	1,000,000	0.00
Non Cat lite-heavy duty truck	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck	18035578.53	0.2356	1,000,000	4.25
Diesel Lite-heavy duty truck	7013836.10	0.0051	1,000,000	0.04
Non Cat lite-heavy duty truck 2	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck 2	5013890.83	0.2356	1,000,000	1.18
Diesel Lite-heavy duty truck 2	4003898.43	0.0051	1,000,000	0.02
Non Cat med-heavy duty truck	0.00	0.4181	1,000,000	0.00
Cat med-heavy duty truck	3013945.57	0.2356	1,000,000	0.71
Diesel med-heavy duty truck	13017679.79	0.0051	1,000,000	0.07
Non cat Heavy Duty truck	0.00	0.4181	1,000,000	0.00
Cat heavy duty truck	0.00	0.2356	1,000,000	0.00
Diesel heavy duty truck	17033601.95	0.0051	1,000,000	0.09
Non Cat Other Bus	0.00	0.4181	1,000,000	0.00
Cat other bus	0.00	0.2356	1,000,000	0.00
Diesel Other Bus	1001976.59	0.0051	1,000,000	0.01
Non Cat Urban Bus	0.00	0.4181	1,000,000	0.00
Cat Urban Bus	0.00	0.2356	1,000,000	0.00
Diesel Urban Bus	0.00	0.0051	1,000,000	0.00
Non cat motorcycle	16031625.36	0.0672	1,000,000	1.08
Cat motorcycle	24047438.04	0.0672	1,000,000	1.62
Diesel Motorcycle	0.00	0.0000	1,000,000	0.00
Non Cat School Bus	0.00	0.4181	1,000,000	0.00
Cat School Bus	0.00	0.2356	1,000,000	0.00
Diesel School Bus	1001976.59	0.0051	1,000,000	0.01
Non Cat Motor home	0.00	0.4181	1,000,000	0.00
Cat Motor home	10015757.94	0.2356	1,000,000	2.36
Diesel Motor home	2007961.08	0.0051	1,000,000	0.01
			Total (MT/yr)	**145.20**

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{AAF})	gr/gallon (EF_{Maf})	gr/MT (C_6)	MT/yr (E_{Maf})
18,250.00	7.04	1,000,000	**0.13**

Sutter County
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A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year (G_F)	gr/gallon (EF_{MF})	gr/MT (C_6)	MT/yr (E_{Mls})
4,042.26	0.50	1,000,000	**0.00**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
241,627.25	0.32	1,000	**76.35**

A5. Stationary Source (Cooling and Heating) - Natural Gas

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Mng})	kg/MT (C_3)	MT/yr (E_{Mng})
AG/RAN/ER	du	5,804	399,431	0.005	1,000	1.9972
Low Density Residential	du	6,245	212,147	0.005	1,000	1.0607
Medium Density Residential	du	2,228	75,689	0.005	1,000	0.3784
High Density Residential	du	904	30,708	0.005	1,000	0.1535
Park	Sq/ft	27,921,960	765	0.005	1,000	0.0038
Commercial	Sq/ft	3,278,683	496,573	0.005	1,000	2.4829
Mixed Use	Sq/ft	512,333	77,591	0.005	1,000	0.3880
Industrial	Sq/ft	7,951,216	1,204,266	0.001	1,000	1.2043
					Total (MT/yr)	**7.67**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/year	MWh/yr (U_{Ae})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mele})
AG/RAN/ER	du	5,804	67,615,633	67,616	0.0302	2,205	0.926
Low Density Residential	du	6,245	35,912,260	35,912	0.0302	2,205	0.492
Medium Density Residential	du	2,228	12,812,611	12,813	0.0302	2,205	0.176
High Density Residential	du	904	5,198,211	5,198	0.0302	2,205	0.071
Park	Sq/ft	27,921,960	97,340	97	0.0302	2,205	0.001
Commercial	Sq/ft	3,278,683	63,180,195	63,180	0.0302	2,205	0.865
Mixed Use	Sq/ft	512,333	9,872,047	9,872	0.0302	2,205	0.135
Industrial	Sq/ft	7,951,216	153,221,593	153,222	0.0302	2,205	2.099
						Total (MT/yr)	**4.766**

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mpot})
AG/RAN/ER	du	5,804	28.23501	3.50	98.82	0.0302	2,205	0.00135
Low Density Residential	du	6,245	14.99628	3.50	52.49	0.0302	2,205	0.00072
Medium Density Residential	du	2,228	5.35030	3.50	18.73	0.0302	2,205	0.00026
High Density Residential	du	904	2.17067	3.50	7.60	0.0302	2,205	0.00010
Park	Sq/ft	27,921,960	0.00124	3.50	0.00	0.0302	2,205	0.00000
Commercial	Sq/ft	3,278,683	0.80483	3.50	2.82	0.0302	2,205	0.00004
Mixed Use	Sq/ft	512,333	0.12576	3.50	0.44	0.0302	2,205	0.00001
Industrial	Sq/ft	7,951,216	1.95183	3.50	6.83	0.0302	2,205	0.00009
							Total (MT/yr)	**0.00257**

Sutter County
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Methane

B3. Solid Waste

B3a. Fugitive Emissions

Unit Type	Unit Type	unit	tons/yr (U_{SW})	MT CO_2e/ton (EF_{MWF})	MT CO_2e/yr (E_{MWF})
AG/RAN/ER	du	5,804	47,235	0.09	4,251.12
Low Density Residential	du	6,245	25,088	0.09	2,257.92
Medium Density Residential	du	2,228	8,950	0.09	805.49
High Density Residential	du	904	3,632	0.09	326.85
Park	Sq/ft	27,921,960	16	0.09	1.44
Commercial	Sq/ft	3,278,683	10,639	0.09	957.51
Mixed Use	Sq/ft	512,333	1,662	0.09	149.58
Industrial	Sq/ft	7,951,216	25,802	0.09	2,322.14
				Total (MT/yr)	**11,072.05**

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{MWT})	gr/MT (C_6)	tons/yr (E_{MWT})
AG/RAN/ER	47,234.6140	0.1125	33	9.62	0.00510	1,000,000	0.000624
Low Density Residential	25,088.0449	0.1125	33	9.62	0.00510	1,000,000	0.000332
Medium Density Residential	8,949.9106	0.1125	33	9.62	0.00510	1,000,000	0.000118
High Density Residential	3,631.6338	0.1125	33	9.62	0.00510	1,000,000	0.000048
Park	15.9930	0.2250	33	9.62	0.00510	1,000,000	0.000000
Commercial	10,639.0140	0.2250	33	9.62	0.00510	1,000,000	0.000070
Mixed Use	1,662.0384	0.2250	33	9.62	0.00510	1,000,000	0.000011
Industrial	25,801.5773	0.2250	33	9.62	0.00510	1,000,000	0.000170
						Total (MT/yr)	**0.001373**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{MWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{MWD})
Excavator	0	0.0164	2.71	313	2,205	0.00
Grader	0	0.0185	2.71	313	2,205	0.00
Off-Highway Tractor	0	0.0243	2.71	313	2,205	0.00
Off-Highway Truck	0	0.0260	2.71	313	2,205	0.00
Rubber Tired Dozer	0	0.0342	2.71	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/yr)	**0.00**

B4. Wastewater

Land Use Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	MT/yr (E_{MWW})
AG/RAN/ER	28.23501	65	18.35	1.91	35.07	0.0302	2,205	0.000480
Low Density Residential	14.99628	82	12.30	1.91	23.50	0.0302	2,205	0.000322
Medium Density Residential	5.35030	82	4.39	1.91	8.38	0.0302	2,205	0.000115
High Density Residential	2.17067	82	1.78	1.91	3.40	0.0302	2,205	0.000047
Park	0.00124	71	0.00	1.91	0.00	0.0302	2,205	0.000000
Commercial	0.80483	71	0.57	1.91	1.09	0.0302	2,205	0.000015
Mixed Use	0.12576	71	0.09	1.91	0.17	0.0302	2,205	0.000002
Industrial	1.95183	80	1.56	1.91	2.98	0.0302	2,205	0.000041
							Total (MT/yr)	**0.001022**

Sutter County
Input data for Green House Gas Emissions
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Methane

C. See Methane Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aviation Fuel	145.33	3,051.90
	Landscape equipment	0.00	0.04
	Cooling and heating	84.02	1,764.48
	Total direct, tons/yr	**229.35**	**4,816.42**
Indirect	Electricity	4.77	100.08
	Potable water	0.00	0.05
	Solid waste	11,072.06	11,072.08
	Wastewater	0.00	0.02
	Total indirect, tons/yr	**11,076.83**	**11,172.24**
	Total from Agriculture	**11,063.19**	**232,326.97**
	Total, tons/yr	***22,369.37***	***248,315.64***
	Global warming potential index	**21**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	4,339.1076	6,099.99
	Low Density Residential	2,304.6601	3,239.93
	Medium Density Residential	822.1646	1,155.81
	High Density Residential	333.6123	469.00
	Total Residential	**7,799.54**	**10,964.73**
Commercial	Park	1.4733	2.15
	Commercial	980.0199	1,430.43
	Mixed Use	153.0999	223.46
	Total Commercial	**1,134.59**	**1,656.04**
Industrial	Industrial	2,371.9124	3,367.89
	Total Industrial	**2,371.9124**	**3,367.89**
	Total from Agriculture	**11,063.19**	**232,326.97**
	Total, tons/yr	***22,369.24***	***248,315.64***
	Global warming potential index	21	

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Nitrous Oxide

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{NHDV})	gr/MT (C_6)	MT/yr (E_{NCON})
Non cat heavy-duty truck	0.00	0.0260	1,000,000	**0.00000**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{NMV})	gr/MT (C_6)	MT/yr (E_{NMV})
Non Cat passenger Car	0	0.0197	1,000,000	0.00000
Cat passenger Car	396,782,728	0.0504	1,000,000	19.99785
Diesel Passenger Car	0	0.0012	1,000,000	0.00000
Non cat light-duty truck	0	0.0218	1,000,000	0.00000
Cat light duty truck	185,452,840	0.0639	1,000,000	11.85044
Diesel Light duty Truck	7,928,641	0.0017	1,000,000	0.01348
Non Cat light-duty truck 2	0	0.0218	1,000,000	0.00000
Cat light duty truck 2	197,389,387	0.0639	1,000,000	12.61318
Diesel Light duty truck 2	0	0.0017	1,000,000	0.00000
Non Cat Medium duty Truck	0	0.0473	1,000,000	0.00000
Cat med duty truck	93,183,822	0.1317	1,000,000	12.27231
Diesel Med duty truck	0	0.0048	1,000,000	0.00000
Non Cat lite-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck	18,035,579	0.1317	1,000,000	2.37529
Diesel Lite-heavy duty truck	7,013,836	0.0048	1,000,000	0.03367
Non Cat lite-heavy duty truck 2	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck 2	5,013,891	0.1317	1,000,000	0.66033
Diesel Lite-heavy duty truck 2	4,003,898	0.0048	1,000,000	0.01922
Non Cat med-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat med-heavy duty truck	3,013,946	0.1317	1,000,000	0.39694
Diesel med-heavy duty truck	13,017,680	0.0048	1,000,000	0.06248
Non cat Heavy Duty truck	0	0.0473	1,000,000	0.00000
Cat heavy duty truck	0	0.1317	1,000,000	0.00000
Diesel heavy duty truck	17,033,602	0.0048	1,000,000	0.08176
Non Cat Other Bus	0	0.0473	1,000,000	0.00000
Cat other bus	0	0.1317	1,000,000	0.00000
Diesel Other Bus	1,001,977	0.0048	1,000,000	0.00481
Non Cat Urban Bus	0	0.0473	1,000,000	0.00000
Cat Urban Bus	0	0.1317	1,000,000	0.00000
Diesel Urban Bus	0	0.0048	1,000,000	0.00000
Non cat motorcycle	16,031,625	0.0069	1,000,000	0.11062
Cat motorcycle	24,047,438	0.0069	1,000,000	0.16593
Diesel Motorcycle	0	0.0000	1,000,000	0.00000
Non Cat School Bus	0	0.0473	1,000,000	0.00000
Cat School Bus	0	0.1317	1,000,000	0.00000
Diesel School Bus	1,001,977	0.0048	1,000,000	0.00481
Non Cat Motor home	0	0.0473	1,000,000	0.00000
Cat Motor home	10,015,758	0.1317	1,000,000	1.31908
Diesel Motor home	2,007,961	0.0048	1,000,000	0.00964
			Total (MT/yr)	**61.99**

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{Aaf})	gr/gallon (EF_{Naf})	gr/lbs (C_6)	MT/yr (E_{NIs})
18,250.00	0.11000	1000000	**0.002008**

Sutter County
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Nitrous Oxide

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year	gr/gallon (EF_{Nls})	gr/lbs (C_6)	MT/yr (E_{Nls})
4,042.26	0.22000	1000000	**0.000889**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
241,627.25	0.00420	1000	**1.014834**

A5. Stationary Source (Cooling and Heating)

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Nng})	kg/MT (C_3)	MT/yr (E_{Nng})
AG/RAN/ER	du	5,804	399,431	0.0001	1,000	0.039943
Low Density Residential	du	6,245	212,147	0.0001	1,000	0.021215
Medium Density Residential	du	2,228	75,689	0.0001	1,000	0.007569
High Density Residential	du	904	30,708	0.0001	1,000	0.003071
Park	Sq/ft	27,921,960	765	0.0001	1,000	0.000077
Commercial	Sq/ft	3,278,683	496,573	0.0001	1,000	0.049657
Mixed Use	Sq/ft	512,333	77,591	0.0001	1,000	0.007759
Industrial	Sq/ft	7,951,216	1,204,266	0.0001	1,000	0.120427
					Total (MT/yr)	**0.249718**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/yr	MWh/yr (U_{Ae})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Nele})
AG/RAN/ER	du	5,804	67,615,633	67,616	0.0081	2,205	0.24843
Low Density Residential	du	6,245	35,912,260	35,912	0.0081	2,205	0.13195
Medium Density Residential	du	2,228	12,812,611	12,813	0.0037	2,205	0.02150
High Density Residential	du	904	5,198,211	5,198	0.0037	2,205	0.00872
Park	Sq/ft	27,921,960	97,340	97	0.0081	2,205	0.00036
Commercial	Sq/ft	3,278,683	63,180,195	63,180	0.0081	2,205	0.23213
Mixed Use	Sq/ft	512,333	9,872,047	9,872	0.0081	2,205	0.03627
Industrial	Sq/ft	7,951,216	153,221,593	153,222	0.0081	2,205	0.56295
						Total (MT/yr)	**1.24231**

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Npot})
AG/RAN/ER	du	5,804	28.2350117	3.50	98.82	0.0081	2,205	0.000363
Low Density Residential	du	6,245	14.9962814	3.50	52.49	0.0081	2,205	0.000193
Medium Density Residential	du	2,228	5.3503046	3.50	18.73	0.0081	2,205	0.000069
High Density Residential	du	904	2.1706747	3.50	7.60	0.0081	2,205	0.000028
Park	Sq/ft	27,921,960	0.0012400	3.50	0.00	0.0081	2,205	0.000000
Commercial	Sq/ft	3,278,683	0.8048272	3.50	2.82	0.0081	2,205	0.000010
Mixed Use	Sq/ft	512,333	0.1257561	3.50	0.44	0.0081	2,205	0.000002
Industrial	Sq/ft	7,951,216	1.9518286	3.50	6.83	0.0081	2,205	0.000025
							Total (MT/yr)	**0.000690**

Sutter County
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Business As Usual (BAU) Inventory
Nitrous Oxide

B3. Solid Waste

B3a. Fugitive Emissions No Fugitive Nitrous Oxide Emissions

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{NWT})	gr/MT (C_6)	MT/yr (E_{NWT})
AG/RAN/ER	47,234.61	0.1125	33	9.62	0.0048	1,000,000	0.00058750
Low Density Residential	25,088.04	0.1125	33	9.62	0.0048	1,000,000	0.00031204
Medium Density Residential	8,949.91	0.1125	33	9.62	0.0048	1,000,000	0.00011132
High Density Residential	3,631.63	0.1125	33	9.62	0.0048	1,000,000	0.00004517
Park	15.99	0.2250	33	9.62	0.0048	1,000,000	0.00000010
Commercial	10,639.01	0.2250	33	9.62	0.0048	1,000,000	0.00006616
Mixed Use	1,662.04	0.2250	33	9.62	0.0048	1,000,000	0.00001034
Industrial	25,801.58	0.2250	33	9.62	0.0048	1,000,000	0.00016046
						Total (MT/yr)	**0.001293**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip.	lbs/hr (EF_{NWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	tons/yr (E_{NWD})
Excavator	0	0.0074	2.71	313	2,205	0.00
Grader	0	0.0083	2.71	313	2,205	0.00
Off-Highway Tractor	0	0.0109	2.71	313	2,205	0.00
Off-Highway Truck	0	0.0117	2.71	313	2,205	0.00
Rubber Tired Dozer	0	0.0153	2.71	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total, tons/yr	**0.00**

B4. Wastewater

AG/RAN/ER	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{NWW})
AG/RAN/ER	28.24	65	18.35	1.91	35.0721	0.0081	2204.62	0.00012886
Low Density Residential	15.00	82	12.30	1.91	23.4995	0.0081	2204.62	0.00008634
Medium Density Residential	5.35	82	4.39	1.91	8.3840	0.0037	2204.62	0.00001407
High Density Residential	2.17	82	1.78	1.91	3.4015	0.0037	2204.62	0.00000571
Park	0.00	71	0.00	1.91	0.0017	0.0081	2204.62	0.00000001
Commercial	0.80	71	0.57	1.91	1.0920	0.0081	2204.62	0.00000401
Mixed Use	0.13	71	0.09	1.91	0.1706	0.0081	2204.62	0.00000063
Industrial	1.95	80	1.56	1.91	2.9840	0.0081	2204.62	0.00001096
							Total (MT/yr)	**0.00025059**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Nitrous Oxide

C. See Nitrous Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2e metric tons/yr
Direct	Construction equipment	0.00000	0.00
	Motor vehicles + aviation fuel	61.9920	19,217.52
	Landscape equipment	0.0009	0.28
	Cooling and heating	1.2646	392.01
Total direct, tons/yr		**63.2574**	**19,609.81**
Indirect	Electricity	1.2423	385.12
	Potable water	0.0007	0.21
	Solid waste	0.0013	0.40
	Wastewater	0.0003	0.08
Total indirect, tons/yr		**1.2445**	**385.81**
Total From Agriculture		**1,806.26**	**559,940.39**
Total, tons/yr		***1,870.76***	***579,936.01***
Global warming potential index		**310**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	24.4805	7,589.19
	Low Density Residential	13.0025	4,030.90
	Medium Density Residential	4.6129	1,430.05
	High Density Residential	1.8718	580.28
	Total Residential	**43.9677**	**13,630.43**
Commercial	Park	0.0086	2.67
	Commercial	5.7306	1,776.54
	Mixed Use	0.8952	277.54
	Total Commercial	**6.6345**	**2,056.75**
Industrial	Industrial	13.8978	4,308.44
	Total Industrial	**13.8978**	**4,308.44**
Total from Agriculture		**1,806.26**	**559,940.39**
Total, tons/yr		**1,870.76**	**579,936.01**
Global warming potential index		310	

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

CM. Methane

CM1. Enteric Fermentation

Source	Number - Head/year (U_{Aani})	Emission Factor kg CH_4/head (EF_{MEF})	Conversion factor kg to MT (C_3)	MT CH_4/year (E_{MEF})
Dairy Cow				
Dairy Cows	8,293.00	123.42	1000.0	1,023.51
Others				
Sheep	16,397.00	8.00	1000.0	131.18
			Total	**1,154.68**

CM2. Manure Management

Source	Number - 1000s Head/year (U_{Aani})	Typical Animal Mass kg/head (TAM)	Volatile Solids Produced kgVS/1000kg/year (VS)	Max CH_4 capacity m^3CH_4/kgVS (B_O)	Extent Capacity Realized (MCF)	Density of Methane (C_8)	MT CH_4/year (E_{MMM})
Dairy Cow							
Dairy Cows	8.293	604.0	3278.5	0.24	0.499	0.678	1,332.76
Other							
Sheep on Feed	16.397	27.0	3361.7	0.36	0.012	0.678	4.359072539
						Total	**1,337.11**

CM3. Rice Cultivation

Season	Acres (U_{AC})	Conversion hectares/acre (C_{11})	Emission Factor (EF_{PS})	Conversion kg/MT (C_3)	MT/year (E_{MRC})
Primary	99,699	0.40	210	1,000	8,473.00
Rattoon	0	0.40	780	1,000	0.00
				Total	**8,473.00**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

CM4. Agricultural Residue Burning

Source	Production - Tons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Ratio CH_4-C (R_{CH4-C})	Conversion CH_4- to Mol.Wt. (C_{11})	Emissions Tons/year (E_{MARB})
Hay (inc Alfalfa)	60,765.97	0	0.000	0.85	0	0.00	0.00	0.005	1.33	0.00
Dry Edible Beans	7,673.75	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Corn for Grain	43,491.36	1	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Oats	21,974.74	1.3	0.000	0.92	0	0.00	0.00	0.005	1.33	0.00
Rice	371,163.14	1.4	0.097	0.91	0.93	0.88	0.38	0.005	1.33	94.54
Sorghum	1,966.78	1.4	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
All Wheat	43,991.75	1.3	0.030	0.93	0.93	0.88	0.44	0.005	1.33	3.85
Vegetable Crops & Fruit Trees	464,274.43	0	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Safflower & Sunflower	11,496.73	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
									Total	**98.39**

CN. Nitrous Oxide

CN1. Manure Management

Source	Total Nitrogen Excreted (N_T)	Manure Anaerobic Lagoons ($\%_{AL}$)	Manure Liquid/Slurry ($\%_S$)	Manure Deep Pit ($\%_{DP}$)	Emission Factor for Liquid System (EF_{NML})	N_2O Emissions from Liquid System Mgt.	Manure Solid Storage/ Managed ($\%_{SS}$)	Manure Deep Pit / DryLot ($\%_{DP}$)	Manure Pasture / Poultry ($\%_P$)	Emission Factor for Solid System (EF_{NMS})	N_2O Emissions from solid system Mgt.	Total N_2OMT/yr (E_{NMM})
Dairy Cow												
Dairy Cows	804,440.90	467,234	166,683	*N/A*	0.001	*996.16*	74,355	1,830	*N/A*	0.02	*2,394.41*	3.39
Other												
Sheep on Feed	67,868.82	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	66,678	*N/A*	*N/A*	0.02	*2,095.60*	2.10
											Total	**5.49**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

CN2. Emissions from Animals and Runoff

Indirect emissions from animals

Source	Total Nitrogen Excreted (N_T)	% of Indirect Volitazition ($\%_{VI}$)	Rate of conversion from NH_3 to NO_X ($EF_{NH3-NOX}$)	Conversion factor for kg to MT (C_3)	Tons/year (E_{NIA})
Dairy Cow					
Dairy Cows	804,440.90	0.20	0.01	1,000	2.53
Other					
Sheep on Feed	67,868.82	0.20	0.01	1,000	0.21
				Total	**2.74**

Direct emissions from animals

Source	Unmanaged Nitrogen (N_{UM})	Emission Factor for Pastures, Ranges and Paddocks (EF_{PRP})	Conversion factor for kg to MT (C_3)	Manure for Pasture, Range and Paddock (M_{PRP})	Managed Nitrogen (N_M)	Unmanaged Daily Spread (N_{DS})	% of Indirect Volitazition ($\%_{VI}$)	Emission Factor for ground Applications (EF_{NV})	Manure applied to Soils (M_{AS})	MT/year (E_{NDA})
Dairy Cow										
Dairy Cows	7,442.98	0.02	1,000	0.149	710,103	86,895.10	0.20	0.0125	7.970	12.992
Other										
Sheep on Feed	66,678.14	0.02	1,000	1.334	1,191	*N/A*	0.20	0.0125	0.012	4.210
									Total	**17.202**

Emissions from Leaching

Source	Unvolatized Synthetic Nitrogen (N_{UVS})	Unvolatized Non-Manure Organic Nitrogen (N_{UVO})	Conversion factor for kg to MT (C_3)	Leaching % of Soil ($\%_{Leach}$)	Leaching Factor - kg N2O-N / kg N (F_{Leach})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Total Leaching from non-manure Fertilizer (L_{fert})	Total Nitrogen Excreted (N_T)	% of Volitazation from Manure ($\%_{VM}$)	Total Leaching from Manure (L_{man})	Total Emissions from Leaching MT/yr (E_{NL})
Total emissions of N_2O from Leaching	18,723,437	7853.35	1,000	0.3000	0.025	1.57	220.76	872,310	0.00	10.28	**231.04**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

CN3: Nitrous Oxide from Crop Growth:

Source	Crop Production MTs	Conversion factor for kg to tons (C_3)	Residue/Crop Ratio (R_{RC})	Fraction Dry (F_{DM})	Nitrogen Content of Abovegroound biomass	Nitrogen Fixed by Crops (FN)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (N_{CR})	Nitrogen Returned to Soil (N_{RS})
Hay (inc Alfalfa)	60,765.97	1,000	0.0	0.8500	0.03	1,549,532	0.00	*N/A*	*0*
Dry Edible Beans	7,673.75	1,000	2.1	0.8700	0.03	620,883	1.60	0.02	376,856
Corn for Grain	43,491.36	1,000	1.0	0.9100	*N/A*	*0*	0.90	0.01	206,593
Oats	21,974.74	1,000	1.3	0.9200	*N/A*	*0*	0.90	0.01	165,575
Rice	371,163.14	1,000	1.4	0.9100	*N/A*	*0*	1.00	0.01	3,404,605
Sorghum	1,966.78	1,000	1.4	0.9100	*N/A*	*0*	0.90	0.01	24,355
All Wheat	43,991.75	1,000	1.3	0.9300	*N/A*	*0*	0.90	0.01	296,778
Vegetable Crops & Fruit Trees	464,274.43	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Safflower & Sunflower	11,496.73	1,000	0.0	0.8700	0.03	300,065	0.90	0.02	0
Total						2,470,480			4,474,762

Source	Crop Production (Hectares)	Nitrogen Fixed by Crops (FN_T)	Nitrogen Returned to Soil (N_{RST})	Conversion factor for kg to tons (C_3)	Emission factor for soils (kg N2O-N/kgN) (EF_{DIR})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Emission factor kg N_2O-N / ha_yr	Emissions in MT (N_{CG})
N2O emissions from Legumes	-	2,470,480.38	-	1,000	0.0100	1.57	-	38.82
N2O emissions from Residues	-	-	4,474,762	1,000	0.0100	1.57	-	70.32
N_2O from Histols (Temperate Zone)	88,337.52	-	-	1,000	-	1.57	8	1,110.53
N_2O from Histols (Sub tropic Zone)	0.00	-	-	1,000	-	1.57	12	0.00
							Total	**1,219.67**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

CN4. Emissions from Fertilizers

Source	Total Fertilizer Use (kg N)	Year Total Fertilizer Use (kg N)	Fertilizers (Calendar Year)	Unvolatized N (kg) (NUV)	Volatized N (kg) (NV)	Emissions (metric tons)	N_2O Emissions (metric	Total Emissions from
Synthetic	20,803,819	20,803,819	20,803,819	18,723,437	2,080,382	294.35	32.72	**327.07**
Organic	240,651	240,651	240,651	7,853	1,963.34			
Dried Manure	1,220	1,220	1,220					
Activated Sewage Sludge	208,212	208,212	208,212					
Other	31,219	31,219	31,219					
Dried Manure %	1%	1%	1%					
Non-Manure Organics	239,432	239,432	239,432					

CN5. Emissions on N_2O from agricultural residue burning

Source	Production - MTTons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Nitrogen Content (NC)	Ratio N2O-N (R_{N2O-N})	Conversion to Mol.Wt. (C_{10})	Emissions MT/year (E_{NARB})
Hay (inc Alfalfa)	60,765.97	0.0000	0.000	0.85	0.000	0.00	*N/A*	0.007	1.57	*0.00*
Dry Edible Beans	7,673.75	2.1000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Corn for Grain	43,491.36	1.0000	0.000	0.91	0.000	0.00	0.006	0.007	1.57	0.00
Oats	21,974.74	1.3000	0.000	0.92	0.000	0.00	0.007	0.007	1.57	0.00
Rice	371,163.14	1.4000	0.097	0.91	0.930	0.88	0.007	0.007	1.57	2.96
Sorghum	1,966.78	1.4000	0.000	0.91	0.000	0.00	0.011	0.007	1.57	0.00
All Wheat	43,991.75	1.3000	0.030	0.93	0.930	0.88	0.006	0.007	1.57	0.09
Vegetable Crops & Fruit Trees	464,274.43	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Safflower & Sunflower	11,496.73	0.0000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.00
									Total	**3.05**

Sutter County
Input data for Green House Gas Emissions
2020
Business As Usual (BAU) Inventory
Agricultural Emissions

D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Methane	Enteric Fermentation	1,154.68	24,248.37
	Manure Management	1,337.11	28,079.41
	Rice Cultivation	8,473.00	177,933.06
	Agricultural Residue Burning	98.39	2,066.13
Total Methane		11,063.19	**232,326.97**
Nitrous Oxide	Manure Management	5.49	1,700.71
	Animals and Runoff	250.99	77,805.65
	Crop Growth	1,219.67	378,097.17
	Fertilizer Use	327.07	101,392.14
	Agricultural Residue Burning	3.05	944.72
Total Nitrous Oxide		1,806.26	**559,940.39**
Total emissions from Agriculture			**792,267.36**

Appendix F: 2030 BAU URBEMIS Output and GHG Calculations

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	CO2
Natural Gas	
Hearth - No Summer Emissions	
Landscape	481.62
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, unmitigated)	481.62

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Area Source Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Winter Pounds Per Day, Unmitigated)

Source	CO2
Natural Gas	
Hearth	645,028.98
Landscaping - No Winter Emissions	
Consumer Products	
Architectural Coatings	
TOTALS (lbs/day, unmitigated)	645,028.98

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Area Source Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Natural Gas	
Hearth	26,446.19
Landscape	43.35
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	26,489.54

Area Source Changes to Defaults

Percentage of residences with natural gas fireplaces changed from 55% to 0%

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	579,625.04
Apartments low rise	784,135.11
Apartments mid rise	497,605.18
Apartments high rise	223,576.08
City park	11,284.10
General office building	1,227,102.21
Office park	332,390.48
General light industry	515,842.50
TOTALS (lbs/day, unmitigated)	4,171,560.70

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	2,148.33	9.24	dwelling units	6,445.00	59,551.80	550,907.73
Apartments low rise	544.94	9.24	dwelling units	8,719.00	80,563.56	745,285.42
Apartments mid rise	145.61	9.24	dwelling units	5,533.00	51,124.92	472,951.51
Apartments high rise	40.10	9.24	dwelling units	2,486.00	22,970.64	212,499.09
City park		1.59	acres	740.00	1,176.60	10,839.43
General office building		22.11	1000 sq ft	5,707.85	126,200.57	1,172,087.78
Office park		22.11	1000 sq ft	1,537.00	33,983.07	316,722.22
General light industry		3.49	1000 sq ft	15,097.75	52,691.15	491,344.95
					428,262.31	3,972,638.13

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	9.3	9.3	9.2	9.3	9.5	9.2
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 9.3 miles

Home-based shop rural trip length changed from 7.1 miles to 9.3 miles

Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 9.2 miles

Commercial-based commute rural trip length changed from 14.7 miles to 9.3 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 9.5 miles

Commercial-based customer rural trip length changed from 6.6 miles to 9.2 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Winter Operational Unmitigated Emissions (Pounds/Day)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Winter Pounds Per Day, Unmitigated)

Source	CO2
Single family housing	505,511.73
Apartments low rise	683,872.27
Apartments mid rise	433,979.27
Apartments high rise	194,988.70
City park	9,825.88
General office building	1,069,421.88
Office park	289,782.01
General light industry	449,742.13
TOTALS (lbs/day, unmitigated)	3,637,123.87

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	2,148.33	9.24	dwelling units	6,445.00	59,551.80	550,907.73
Apartments low rise	544.94	9.24	dwelling units	8,719.00	80,563.56	745,285.42
Apartments mid rise	145.61	9.24	dwelling units	5,533.00	51,124.92	472,951.51
Apartments high rise	40.10	9.24	dwelling units	2,486.00	22,970.64	212,499.09
City park		1.59	acres	740.00	1,176.60	10,839.43
General office building		22.11	1000 sq ft	5,707.85	126,200.57	1,172,087.78
Office park		22.11	1000 sq ft	1,537.00	33,983.07	316,722.22
General light industry		3.49	1000 sq ft	15,097.75	52,691.15	491,344.95
					428,262.31	3,972,638.13

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	9.3	9.3	9.2	9.3	9.5	9.2
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 9.3 miles

Home-based shop rural trip length changed from 7.1 miles to 9.3 miles

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Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 9.2 miles

Commercial-based commute rural trip length changed from 14.7 miles to 9.3 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 9.5 miles

Commercial-based customer rural trip length changed from 6.6 miles to 9.2 miles

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\0D5136300 - Sutter County CAP\Modeling\GHG\2030 GP Buildout\2030 GP Build out 6-23-2010-2.urb924

Project Name: Sutter County 2030 General Plan Build out

Project Location: Feather River AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Single family housing	101,273.01
Apartments low rise	137,005.33
Apartments mid rise	86,942.37
Apartments high rise	39,063.57
City park	1,970.64
General office building	214,353.93
Office park	58,069.25
General light industry	90,120.15
TOTALS (tons/year, unmitigated)	728,798.25

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

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Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	2,148.33	9.24	dwelling units	6,445.00	59,551.80	550,907.73
Apartments low rise	544.94	9.24	dwelling units	8,719.00	80,563.56	745,285.42
Apartments mid rise	145.61	9.24	dwelling units	5,533.00	51,124.92	472,951.51
Apartments high rise	40.10	9.24	dwelling units	2,486.00	22,970.64	212,499.09
City park		1.59	acres	740.00	1,176.60	10,839.43
General office building		22.11	1000 sq ft	5,707.85	126,200.57	1,172,087.78
Office park		22.11	1000 sq ft	1,537.00	33,983.07	316,722.22
General light industry		3.49	1000 sq ft	15,097.75	52,691.15	491,344.95
					428,262.31	3,972,638.13

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	39.9	0.0	100.0	0.0
Light Truck < 3750 lbs	19.1	0.0	99.0	1.0
Light Truck 3751-5750 lbs	19.7	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.5	0.0	80.0	20.0
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	1.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.2	0.0	91.7	8.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	9.3	9.3	9.2	9.3	9.5	9.2
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
General office building				35.0	17.5	47.5
Office park				48.0	24.0	28.0
General light industry				50.0	25.0	25.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 16.8 miles to 9.3 miles

Home-based shop rural trip length changed from 7.1 miles to 9.3 miles

Operational Changes to Defaults

Home-based other rural trip length changed from 7.9 miles to 9.2 miles

Commercial-based commute rural trip length changed from 14.7 miles to 9.3 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 9.5 miles

Commercial-based customer rural trip length changed from 6.6 miles to 9.2 miles

Sutter County
Emissions by Source
2030
Business As Usual (BAU) Inventory
By Source

Transportation		
	Source:	**Metric tons of CO_2e**
1	On-Road Vehicles	693,377
2	Airport Operations	155
	Total	**693,532**

Energy		
	Sources:	**Metric tons of CO_2e**
1	Electric	129,434
2	Natural Gas	215,552
	Total	**344,986**

Solid Waste		
	Source	**Metric tons of CO_2e**
1	Solid Waste Disposal	21,899
2	Green Waste Recycling	Data Not Available
3	Materials Recycling	Data Not Available
	Total	**21,899**

Landscape Design		
	Sources:	**Metric tons of CO_2e**
1	Landscape Maintenance Emissions	40
2	Carbon sink from CO_2 sequestration	Data Not Available
	Total	**40**

Agriculture		
	Sources:	**Metric tons of CO_2e**
1	Enteric Fermentation	24,248
2	Manure Management	29,780
3	Rice Cultivation	171,663
4	Agricultural Residue Burning	3,011
5	Crop Growth	372,557
6	Animals and Runoff	76,704
7	Fertilizer Use	99,760
	Total	**777,724**

Net Total Emissions	
Category	**Metric tons of CO_2e**
Energy	344,986
Solid Waste	21,899
Landscape Design	40
Agriculture	777,724
Transportation	693,532
Total	**1,838,181**

Sutter County
Emissions by Land Use
2030
Business As Usual (BAU) Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/RAN/ER	238,228.19	7,487.35	7,828.17	253,544
	Low Density Residential	159,085.76	4,999.89	5,227.49	169,313
	Medium Density Residential	100,942.78	3,172.84	3,296.88	107,413
	High Density Residential	45,356.19	1,425.64	1,481.37	48,263
	Total Residential	**543,612.92**	**17,085.72**	**17,833.91**	**578,533**
Commercial	Park	99.21	2.24	2.37	104
	Commercial	117,571.44	2,698.28	2,849.17	123,119
	Mixed Use	31,661.78	726.65	767.29	33,156
	Total Commercial	**149,332.44**	**3,427.18**	**3,618.83**	**156,378**
Industrial	Industrial	310,994.93	7,014.56	7,536.58	325,546
	Total Industrial	**310,994.93**	**7,014.56**	**7,536.58**	**325,546**
Agriculture		0.00	226,057.31	551,666.67	777,724
	Total	**1,003,940.29**	**253,584.77**	**580,655.99**	**1,838,181**

Sutter County
Input data for Green House Gas Emissions
2030 Inventory

Land Use Type (units)	Total Trips	Total VMT	Total Trips	Total VMT	2020 Unit Totals	Unit Type
AG/RAN/ER	59,551.80	550907.73	59551.8	550907.73	6445	du
Low Density Residential	80563.56	745285.42	80563.56	745285.42	8719	du
Medium Density Residential	51124.92	472951.51	51124.92	472951.51	5533	du
High Density Residential	22970.64	212499.09	22970.64	212499.09	2486	du
Park	1176.6	10839.43	1176.6	10839.43	32,234,400.00	Sq/ft
Commercial	126200.57	1172087.78	126200.57	1172087.78	5,707,850.00	Sq/ft
Mixed Use	33983.07	316722.22	33983.07	316722.22	1,537,000.00	Sq/ft
Industrial	52691.15	491344.95	52691.15	491344.95	15,097,750.00	Sq/ft
Total	**428262.31**	**3972638.13**	**428262.31**	**3972638.13**		

Sutter County
Input data for Green House Gas Emissions
2030 Inventory

Land Use Type (units)	Natural gas usage rate (MMBTU/yr)	Electricity (kWh/yr)	Potable Water Usage (gallons/year)	Solid Waste (lbs/year)	% Total Square Foot - SFR/MFR/Non-Res	% Total Square Foot - Res/Non-Res	% Total Square Foot
AG/RAN/ER	605,697	77,747,538	27,910,584	122,851,128	100.00%	43.82%	27.29%
Low Density Residential	404,480	51,919,218	18,638,477	82,037,308	52.09%	29.26%	18.22%
Medium Density Residential	256,670	32,946,278	11,827,382	52,059,454	33.06%	18.57%	11.56%
High Density Residential	115,329	14,803,648	5,314,361	23,391,640	14.85%	8.34%	5.20%
Park	476	80,025	796	36,015	0.02%	0.02%	0.01%
Commercial	553,077	92,905,886	924,277	43,379,877	25.54%	25.54%	9.64%
Mixed Use	148,939	25,018,859	248,901	11,682,314	6.88%	6.88%	2.60%
Industrial	1,462,954	245,747,181	2,444,822	114,747,788	67.56%	67.56%	25.49%
Total	**3,547,621**	**541,168,632**	**67,309,600**	**450,185,525**			

Sutter County
Input data for Green House Gas Emissions
2030 Inventory

City Parks

Year	# of City Parks	Estimated SQ / "building"	Estimated Buildings per
2030	10	500	1
2008	10	500	1

Airport

Year	# of planes	Gallons fuel per day	Annual days of operation	Annual Fuel Usage (g/yr)
2030	77	50.00	365	18,250
2008	77	50	365	18,250

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	Summer	Winter	tons/Year	Summer	Winter	Year	
2030	4,171,560.70	3,637,123.87	728,798.25	0.00	0.00	0.00	728,798.25
2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
2030	481.62	0.00	43.35	0.00	645,028.98	26,446.19
2008	0.00	0.00	0.00	0.00	0.00	0.00

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	39.60	0.3960	0.00	0.0000	100.00	1.0000	0.00	0.0000
Light Truck <3,750 lbs	19.30	0.1930	0.00	0.0000	95.90	0.9590	4.10	0.0410
Light Truck 3,751-5,750 lbs	19.70	0.1970	0.00	0.0000	100.00	1.0000	0.00	0.0000
Med Truck 5,751-8,500 lbs	9.30	0.0930	0.00	0.0000	100.00	1.0000	0.00	0.0000
Lite-Heavy Truck 8,501-10,000 lbs	2.50	0.0250	0.00	0.0000	72.00	0.7200	28.00	0.2800
Lite-Heavy Truck 10,001-14,000 lbs	0.90	0.0090	0.00	0.0000	55.60	0.5560	44.40	0.4440
Med-Heavy Truck 14,001 - 33,000 lbs	1.60	0.0160	0.00	0.0000	18.80	0.1880	81.20	0.8120
Heavy-Heavy Truck 33,001-60,000 lbs	1.70	0.0170	0.00	0.0000	0.00	0.0000	100.00	1.0000
Other bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Urban bus	0.00	0.0000	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motorcycle	4.00	0.0400	40.00	0.4000	60.00	0.6000	0.00	0.0000
School Bus	0.10	0.0010	0.00	0.0000	0.00	0.0000	100.00	1.0000
Motor Home	1.20	0.0120	0.00	0.0000	83.30	0.8330	16.70	0.1670

Disposal Facility	Jurisdiction?	No		Type of Facility:	Landfill w/ Combination		year began:	2009
Landfill	Annual (tons)	Total	Facility	attributed to	of operation	delivered	way)	Distance (miles)
Recology Landfill	225,092.76	29.14%	9	2.62	313.00	100	4.81	9.62
		0.00%		0.00		0		
		0.00%		0.00		0		
		0.00%		0.00		0		
		0.00%		0.00		0		
				2.62	313.00	**Total**		**9.62**

Sutter County
Input data for Green House Gas Emissions
2030 Inventory

Electrical Usage

177,416,681 Total 2030 Residential Electrical Usage
363,751,951 Total 2030 Non-Residential Electrical Usage

Total 2030	GP Area Growth	2008	kWh/yr
		37,634	County facilities located in Yuba City
		214	County facilities located in Live Oak City
		25,475	County facilities located in Unincorporated Sutter
		83,676,413	Residential in Unincorporated Sutter County
177,416,681	**93,676,945**	**83,739,736**	**Total Residnential**
		6,062,361	County facilities located in Yuba City
		88,361	County facilities located in Live Oak City
		793,010	County facilities located in Unincorporated Sutter
		38,211,643	Commercial in Unincorporated Sutter County
		89,160,499	Industrial in Unincorporated Sutter County
363,751,951	**229,436,077**	**134,315,874**	**Total Commercial**

Water Usage

	Total 2030	GP Area Growth	2008	
63,690,805	63,690,805	21,649,514	42,041,290	Residential (gallons per year)
3,618,796	3,618,796	1,230,086	2,388,710	Commercial/Institutional/Industrial (gallons/year)
		22,879,600	**44,430,000**	Total

Solid Waste for Unincorporated Sutter County

	Total 2030	GP Area Growth	2008	
450,185,525	**450,185,525**	**410,348,330**	**39,837,195**	**lbs/year**
			24,807,418	Residential in Unincorporated Sutter County
			15,029,777	Non-Residential in Unincorporated Sutter County

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Natural Gas Data

1,382,175 Total Residential Natural gas usage rate (MMBTU/yr)
2,165,446 Total Non-Residential Natural gas usage rate (MMBTU/yr)

Total 2030	GP Area Growth	2008	MMBTU/year
		13.50	County facilities located in Yuba City
		0.20	County facilities located in Live Oak City
		0.00	County facilities located in Unincorporated Sutter
		268,658.68	Residential in Unincorporated Sutter County
1,382,175	**1,113,502**	**268,672.37**	**Total Residential**
		14,853	County facilities located in Yuba City
		312	County facilities located in Live Oak City
		501	County facilities located in Unincorporated Sutter
		1,504,713	Commercial in Unincorporated Sutter County
2,165,446	**645,067**	**1,520,379**	**Total Commercial**

Sutter County
Input data for Agriculture
2030

	Enteric Fermentation Emission Factor (EF_{MEF})	Typical Animal Mass -kg- (TAM)	Volatile Solids -kg VS/1000kg mass/day-	Max CH_4 Capacity - m^3CH_4/kg VS- (B_O)	K-Nitrogen - kg/day/1000kg animal mass- (K_N)	Number of Head
	EF used	EF used	EF used	EF used	EF used	
Dairy Cow						
Dairy Cows	123.4	604.0	9.0	0.2	0.4	**8,293**
Other						
Sheep on Feed	8.0	27.0	9.2	0.4	0.4	16,397

Sutter County
Input data for Agriculture
2030

	Residue/Crop Ratio (R_{RC})	Fraction Residue Burned (F_{RB})	Fraction Dry Matter (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (NC)
	EF used	EF used	EF used	EF used	EF used	EF used	EF used	EF used
Hay (inc Alfalfa)	0.0	0.00	0.85	0.00	0.00	0.00	0.00	N/A
Barley	1.2	0.03	0.93	0.93	0.88	0.45	0.90	0.01
Dry Edible Beans	2.1	0.00	0.87	0.00	0.00	0.00	1.60	0.02
Corn	1.0	0.03	0.91	0.93	0.88	0.45	0.90	0.01
Corn for Grain	1.0	0.00	0.91	0.00	0.00	0.00	0.90	0.01
Oats	1.3	0.00	0.92	0.00	0.00	0.00	0.90	0.01
Rice	1.4	0.10	0.91	0.93	0.88	0.38	1.00	0.01
Sorghum	1.4	0.00	0.91	0.00	0.00	0.00	0.90	0.01
All Wheat	1.3	0.03	0.93	0.93	0.88	0.44	0.90	0.01
Potatoes (inc Sweet)	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cotton	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar Beet	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable Crops & Fruit Trees	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safflower & Sunflower	0.0	0.03	0.87	0.93	0.88	0.45	0.90	0.02

Sutter County
Input data for Agriculture
2030

		Growing Season Emission Factor		
Primary		EF used	Entered	Default
		210		210
Rattoon		780		780
		State	***Project***	***% of State ($\%_P$)***
Total acres	2030	7,667,570	214,769.00	0.02801
Total acres	2031	7,667,570	214,769.00	0.02801
Climate Zone	Temperate	Yes	Sub Tropic	No

	2030					2031				
	Primary (Acres Harvested)	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**	**Primary (Acres Harvested)**	**Annual Yield**	**Unit of Yield**	**Annual Yield (MT/yr)**	**State Acres Harvested**
Hay (inc Alfalfa)	11,138	66,983	tons	60,766	1,610,000	11,138	66,983	tons	60,766	1,610,000
Barley			tons		60,000	0	0	tons		60,000
Dry Edible Beans	8,446	8,459	tons	7,674	51,900	8,446	8,459	tons	7,674	51,900
Corn			tons	0	495,000	0	0	tons	0	495,000
Corn for Grain	7,720	47,941	tons	43,491	170,000	7,720	47,941	tons	43,491	170,000
Oats	2,035	24,223	tons	21,975	25,000	2,035	24,223	tons	21,975	25,000
Rice	96,186	409,137	tons	371,163	517,000	96,186	409,137	tons	371,163	517,000
Sorghum	572	2,168	tons	1,967	9,000	572	2,168	tons	1,967	9,000
All Wheat	7,631	48,493	tons	43,992	545,000	7,631	48,493	tons	43,992	545,000
Potatoes (inc Sweet)			tons	0	53,200	0	0	tons	0	53,200
Cotton			bales		268,000	0	0	bales		268,000
Sugar Beet					25,300	0	0			25,300
Vegetable Crops & Fru	66,815	511,775	tons	464,274	3,734,170	66,815	511,775	tons	464,274	3,734,170
Safflower & Sunflower	14,226	12,673	tons	11,497	104,000	14,226	12,673	tons	11,497	104,000

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Carbon Dioxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment)

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})	MT/yr
0.00	661,154.84	39.33	23,991.59	**685,185.75**
0.00	0.96	0.00		

Fuel emissions from Airports

Annual Fuel Usage (U_{AAF})	kg/gallon (EF_{CAF})	kg/MT (C_3)	MT/yr (E_{CAF})
18,250.00	8.32	1,000.00	**151.84**

A4. Stationary Sources (Natural Gas)

Unit Type	MMBTU/yr (U_{Ang})	kg/MMBTU (EF_{Cng})	kg/MT (C_3)	MT/yr (E_{Cng})
AG/RAN/ER	605,697	53.07	1,000.00	32,144.3
Low Density Residential	404,480	53.07	1,000.00	21,465.7
Medium Density Residential	256,670	53.07	1,000.00	13,621.5
High Density Residential	115,329	53.07	1,000.00	6,120.5
Park	476	53.07	1,000.00	25.3
Commercial	553,077	53.07	1,000.00	29,351.8
Mixed Use	148,939	53.07	1,000.00	7,904.2
Industrial	1,462,954	53.07	1,000.00	77,639.0
			Total (MT/year)	**188,272.2**

B. Indirect Sources

B1. Electricity

Unit Type	kWh/yr	Unit	Unit type	MWh/yr (U_{Ae})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cele})
AG/RAN/ER	77747538	6,445	du	77,748	524.00	2,204.62	18,479.24
Low Density Residential	51919218	8,719	du	51,919	524.00	2,204.62	12,340.30
Medium Density Residential	32946278	5,533	du	32,946	524.00	2,204.62	7,830.76
High Density Residential	14803648	2,486	du	14,804	524.00	2,204.62	3,518.57
Park	80025.429	32,234,400	Sq/ft	80	524.00	2,204.62	19.02
Commercial	92905886	5,707,850	Sq/ft	92,906	524.00	2,204.62	22,082.12
Mixed Use	25018859	1,537,000	Sq/ft	25,019	524.00	2,204.62	5,946.55
Industrial	245747181	15,097,750	Sq/ft	245,747	524.00	2,204.62	58,409.85
						Total (MT/year)	**128,626.41**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Carbon Dioxide

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWh/yr (U_{epot})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{Cpot})
AG/RAN/ER	du	6,445	27.9106	3.50	97.69	524.00	2,204.62	23.22
Low Density Residential	du	8,719	18.6385	3.50	65.23	524.00	2,204.62	15.51
Medium Density Residential	du	5,533	11.8274	0.01	0.12	804.54	2,000	0.05
High Density Residential	du	2,486	5.3144	0.01	0.05	804.54	2,000	0.02
Park	Sq/ft	32,234,400	0.0008	3.50	0.00	524.00	2,204.62	0.00
Commercial	Sq/ft	5,707,850	0.9243	3.50	3.24	524.00	2,204.62	0.77
Mixed Use	Sq/ft	1,537,000	0.2489	3.50	0.87	524.00	2,204.62	0.21
Industrial	Sq/ft	15,097,750	2.4448	3.50	8.56	524.00	2,204.62	2.03
							Total (MT/year)	**41.81**

B3. Solid Waste

B3a. Anthropogenic Carbon
CO_2 emissions are considered anthropogenic and are not counted in this inventory.
B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{CWT})	g/MT (C_6)	tons/yr (E_{CWT})
AG/RAN/ER	61,425.56	0.1125	33	9.62	3,464.164	1,000,000	551.39
Low Density Residential	41,018.65	0.1125	33	9.62	3,464.164	1,000,000	368.20
Medium Density Residential	26,029.73	0.1125	33	9.62	3,464.164	1,000,000	233.66
High Density Residential	11,695.82	0.1125	33	9.62	3,464.164	1,000,000	104.99
Park	18.01	0.2250	33	9.62	3,464.164	1,000,000	0.08
Commercial	21,689.94	0.2250	33	9.62	3,464.164	1,000,000	97.35
Mixed Use	5,841.16	0.2250	33	9.62	3,464.164	1,000,000	26.22
Industrial	57,373.89	0.2250	33	9.62	3,464.164	1,000,000	257.51
						Total (MT/year)	**1,639.40**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{CWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{CWD})
Excavator	0	119.60	2.62	313	2,205	0.00
Grader	0	132.70	2.62	313	2,205	0.00
Off-Highway Tractor	0	151.50	2.62	313	2,205	0.00
Off-Highway Truck	0	260.10	2.62	313	2,205	0.00
Rubber Tired Dozer	0	239.00	2.62	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/year)	**0.00**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Carbon Dioxide

B4. Wastewater

Unit Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG	MWh/yr (U_{eWW})	lbs/MWh (EF_{Cele})	lbs/MT (C_1)	MT/yr (E_{CWW})
AG/RAN/ER	27.9106	0.65	18.14189	1.911	34.669152	524.00	2,205	8.24
Low Density Residential	18.6385	0.82	15.28357	1.911	29.206902	524.00	2,205	6.94
Medium Density Residential	11.8274	0.82	9.698468	1.911	18.533772	524.00	2,205	4.41
High Density Residential	5.3144	0.82	4.357808	1.911	8.3277711	524.00	2,205	1.98
Park	0.0008	0.71	0.000568	1.911	0.0010854	524.00	2,205	0.00
Commercial	0.9243	0.71	0.656253	1.911	1.2540995	524.00	2,205	0.30
Mixed Use	0.2489	0.71	0.176719	1.911	0.33771	524.00	2,205	0.08
Industrial	2.4448	0.8	1.95584	1.911	3.7376102	524.00	2,205	0.89
							Total (MT/year)	22.83

C. Reserved for AG emissions for CH_4 and N_2O, not applicable for CO_2.

D. Summary Table

Source Type		Emissions, MT /yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aircraft	661306.68	661,306.68
	Landscape equipment	39.33	39.33
	Cooling and heating	212263.83	212,263.83
Total direct, tons/yr		**873609.84**	**873609.84**
Indirect	Electricity	128626.41	128,626.41
	Potable water	41.81	41.81
	Solid waste	1639.40	1,639.40
	Wastewater	22.83	22.83
Total indirect, tons/yr		**130,330.45**	**130,330.45**
Total, tons/yr		**1,003,940**	**1,003,940**
Global warming potential index		**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	238,228.19	238,228.19
	Low Density Residential	159,085.76	159,085.76
	Medium Density Residential	100,942.78	100,942.78
	High Density Residential	45,356.19	45,356.19
	Total Residential	**543,612.92**	**543,612.92**
Commercial	Park	99.21	99.21
	Commercial	117,571.44	117,571.44
	Mixed Use	31,661.78	31,661.78
	Total Commercial	**149,332.44**	**149,332.44**
Industrial	Industrial	310,994.93	310,994.93
	Total Industrial	**310,994.93**	**310,994.93**
Total, tons/yr		**1,003,940**	**1,003,940**
Global warming potential index		1	

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{MHDV})	gr/MT (C_6)	MT/yr (E_{MCON})
Construction Equipment	0.00	0.0580	1,000,000	**0.00**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{MMV})	gr/MT (C_6)	tons/yr (E_{MMV})
Non Cat passenger Car	0.00	0.1696	1,000,000	0.00
Cat passenger Car	574205115.13	0.1355	1,000,000	77.80
Diesel Passenger Car	0.00	0.0006	1,000,000	0.00
Non cat light-duty truck	0.00	0.1908	1,000,000	0.00
Cat light duty truck	268378540.77	0.1516	1,000,000	40.69
Diesel Light duty Truck	11473952.21	0.0011	1,000,000	0.01
Non Cat light-duty truck 2	0.00	0.1908	1,000,000	0.00
Cat light duty truck 2	285652544.65	0.1516	1,000,000	43.30
Diesel Light duty truck 2	0.00	0.0011	1,000,000	0.00
Non Cat Medium duty Truck	0.00	0.4181	1,000,000	0.00
Cat med duty truck	134851201.28	0.2356	1,000,000	31.77
Diesel Med duty truck	0.00	0.0051	1,000,000	0.00
Non Cat lite-heavy duty truck	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck	26100232.51	0.2356	1,000,000	6.15
Diesel Lite-heavy duty truck	10150090.42	0.0051	1,000,000	0.05
Non Cat lite-heavy duty truck 2	0.00	0.4181	1,000,000	0.00
Cat Light-heavy duty truck 2	7255864.64	0.2356	1,000,000	1.71
Diesel Lite-heavy duty truck 2	5794251.62	0.0051	1,000,000	0.03
Non Cat med-heavy duty truck	0.00	0.4181	1,000,000	0.00
Cat med-heavy duty truck	4361638.85	0.2356	1,000,000	1.03
Diesel med-heavy duty truck	18838567.82	0.0051	1,000,000	0.10
Non cat Heavy Duty truck	0.00	0.4181	1,000,000	0.00
Cat heavy duty truck	0.00	0.2356	1,000,000	0.00
Diesel heavy duty truck	24650219.59	0.0051	1,000,000	0.13
Non Cat Other Bus	0.00	0.4181	1,000,000	0.00
Cat other bus	0.00	0.2356	1,000,000	0.00
Diesel Other Bus	1450012.92	0.0051	1,000,000	0.01
Non Cat Urban Bus	0.00	0.4181	1,000,000	0.00
Cat Urban Bus	0.00	0.2356	1,000,000	0.00
Diesel Urban Bus	0.00	0.0051	1,000,000	0.00
Non cat motorcycle	23200206.67	0.0672	1,000,000	1.56
Cat motorcycle	34800310.01	0.0672	1,000,000	2.34
Diesel Motorcycle	0.00	0.0000	1,000,000	0.00
Non Cat School Bus	0.00	0.4181	1,000,000	0.00
Cat School Bus	0.00	0.2356	1,000,000	0.00
Diesel School Bus	1450012.92	0.0051	1,000,000	0.01
Non Cat Motor home	0.00	0.4181	1,000,000	0.00
Cat Motor home	14494329.12	0.2356	1,000,000	3.41
Diesel Motor home	2905825.89	0.0051	1,000,000	0.01
			Total (MT/yr)	**210.11**

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{AAF})	gr/gallon (EF_{Maf})	gr/MT (C_6)	MT/yr (E_{Maf})
18,250.00	7.04	1,000,000	**0.13**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Methane

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year (G_F)	gr/gallon (EF_{MF})	gr/MT (C_6)	MT/yr (E_{Mls})
4,469.07	0.50	1,000,000	**0.00**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
368,990.61	0.32	1,000	**116.60**

A5. Stationary Source (Cooling and Heating) - Natural Gas

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Mng})	kg/MT (C_3)	MT/yr (E_{Mng})
AG/RAN/ER	du	6,445	605,697	0.005	1,000	3.0285
Low Density Residential	du	8,719	404,480	0.005	1,000	2.0224
Medium Density Residential	du	5,533	256,670	0.005	1,000	1.2833
High Density Residential	du	2,486	115,329	0.005	1,000	0.5766
Park	Sq/ft	32,234,400	476	0.005	1,000	0.0024
Commercial	Sq/ft	5,707,850	553,077	0.005	1,000	2.7654
Mixed Use	Sq/ft	1,537,000	148,939	0.005	1,000	0.7447
Industrial	Sq/ft	15,097,750	1,462,954	0.001	1,000	1.4630
					Total (MT/yr)	**11.89**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/year	MWh/yr (U_{Ae})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mele})
AG/RAN/ER	du	6445.00	77747537.9	77,747.54	0.0302	2,205	1.065
Low Density Residential	du	8719.00	51919217.5	51,919.22	0.0302	2,205	0.711
Medium Density Residential	du	5533.00	32946277.7	32,946.28	0.0302	2,205	0.451
High Density Residential	du	2486.00	14803647.9	14,803.65	0.0302	2,205	0.203
Park	Sq/ft	32234400.00	80025.4292	80.03	0.0302	2,205	0.001
Commercial	Sq/ft	5707850.00	92905885.8	92,905.89	0.0302	2,205	1.273
Mixed Use	Sq/ft	1537000.00	25018859.2	25,018.86	0.0302	2,205	0.343
Industrial	Sq/ft	15097750.00	245747181	245,747.18	0.0302	2,205	3.366
						Total (MT/yr)	**7.413**

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	tons/yr (E_{Mpot})
AG/RAN/ER	du	6445.00	27.91058	3.50	97.69	0.0302	2,205	0.00134
Low Density Residential	du	8719.00	18.63848	3.50	65.23	0.0302	2,205	0.00089
Medium Density Residential	du	5533.00	11.82738	3.50	41.40	0.0302	2,205	0.00057
High Density Residential	du	2486.00	5.31436	3.50	18.60	0.0302	2,205	0.00025
Park	Sq/ft	32234400.00	0.00080	3.50	0.00	0.0302	2,205	0.00000
Commercial	Sq/ft	5707850.00	0.92428	3.50	3.23	0.0302	2,205	0.00004
Mixed Use	Sq/ft	1537000.00	0.24890	3.50	0.87	0.0302	2,205	0.00001
Industrial	Sq/ft	15097750.00	2.44482	3.50	8.56	0.0302	2,205	0.00012
							Total (MT/yr)	**0.00323**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Methane

B3. Solid Waste

B3a. Fugitive Emissions

Unit Type	Unit Type	unit	tons/yr (U_{SW})	MT CO_2e/ton (EF_{MWF})	MT CO_2e/yr (E_{MWF})
AG/RAN/ER	du	6,445	61,426	0.09	5,528.30
Low Density Residential	du	8,719	41,019	0.09	3,691.68
Medium Density Residential	du	5,533	26,030	0.09	2,342.68
High Density Residential	du	2,486	11,696	0.09	1,052.62
Park	Sq/ft	32,234,400	18	0.09	1.62
Commercial	Sq/ft	5,707,850	21,690	0.09	1,952.09
Mixed Use	Sq/ft	1,537,000	5,841	0.09	525.70
Industrial	Sq/ft	15,097,750	57,374	0.09	5,163.65
				Total (MT/yr)	**20,258.35**

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{MWT})	gr/MT (C_6)	tons/yr (E_{MWT})
AG/RAN/ER	61,425.5640	0.1125	33	9.62	0.00510	1,000,000	0.000812
Low Density Residential	41,018.6541	0.1125	33	9.62	0.00510	1,000,000	0.000542
Medium Density Residential	26,029.7271	0.1125	33	9.62	0.00510	1,000,000	0.000344
High Density Residential	11,695.8199	0.1125	33	9.62	0.00510	1,000,000	0.000155
Park	18.0074	0.2250	33	9.62	0.00510	1,000,000	0.000000
Commercial	21,689.9386	0.2250	33	9.62	0.00510	1,000,000	0.000143
Mixed Use	5,841.1572	0.2250	33	9.62	0.00510	1,000,000	0.000039
Industrial	57,373.8942	0.2250	33	9.62	0.00510	1,000,000	0.000379
						Total (MT/yr)	**0.002414**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip	lbs/hr (EF_{MWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	MT/yr (E_{MWD})
Excavator	0	0.0164	2.62	313	2,205	0.00
Grader	0	0.0185	2.62	313	2,205	0.00
Off-Highway Tractor	0	0.0243	2.62	313	2,205	0.00
Off-Highway Truck	0	0.0260	2.62	313	2,205	0.00
Rubber Tired Dozer	0	0.0342	2.62	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total (MT/yr)	**0.00**

B4. Wastewater

Land Use Type	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Mele})	lbs/MT (C_1)	MT/yr (E_{MWW})
AG/RAN/ER	27.91058	65	18.14	1.91	34.67	0.0302	2,205	0.000475
Low Density Residential	18.63848	82	15.28	1.91	29.21	0.0302	2,205	0.000400
Medium Density Residential	11.82738	82	9.70	1.91	18.53	0.0302	2,205	0.000254
High Density Residential	5.31436	82	4.36	1.91	8.33	0.0302	2,205	0.000114
Park	0.00080	71	0.00	1.91	0.00	0.0302	2,205	0.000000
Commercial	0.92428	71	0.66	1.91	1.25	0.0302	2,205	0.000017
Mixed Use	0.24890	71	0.18	1.91	0.34	0.0302	2,205	0.000005
Industrial	2.44482	80	1.96	1.91	3.74	0.0302	2,205	0.000051
							Total (MT/yr)	**0.001316**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Methane

C. See Methane Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Direct	Construction equipment	0.00	0.00
	Motor vehicles & Aviation Fuel	210.24	4,415.01
	Landscape equipment	0.00	0.05
	Cooling and heating	128.49	2,698.23
	Total direct, tons/yr	**338.73**	**7,113.29**
Indirect	Electricity	7.41	155.68
	Potable water	0.00	0.07
	Solid waste	20,258.35	20,258.40
	Wastewater	0.00	0.03
	Total indirect, tons/yr	**20,265.77**	**20,414.17**
	Total from Agriculture	**10,764.63**	**226,057.31**
	Total, tons/yr	***31,369.13***	***253,584.77***
	Global warming potential index	**21**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	5,621.5537	7,487.35
	Low Density Residential	3,753.9513	4,999.89
	Medium Density Residential	2,382.1924	3,172.84
	High Density Residential	1,070.3798	1,425.64
	Total Residential	**12,828.08**	**17,085.72**
Commercial	Park	1.6503	2.24
	Commercial	1,987.6148	2,698.28
	Mixed Use	535.2698	726.65
	Total Commercial	**2,524.53**	**3,427.18**
Industrial	Industrial	5,251.7563	7,014.56
	Total Industrial	**5,251.7563**	**7,014.56**
	Total from Agriculture	**10,764.63**	**226,057.31**
	Total, tons/yr	***31,369.00***	***253,584.77***
	Global warming potential index	21	

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Nitrous Oxide

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Unit Type	gallons/yr (U_{AG})	gr/gallon (EF_{NHDV})	gr/MT (C_6)	MT/yr (E_{NCON})
Non cat heavy-duty truck	0.00	0.0260	1,000,000	**0.00000**

A2. Mobile Source (Motor Vehicles)

Unit Type	miles/yr (M)	gr/mile (EF_{NMV})	gr/MT (C_6)	MT/yr (E_{NMV})
Non Cat passenger Car	0	0.0197	1,000,000	0.00000
Cat passenger Car	574,205,115	0.0504	1,000,000	28.93994
Diesel Passenger Car	0	0.0012	1,000,000	0.00000
Non cat light-duty truck	0	0.0218	1,000,000	0.00000
Cat light duty truck	268,378,541	0.0639	1,000,000	17.14939
Diesel Light duty Truck	11,473,952	0.0017	1,000,000	0.01951
Non Cat light-duty truck 2	0	0.0218	1,000,000	0.00000
Cat light duty truck 2	285,652,545	0.0639	1,000,000	18.25320
Diesel Light duty truck 2	0	0.0017	1,000,000	0.00000
Non Cat Medium duty Truck	0	0.0473	1,000,000	0.00000
Cat med duty truck	134,851,201	0.1317	1,000,000	17.75990
Diesel Med duty truck	0	0.0048	1,000,000	0.00000
Non Cat lite-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck	26,100,233	0.1317	1,000,000	3.43740
Diesel Lite-heavy duty truck	10,150,090	0.0048	1,000,000	0.04872
Non Cat lite-heavy duty truck 2	0	0.0473	1,000,000	0.00000
Cat Light-heavy duty truck 2	7,255,865	0.1317	1,000,000	0.95560
Diesel Lite-heavy duty truck 2	5,794,252	0.0048	1,000,000	0.02781
Non Cat med-heavy duty truck	0	0.0473	1,000,000	0.00000
Cat med-heavy duty truck	4,361,639	0.1317	1,000,000	0.57443
Diesel med-heavy duty truck	18,838,568	0.0048	1,000,000	0.09043
Non cat Heavy Duty truck	0	0.0473	1,000,000	0.00000
Cat heavy duty truck	0	0.1317	1,000,000	0.00000
Diesel heavy duty truck	24,650,220	0.0048	1,000,000	0.11832
Non Cat Other Bus	0	0.0473	1,000,000	0.00000
Cat other bus	0	0.1317	1,000,000	0.00000
Diesel Other Bus	1,450,013	0.0048	1,000,000	0.00696
Non Cat Urban Bus	0	0.0473	1,000,000	0.00000
Cat Urban Bus	0	0.1317	1,000,000	0.00000
Diesel Urban Bus	0	0.0048	1,000,000	0.00000
Non cat motorcycle	23,200,207	0.0069	1,000,000	0.16008
Cat motorcycle	34,800,310	0.0069	1,000,000	0.24012
Diesel Motorcycle	0	0.0000	1,000,000	0.00000
Non Cat School Bus	0	0.0473	1,000,000	0.00000
Cat School Bus	0	0.1317	1,000,000	0.00000
Diesel School Bus	1,450,013	0.0048	1,000,000	0.00696
Non Cat Motor home	0	0.0473	1,000,000	0.00000
Cat Motor home	14,494,329	0.1317	1,000,000	1.90890
Diesel Motor home	2,905,826	0.0048	1,000,000	0.01395
			Total (MT/yr)	**89.71**

Emissions from Aviation Fuel

Gasoline gallons/ year (U_{Aaf})	gr/gallon (EF_{Naf})	gr/lbs (C_6)	MT/yr (E_{Nls})
18,250.00	0.11000	1000000	**0.002008**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Nitrous Oxide

A3. Mobile Source (Landscape Equipment)

Gasoline gallons/ year	gr/gallon (EF_{Nls})	gr/lbs (C_6)	MT/yr (E_{Nls})
4,469.07	0.22000	1000000	**0.000983**

A4. Wood burning Hearth

MMBtu	kg/MMBtu (EF_{Mwood})	kg/MT (C_3)	MT/yr (E_{Mls})
368,990.61	0.00420	1000	**1.549761**

A5. Stationary Source (Cooling and Heating)

Land Use Type	Unit Type	Units	MMBTUs/yr (U_{Ang})	kg/MMBTU (EF_{Nng})	kg/MT (C_3)	MT/yr (E_{Nng})
AG/RAN/ER	du	6445	605,697	0.0001	1,000	0.060570
Low Density Residential	du	8719	404,480	0.0001	1,000	0.040448
Medium Density Residential	du	5533	256,670	0.0001	1,000	0.025667
High Density Residential	du	2486	115,329	0.0001	1,000	0.011533
Park	Sq/ft	32234400	476	0.0001	1,000	0.000048
Commercial	Sq/ft	5707850	553,077	0.0001	1,000	0.055308
Mixed Use	Sq/ft	1537000	148,939	0.0001	1,000	0.014894
Industrial	Sq/ft	15097750	1,462,954	0.0001	1,000	0.146295
					Total (MT/yr)	**0.354763**

B. Indirect Sources

B1. Electricity

Land Use Type	Unit Type	Units	kWh/yr	MWh/yr (U_{Ae})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Nele})
AG/RAN/ER	du	6445	77747537.9	77,748	0.0081	2,205	0.28565
Low Density Residential	du	8719	51919217.5	51,919	0.0081	2,205	0.19076
Medium Density Residential	du	5533	32946277.7	32,946	0.0037	2,205	0.05529
High Density Residential	du	2486	14803647.9	14,804	0.0037	2,205	0.02484
Park	Sq/ft	32234400	80025.4292	80	0.0081	2,205	0.00029
Commercial	Sq/ft	5707850	92905885.8	92,906	0.0081	2,205	0.34135
Mixed Use	Sq/ft	1537000	25018859.2	25,019	0.0081	2,205	0.09192
Industrial	Sq/ft	15097750	245747181	245,747	0.0081	2,205	0.90290
						Total (MT/yr)	**1.89301**

B2. Potable Water

Unit Type	unit type	unit number	MG/yr (U_{Apot})	MWh/MG (C_4)	MWH/yr (U_{epot})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{Npot})
AG/RAN/ER	du	6445	27.9105844	3.50	97.69	0.0081	2,205	0.000359
Low Density Residential	du	8719	18.6384771	3.50	65.23	0.0081	2,205	0.000240
Medium Density Residential	du	5533	11.8273824	3.50	41.40	0.0081	2,205	0.000152
High Density Residential	du	2486	5.3143607	3.50	18.60	0.0081	2,205	0.000068
Park	Sq/ft	32234400	0.0007961	3.50	0.00	0.0081	2,205	0.000000
Commercial	Sq/ft	5707850	0.9242766	3.50	3.23	0.0081	2,205	0.000012
Mixed Use	Sq/ft	1537000	0.2489008	3.50	0.87	0.0081	2,205	0.000003
Industrial	Sq/ft	15097750	2.4448222	3.50	8.56	0.0081	2,205	0.000031
							Total (MT/yr)	**0.000866**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Nitrous Oxide

B3. Solid Waste

B3a. Fugitive Emissions No Fugitive Nitrous Oxide Emissions

B3b. Exhaust Emissions (Hauling Trucks)

Unit Type	tons/yr (U_{SW})	tons/cuyd (d)	cuyd/trip (C_T)	miles/trip (M)	gr/mile (EF_{NWT})	gr/MT (C_6)	MT/yr (E_{NWT})
AG/RAN/ER	61,425.56	0.1125	33	9.62	0.0048	1,000,000	0.00076401
Low Density Residential	41,018.65	0.1125	33	9.62	0.0048	1,000,000	0.00051019
Medium Density Residential	26,029.73	0.1125	33	9.62	0.0048	1,000,000	0.00032376
High Density Residential	11,695.82	0.1125	33	9.62	0.0048	1,000,000	0.00014547
Park	18.01	0.2250	33	9.62	0.0048	1,000,000	0.00000011
Commercial	21,689.94	0.2250	33	9.62	0.0048	1,000,000	0.00013489
Mixed Use	5,841.16	0.2250	33	9.62	0.0048	1,000,000	0.00003633
Industrial	57,373.89	0.2250	33	9.62	0.0048	1,000,000	0.00035681
						Total (MT/yr)	**0.002272**

B3c. Exhaust Emissions (Disposal Equipment)

Vehicle Type	# of equip.	lbs/hr (EF_{NWD})	hrs/day (h)	days/yr (n)	lbs/MT (C_1)	tons/yr (E_{NWD})
Excavator	0	0.0074	2.62	313	2,205	0.00
Grader	0	0.0083	2.62	313	2,205	0.00
Off-Highway Tractor	0	0.0109	2.62	313	2,205	0.00
Off-Highway Truck	0	0.0117	2.62	313	2,205	0.00
Rubber Tired Dozer	0	0.0153	2.62	313	2,205	0.00
Disposal Facility run by City?					No	0.00
					Total, tons/yr	**0.00**

B4. Wastewater

AG/RAN/ER	MG/yr Potable (U_{Apot})	% used indoors ($\%_{in}$)	MG/yr ww generated (U_{AWW})	MWh/MG (C_5)	MWh/yr (U_{eWW})	lbs/MWh (EF_{Nele})	lbs/MT (C_1)	MT/yr (E_{NWW})
AG/RAN/ER	27.91	65	18.14	1.91	34.6691	0.0081	2204.62	0.00012738
Low Density Residential	18.64	82	15.28	1.91	29.2069	0.0081	2204.62	0.00010731
Medium Density Residential	11.83	82	9.70	1.91	18.5337	0.0037	2204.62	0.00003111
High Density Residential	5.31	82	4.36	1.91	8.3277	0.0037	2204.62	0.00001398
Park	0.00	71	0.00	1.91	0.0011	0.0081	2204.62	0.00000000
Commercial	0.92	71	0.66	1.91	1.2541	0.0081	2204.62	0.00000461
Mixed Use	0.25	71	0.18	1.91	0.3377	0.0081	2204.62	0.00000124
Industrial	2.44	80	1.96	1.91	3.7376	0.0081	2204.62	0.00001373
							Total (MT/yr)	**0.00029935**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Nitrous Oxide

C. See Nitrous Emissions from AG Formula Spreadsheet (entered into table below under commercial AG)
D. Summary Table

Source Type		Emissions, tons/yr	CO_2e metric tons/yr
Direct	Construction equipment	0.00000	0.00
	Motor vehicles + aviation fuel	89.7120	27,810.72
	Landscape equipment	0.0010	0.30
	Cooling and heating	1.9045	590.40
Total direct, tons/yr		**91.6175**	**28,401.43**
Indirect	Electricity	1.8930	586.83
	Potable water	0.0009	0.27
	Solid waste	0.0023	0.70
	Wastewater	0.0003	0.09
Total indirect, tons/yr		**1.8964**	**587.90**
Total From Agriculture		**1,779.57**	**551,666.67**
Total, tons/yr		***1,873.08***	***580,655.99***
Global warming potential index		**310**	

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Residential	AG/RAN/ER	25.2516	7,828.17
	Low Density Residential	16.8625	5,227.49
	Medium Density Residential	10.6349	3,296.88
	High Density Residential	4.7785	1,481.37
	Total Residential	**57.5275**	**17,833.91**
Commercial	Park	0.0076	2.37
	Commercial	9.1907	2,849.17
	Mixed Use	2.4751	767.29
	Total Commercial	**11.6734**	**3,618.83**
Industrial	Industrial	24.3110	7,536.58
	Total Industrial	**24.3110**	**7,536.58**
Total from Agriculture		**1,779.57**	**551,666.67**
Total, tons/yr		**1,873.08**	**580,655.99**
Global warming potential index		310	

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Agricultural Emissions

CM. Methane

CM1. Enteric Fermentation

Source	Number - Head/year (U_{Aani})	Emission Factor kg CH_4/head (EF_{MEF})	Conversion factor kg to MT (C_3)	MT CH_4/year (E_{MEF})
Dairy Cow				
Dairy Cows	8,293.00	123.42	1000.0	1,023.51
Others				
Sheep	16,397.00	8.00	1000.0	131.18
			Total	**1,154.68**

CM2. Manure Management

Source	Number - 1000s Head/year (U_{Aani})	Typical Animal Mass kg/head (TAM)	Volatile Solids Produced kgVS/1000kg/year (VS)	Max CH_4 capacity m^3CH_4/kgVS (B_O)	Extent Capacity Realized (MCF)	Density of Methane (C_8)	MT CH_4/year (E_{MMM})
Dairy Cow							
Dairy Cows	8.293	604.0	3278.5	0.24	0.499	0.678	1,332.76
Other							
Sheep on Feed	16.397	27.0	3361.7	0.36	0.012	0.678	4.36
						Total	**1,337.11**

CM3. Rice Cultivation

Season	Acres (U_{AC})	Conversion hectares/acre (C_{11})	Emission Factor (EF_{PS})	Conversion kg/MT (C_3)	MT/year (E_{MRC})
Primary	96,186	0.40	210	1,000	8,174.45
				Total	**8,174.45**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Agricultural Emissions

CM4. Agricultural Residue Burning

Source	Production - Tons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Carbon Content (CC)	Ratio CH_4-C (R_{CH4-C})	Conversion CH_4- to Mol.Wt. (C_{11})	Emissions Tons/year (E_{MARB})
Hay (inc Alfalfa)	60,765.97	0	0.000	0.85	0	0.00	0.00	0.005	1.33	0.00
Dry Edible Beans	7,673.75	2.1	0.000	0.87	0	0.00	0.00	0.005	1.33	0.00
Corn for Grain	43,491.36	1	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
Oats	21,974.74	1.3	0.000	0.92	0	0.00	0.00	0.005	1.33	0.00
Rice	371,163.14	1.4	0.097	0.91	0.93	0.88	0.38	0.005	1.33	94.54
Sorghum	1,966.78	1.4	0.000	0.91	0	0.00	0.00	0.005	1.33	0.00
All Wheat	43,991.75	1.3	0.030	0.93	0.93	0.88	0.44	0.005	1.33	3.85
Vegetable Crops & Fruit Trees	464,274.43	0	0.030	0.87	0.93	0.88	0.45	0.005	1.33	0.00
Safflower & Sunflower	11,496.73	0	0.000	0.00	0	0.00	0.00	0.005	1.33	0.00
									Total	**98.39**

CN. Nitrous Oxide

CN1. Manure Management

Source	Total Nitrogen Excreted (N_T)	Manure Anaerobic Lagoons ($\%_{AL}$)	Manure Liquid/Slurry ($\%_S$)	Manure Deep Pit ($\%_{DP}$)	Emission Factor for Liquid System (EF_{NML})	N_2O Emissions from Liquid System Mgt.	Manure Solid Storage/ Managed ($\%_{SS}$)	Manure Deep Pit / DryLot ($\%_{DP}$)	Manure Pasture / Poultry ($\%_P$)	Emission Factor for Solid System (EF_{NMS})	N_2O Emissions from solid system Mgt.	Total N_2OMT/yr (E_{NMM})
Dairy Cow												
Dairy Cows	804,440.90	467,234	166,683	*N/A*	0.001	*996.16*	74,355	1,830	*N/A*	0.02	*2,394.41*	3.39
Other												
Sheep on Feed	67,868.82	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	66,678	*N/A*	*N/A*	0.02	*2,095.60*	2.10
											Total	**5.49**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Agricultural Emissions

CN2. Emissions from Animals and Runoff

Indirect emissions from animals

Source	Total Nitrogen Excreted (N_T)	% of Indirect Volitazition ($\%_{VI}$)	Rate of conversion from NH_3 to NO_X ($EF_{NH3-NOX}$)	Conversion factor for kg to MT (C_3)	Tons/year (E_{NIA})
Dairy Cow					
Dairy Cows	804,440.90	0.20	0.01	1,000	2.53
Other					
Sheep on Feed	67,868.82	0.20	0.01	1,000	0.21
				Total	**2.74**

Direct emissions from animals

Source	Unmanaged Nitrogen (N_{UM})	Emission Factor for Pastures, Ranges and Paddocks (EF_{PRP})	Conversion factor for kg to MT (C_3)	Manure for Pasture, Range and Paddock (M_{PRP})	Managed Nitrogen (N_M)	Unmanaged Daily Spread (N_{DS})	% of Indirect Volitazition ($\%_{VI}$)	Emission Factor for ground Applications (EF_{NV})	Manure applied to Soils (M_{AS})	MT/year (E_{NDA})
Dairy Cow										
Dairy Cows	7,442.98	0.02	1,000	0.149	710,103	86,895.10	0.20	0.0125	7.970	12.992
Other										
Sheep on Feed	66,678.14	0.02	1,000	1.334	1,191	*N/A*	0.20	0.0125	0.012	4.210
									Total	**17.202**

Emissions from Leaching

Source	Unvolatized Synthetic Nitrogen (N_{UVS})	Unvolatized Non-Manure Organic Nitrogen (N_{UVO})	Conversion factor for kg to MT (C_3)	Leaching % of Soil ($\%_{Leach}$)	Leaching Factor - kg N2O-N / kg N (F_{Leach})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Total Leaching from non-manure Fertilizer (L_{fert})	Total Nitrogen Excreted (N_T)	% of Volitazation from Manure ($\%_{VM}$)	Total Leaching from Manure (L_{man})	Total Emissions from Leaching MT/yr (E_{NL})
Total emissions of N_2O from Leaching	18,422,105	7726.96	1,000	0.3000	0.025	1.57	217.21	872,310	0.00	10.28	**227.49**

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Agricultural Emissions

CN3: Nitrous Oxide from Crop Growth:

Source	Crop Production MTs	Conversion factor for kg to tons (C_3)	Residue/Crop Ratio (R_{RC})	Fraction Dry (F_{DM})	Nitrogen Content of Aboveground biomass	Nitrogen Fixed by Crops (FN)	Fraction of Residue Applied (F_{RA})	Nitrogen Content of Residue (N_{CR})	Nitrogen Returned to Soil (N_{RS})
Hay (inc Alfalfa)	60,765.97	1,000	0.0	0.8500	0.03	1,549,532	0.00	*N/A*	*0*
Dry Edible Beans	7,673.75	1,000	2.1	0.8700	0.03	620,883	1.60	0.02	376,856
Corn for Grain	43,491.36	1,000	1.0	0.9100	*N/A*	*0*	0.90	0.01	206,593
Oats	21,974.74	1,000	1.3	0.9200	*N/A*	*0*	0.90	0.01	165,575
Rice	371,163.14	1,000	1.4	0.9100	*N/A*	*0*	1.00	0.01	3,404,605
Sorghum	1,966.78	1,000	1.4	0.9100	*N/A*	*0*	0.90	0.01	24,355
All Wheat	43,991.75	1,000	1.3	0.9300	*N/A*	*0*	0.90	0.01	296,778
Vegetable Crops & Fruit Trees	464,274.43	1,000	0.0	0.0000	0.03	0	0.00	0.00	0
Safflower & Sunflower	11,496.73	1,000	0.0	0.8700	0.03	300,065	0.90	0.02	0
Total						2,470,480			4,474,762

Source	Crop Production (Hectares)	Nitrogen Fixed by Crops (FN_T)	Nitrogen Returned to Soil (N_{RST})	Conversion factor for kg to tons (C_3)	Emission factor for soils (kg N2O-N/kgN) (EF_{DIR})	Molecular Weight Ratio $N_2O:N_2$ (C_{10})	Emission factor kg N_2O-N / ha_yr	Emissions in MT (N_{CG})
N2O emissions from Legumes	-	2,470,480.38	-	1,000	0.0100	1.57	-	38.82
N2O emissions from Residues	-	-	4,474,762	1,000	0.0100	1.57	-	70.32
N_2O from Histols (Temperate Zone)	86,915.82	-	-	1,000	-	1.57	8	1,092.66
N_2O from Histols (Sub tropic Zone)	0.00	-	-	1,000	-	1.57	12	0.00
							Total	**1,201.80**

CN4. Emissions from Fertilizers

Source	Total Fertilizer Use (kg N)	Year Total Fertilizer Use (kg N)	Fertilizers (Calendar Year)	Unvolatized N (kg) (NUV)	Volatized N (kg) (NV)	Emissions (metric tons)	N_2O Emissions (metric	Total Emissions from
Synthetic	20,469,005	20,469,005	20,469,005	18,422,105	2,046,901	289.61	32.20	**321.81**
Organic	236,778	236,778	236,778	7,727	1,931.74			
Dried Manure	1,200	1,200	1,200					
Activated Sewage Sludge	204,861	204,861	204,861					
Other	30,717	30,717	30,717					
Dried Manure %	1%	1%	1%					
Non-Manure Organics	235,578	235,578	235,578					

Sutter County
Input data for Green House Gas Emissions
2030
Business As Usual (BAU) Inventory
Agricultural Emissions

CN5. Emissions on N_2O from agricultural residue burning

Source	Production - MTTons (U_C)	Residue/Crop Ratio (R_{RC})	Fraction Burned (F_{RB})	Fraction Dry (F_{DM})	Burning Efficiency (BE)	Combustion Efficiency (CE)	Nitrogen Content (NC)	Ratio N2O-N (R_{N2O-N})	Conversion to Mol.Wt. (C_{10})	Emissions MT/year (E_{NARB})
Hay (inc Alfalfa)	60,765.97	0.0000	0.000	0.85	0.000	0.00	*N/A*	0.007	1.57	*0.00*
Dry Edible Beans	7,673.75	2.1000	0.000	0.87	0.000	0.00	0.017	0.007	1.57	0.00
Corn for Grain	43,491.36	1.0000	0.000	0.91	0.000	0.00	0.006	0.007	1.57	0.00
Oats	21,974.74	1.3000	0.000	0.92	0.000	0.00	0.007	0.007	1.57	0.00
Rice	371,163.14	1.4000	0.097	0.91	0.930	0.88	0.007	0.007	1.57	2.96
Sorghum	1,966.78	1.4000	0.000	0.91	0.000	0.00	0.011	0.007	1.57	0.00
All Wheat	43,991.75	1.3000	0.030	0.93	0.930	0.88	0.006	0.007	1.57	0.09
Vegetable Crops & Fruit Trees	464,274.43	0.0000	0.000	0.00	0.000	0.00	0.000	0.007	1.57	0.00
Safflower & Sunflower	11,496.73	0.0000	0.030	0.87	0.930	0.88	0.023	0.007	1.57	0.00
									Total	**3.05**

D. Summary Table

Source Type		Emissions, tons/yr	CO_2E metric tons/yr
Methane	Enteric Fermentation	1,154.68	24,248.37
	Manure Management	1,337.11	28,079.41
	Rice Cultivation	8,174.45	171,663.40
	Agricultural Residue Burning	98.39	2,066.13
Total Methane		10,764.63	**226,057.31**
Nitrous Oxide	Manure Management	5.49	1,700.71
	Animals and Runoff	247.43	76,704.25
	Crop Growth	1,201.80	372,556.64
	Fertilizer Use	321.81	99,760.35
	Agricultural Residue Burning	3.05	944.72
Total Nitrous Oxide		1,779.57	**551,666.67**
	Total emissions from Agriculture		**777,723.98**

Appendix G: Reduction Measures, Assumptions and Attributed Reductions

Sutter County
Reduction Measures

R1 Reductions
In order to provide credit to the County for regulatory actions already taken or planned by the State of California, The Climate Action Plan first evaluates the greenhouse gas reductions that will occur within the County as a result of these actions. These will be identified in the CAP as R1 reduction measures.

R2 Reductions
R2 and R3 reduction measures are measures that can be incorporated at the County level to provide reductions in greenhouse gas emissions. R2 measures are those measures that can be quantified to show the value of the reduction from the incorporation of those measures.

R3 Reductions
R3 measures are those measures that, although they provide a vehicle through which reductions in emissions will occur, cannot be quantified at this time. The R3 measures can be viewed as supportive measures or methods of implementation for the R2 measures.

Transportation Reduction Measures

R1-T 1 Assembly Bill 1493: Pavley I

Assembly Bill (AB) 1493 (Pavley) required the California Air Resources Board (CARB) to adopt regulations that will reduce GHG from automobiles and light-duty trucks by 30 percent below 2002 levels by the year 2016, effective with 2009 models. By 2020, this requirement will reduce emissions in California by approximately 16.4 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), representing 17.3 percent of emissions from passenger/light-duty vehicles in the State. By 2030 this requirement will reduce emissions in California by 19.70 percent from passenger/light-duty vehicles in the State.

		2020	2030
Pavley Afforded Reduction to automobiles & light duty Trucks	=	17.30%	19.70%

R1-T 2 Assembly Bill 1493: Pavley II

California committed to further strengthening the AB1493 standards beginning in 2017 to obtain a 45 percent GHG reduction from 2020 model year vehicles. By 2020, this requirement will reduce emissions in California by approximately 4.0 $MMTCO_2e$, representing 2.5 percent of emissions from passenger/light-duty vehicles in the State. By 2030 reductions from increased energy efficiency for passenger and light duty vehicles would increase by 55% (from combined Pavley I and II 2020 reductions of 22.2% to 34.25%) and will provide reductions from heavy duty vehicles by at least 25%. Airplane fuel economy will increase reductions by at least 25% by 2030 (PEW, 2003).

		2020	2030
Pavley Afforded Reduction to automobiles & light duty Trucks	=	2.50%	14.55%
Pavley Afforded Reductions to Heavy Duty Trucks	=	N/A	25.00%
Reduction afforded to airplane fuel	=	N/A	25.00%

R1-T 3 Executive Order S-1-07 (Low Carbon Fuel Standard)

The Low Carbon Fuel Standard (LCFS) will require a reduction of at least ten (10) percent in the carbon intensity of California's transportation fuels by 2020. This requirement will reduce emissions in California by approximately 15 $MMTCO_2e$, representing 6.9 percent of emissions from passenger/light-duty vehicles in the State. This requirement will reduce emissions in California by 7.2 percent from passenger/light-duty vehicles in the State by 2030.

		2020	2030
Reduction to automobiles & light duty Trucks	=	6.90%	7.20%

R1-T 4 Tire Pressure Program

The AB32 early action measure involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. By 2020, this requirement will reduce emissions in California by approximately 0.55 $MMTCO_2e$, representing 0.3 percent of emissions from passenger/light-duty vehicles in the State.

		2020	2030
Reduction to automobiles & light duty Trucks	=	0.30%	0.30%

R1-T 5 Low Rolling Resistance Tires

This AB32 early action measure would increase vehicle efficiency by creating an energy efficiency standard for automobile tires to reduce rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.3 $MMTCO_2e$, representing 0.2 percent of emissions from passenger/light-duty vehicles in the State.

		2020	2030
Reduction to automobiles & light duty Trucks	=	0.30%	0.30%

R1-T 6 Low Friction Engine Oils

This AB32 early action measure would increase vehicle efficiency by mandating the use of engine oils that meet certain low friction specifications. By 2020, this requirement will reduce emissions in California by approximately 2.8 $MMTCO_2e$, representing 1.7 percent of emissions from passenger light-duty vehicles in the State.

		2020	2030
Reduction to automobiles & light duty Trucks	=	1.70%	1.70%

R1-T 7 Cool Paints and Reflective Glazing

This AB32 early action measure is based on measures to reduce the solar heat gain in a vehicle parked in the sun. By 2020, this requirement will reduce emissions in California by approximately 0.89 $MMTCO_2e$, representing 0.6 percent of emissions from passenger/light-duty vehicles in the State.

		2020	2030
Reduction to automobiles & light duty Trucks	=	0.60%	0.60%

R1-T 8 Goods Movement Efficiency Measures

This AB32 early action measure targets system wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion. By 2020, this requirement will reduce emissions in California by approximately 3.5 $MMTCO_2e$, representing 1.6 Percent of emissions from all mobile sources (on-road and off-road) in the State.

		2020	2030
Reduction afforded to Medium and Heavy Duty Vehicle emissions	=	1.60%	1.60%

R1-T 9 Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)

This AB32 early action measure would increase heavy-duty vehicle (long-haul trucks) efficiency by requiring installation of best available technology and/or CARB approved technology to reduce aerodynamic drag and rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.93 $MMTCO_2e$, representing 1.9 percent of emissions from heavy-duty vehicles in the State.

Reduction afforded to Heavy Duty Vehicles emissions		2020	2030
	=	1.90%	1.90%

R1-T 10 Medium and Heavy Duty Vehicle Hybridization

The implementation approach for this AB 32 measure is to adopt a regulation and/or incentive program that reduce the GHG emissions of new trucks (parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks) sold in California by replacing them with hybrids. By 2020, this requirement will reduce emissions in California by approximately 0.5 $MMTCO_2e$, representing 0.2 percent of emissions from all on-road mobile sources in the State. This reduction is also equivalent to a 1.0 percent reduction of emissions from all heavy-duty trucks in the State.

Reduction afforded to all on-road mobile sources		2020	2030
	=	0.20%	0.20%

R2-T 1 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. A guaranteed ride home program is a program that ensures employees that take advantage of carpooling opportunities are guaranteed a safe ride home should the employee miss the carpool pick-up time due to work related activities. This could be as simple as the employer paying for taxi service for the employee. This measure would require employers with more than 100 employees within the unincorporated County to establish a trip reduction plan that would incorporate annual employee commute surveys, marketing of commute alternatives, ride matching assistance, and transit information at a minimum. This reduction measure adds to and enhances Mobility Policies 2.G-2 and 2.G-3.

The Sutter Pointe development, in addition to the above ordinance, and in accordance with its Master Air Quality Mitigation Plan (MAQMP), will provide the following services and programs that will enhance the reduction of VMT within this Specific Plan Area. The following elements of the Sutter Pointe MAQMP are included within R2-T1 because they will reduce GHG emissions and further the County's goal of achieving the reduction target:

- Sutter Pointe will create a Transportation Management Association (TMA) with the primary goal of providing alternative mode use programs and services to the residents, employers, and employees, as
- Employment of a Transportation Coordinator (TC) will be required for all commercial/industrial development with 500 or more employees. The primary role of the TC will be to act as a liaison between the TMA and their employer and employees to disseminate information and facilitate trip

Assumptions:

* By 2020, this measure results in a 0.2% reduction in passenger/light-duty VMT in the County.
* By 2030, this measure results in a 4% reduction in passenger/light-duty VMT in the County.
* The percentage reduction reflects a growing decentralized and geographically extensive transportation network in the County.
* Measures R1-T1 through R1-T7 are implemented

Reductions:

Reduction afforded to passenger/light duty VMT in county		2020	2030
	=	0.20%	4.00%

R2-T 2 Land Use Based trips and VMT Reduction Policies

The demand for transportation is influenced by the density and geographic distribution of people and places. Whether neighborhoods have sidewalks or bike paths, whether homes are within walking distance of shops or transit stops will influence the type and amount of transportation that is utilized. By changing the focus of land use from automobile centered transportation, a reduction in vehicle miles traveled will occur. Implementation of Policies LU1.2 (Balanced Land Use Pattern), LU1.3 (Adequate Land Use Supply), LU 3.5 (Infill Development), LU 3.9 (Rural Hubs), LU 3.12 (Mixed Use); Mobility Policies M 3.1 (Transit Service for Residents), M 3.2 (Transit in New Development), M 3.3 (Transit Integration); and Agricultural Policies AG 4.4 (Farm worker Housing), AG 4.6 (Local Processing), AG 4.7 (Local Purchasing), and AG 4.12 (Support Uses) will all work together to 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.

Assumptions:

* General Plan Policies: Land Use LU 1.2, 1.3, 3.5, 3,.9, 3.12, Mobility 2.C-1, 2.C-2, 2.C-3, and Agricultural policies AG4.4, AG 4.6, AG 4.7, and AG 4.12; are implemented and enforced with the planning of new development.
* In 2020, reduction in VMT is approximately 4% per year.
* In 2030, reduction in VMT is approximately 6% per year.
* Measures R2-T2, R2-T3, R2-T5, R2-T6, R2-T8, and R3-T1 are implemented.

Reductions:

Reduction afforded to passenger/light duty		2020	2030
VMT in county	=	4.00%	6.00%

R2-T 3 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. Incentives to encourage carpooling and the use of alternate transportation methods could include:

- Providing reserved preferential parking spaces for car-share, carpool, and ultra-low or zero emission vehicles;
- Provide larger parking spaces that can accommodate vans used for ride-sharing programs and reserve them for vanpools; and include adequate passenger waiting/loading areas;
- Consider restricting the number of parking spaces within the County by sharing parking among different land uses where feasible. For example in areas where there are multiple land uses provide resident restricted parking during nighttime hours (7pm to 7am) and open the parking lot
- Provide convenient pedestrian pathways through parking areas.

The development within the Sutter Pointe Specific Plan area requires, as part of the MAQMP, that developments with 100 or more employees provide the minimum required parking and develop the sites to facilitate alternate modes of transportation.

Assumptions:

* The percentage reduction reflects a growing decentralized and geographically extensive transportation network in the County.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T2 are implemented
* In 2020, reduction is equal to 0.1% from all vehicle miles traveled by passenger and light duty vehicles in the County.
* In 2030. reduction is equal to 0.88% from all vehicle miles traveled by passenger and light duty vehicles in the County.

Reductions:

Reduction afforded to passenger/light duty		2020	2030
VMT in county	=	0.10%	0.88%

R2-T 4

Roadway Improvements Including Signal Synchronization and Transportation Flow Management

This reduction builds on Mobility Goals M 1 and M 2, and Agricultural Policy AG 4.1 and supports (through the policies associated with those goals) modification of arterial roadways to promote and support multimodal transportation options for automobiles, transit, trucks,. In addition, this measure results in the maintenance of existing regional transportation systems to support the local, national, and global movement of agricultural products. These modifications include, but are not limited to, synchronization of signals, improvement of traffic flow, the development of parallel roadways, and support for the extension of freight rail into Sutter County's industrial areas.

Assumptions:

* In 2020, results in a 1% reduction in fuel consumption.
* In 2030, results in a 1.5% reduction in fuel consumption.
* A 1% reduction in fuel consumption is equal to a 1% reduction in VMT.
* A 1.5% reduction in fuel consumption is equal to a 1.5% reduction in VMT.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T3 are implemented

Reductions:

Reduction afforded to passenger/light duty VMT in county		2020	2030
	=	1.00%	1.50%

R2-T 5 Increase the Use of Ridesharing as an Alternative to Single Occupancy Vehicle Use

Mobility Implementation Programs M 3-A, M 3-B, and M 3-C promote 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. Encouraging community car-sharing through employers will further enhance the use of these services and support the underlying goal of reducing congestion and providing viable alternatives to automobile use. Further reductions in VMT could be obtained through assistance provided by a Transportation Management Agency (TMA). A TMA could oversee or provide assistance with the creation of rideshare incentives for employees such as gas cards, carpool awards, educational seminars, commuter-choice programs, commuter-tax benefits, guaranteed ride-home programs, commuter assistance and outreach, parking incentives, and the encouragement of telecommuting and compressed work weeks. This reduction measure will also be enhanced by the requirements of the MAQMP as discussed in R2-T1 above.

Assumptions:

* The percentage reduction reflects a growing decentralized and geographically extensive transportation network in the County.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T4 are implemented are implemented
* Results in a 0.1% reduction in vehicle miles traveled by passenger cars and light duty trucks in 2020.
* Results in a 3% reduction in vehicle miles traveled by passenger cars and light duty trucks in 2030.

Reductions:

Reduction afforded to passenger/light duty VMT in county		2020	2030
	=	0.10%	3.00%

R2-T 6 Provide a Comprehensive System of Facilities for Non-motorized Transportation

Mobility Goal M 5, and land use policies LU 1.10 (Efficient Land Use Patterns) and LU 4.8 (Quality New Development) require the County to address bicycle and pedestrian facilities. These goals and policies should: encourage the creation of bike lanes and walking paths directed to the location of schools, provide adequate bicycle parking; and encourage the development of bicycle stations, attended parking, and other attended bicycle support facilities at intermodal hubs. Bicycle stations are full-service bicycle facilities that in addition to providing secure, guarded bicycle parking could include other amenities such as "valet" bicycle service, showers, bicycle rentals, or repair services. These types of requirements are intended for large residential and non-residential development as well as large employers (500 or more employees). In addition, the establishment of multi-use trails that promote off-street bicycle and pedestrian travel as well as secure bicycle racks along these pathways will encourage their use.

The development within the Sutter Pointe Specific Plan area requires, as part of the MAQMP, bicycle and pedestrian connectivity where projects will be required to support bicycling and walking through providing amenities or incorporating convenient access to/within the project sites. Amenities and site design for these developments may include:

- Proximity to bike lanes;
- Elimination of impediments to bicycle and pedestrian circulation;
- Secure bicycle storage;
- Bicycle and pedestrian incentive programs; and
- Showers and lockers.

Assumptions:

* The percentage reduction reflects a growing decentralized and geographically extensive transportation network in the County.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T5 are implemented are implemented
* Results in a 0.02% reduction in 2020, and 0.07% reduction in 2030, in vehicle miles traveled by passenger cars and light duty trucks from the development of Sutter Pointe only. - Assumes that large residential, commercial, and industrial development will occur only in Sutter Pointe.

Reductions:

		2020	2030
Afforded Reduction	=	0.20%	0.20%
% passenger/light duty from Sutter Pointe	=	18.48%	34.47%
Reduction afforded to passenger/light duty VMT County	=	0.02%	0.07%

R2-T 7 Expand Renewable Fuel/Low-Emission Vehicle Use

Implementation of the following would promote the expanded use of renewable fuel and low-emission vehicles:

- Collaboration between local and regional governments and business to foster the increased use of renewable fuels. This can be accomplished by coordinating the siting of new alternative fueling/recharging locations for example.
- Providing preferential parking for ultra low-, zero- emission, and alternative fuel vehicles;
- Collaboration with energy providers to ensure the availability of necessary facilities and infrastructure to encourage the use of privately owned zero emission vehicles. This can be accomplished by having conveniently located charging and fueling stations for these vehicles.
- Provide incentives for taxicabs to use gas-electric hybrid vehicles or, at a minimum, smaller more fuel-efficient vehicles.

New developments within the Sutter Pointe Specific Plan area (as provided in the EIR for the area) will be required to provide the necessary facilities and infrastructure in all land use types to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations). In addition industrial and commercial land uses will require all forklifts, yard trucks, or vehicles that are predominantly used onsite at non-residential land uses to be electric-powered or powered by biofuels that are produced from waste products, or shall use other technologies that do not rely on direct fossil fuel consumption.

Assumptions:

* Results in a 2% increase in 2020, and a 3% increase in 2030, in average miles per gallon for passenger vehicles and light duty trucks.
* A 2 % increase in average miles per gallon is equal to a 2% reduction in VMT.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T6 are implemented are implemented

Reductions:

		2020	2030
Reduction afforded to passenger/light duty VMT County	=	2.00%	3.00%
Reduction from increase in alternative fuel use	=	N/A	4.00%
Reduction afforded to passenger/light duty VMT County	=	N/A	7.00%

R2-T 8 Transit Infrastructure Development within the Sutter Pointe Specific Plan

The Sutter Pointe Specific Plan EIR has included the following requirements regarding transportation. The inclusion of these requirements will facilitate the reduction of vehicle miles traveled and help to reduce greenhouse gas emissions throughout the County. A Conceptual Transit Plan has been developed for Sutter Pointe that includes plans for phased transit service which will begin as soon as 50 interested riders have been identified. There are four phases of transportation improvement within the Sutter Pointe development as follows:

- Phase 1 will extend past 2020 based on anticipated residential development. The primary focus of this phase is for the TMA to facilitate or develop and market rideshare initiatives including car and vanpool programs, commuter bus services, incorporation of transit stops for the Yuba-Sutter Transit system, and Airporter services to and from Sacramento International Airport.
- Phase 2 of the Sutter Pointe Transit Plan would incorporate an expansion of Sutter Pointe Transit Commuter Express Service.
- Phase 3 would increase Sacramento commuter service capacity, expand commuter service to Placer County, establish midday service to Sacramento and provide commute services to the Sutter Pointe Business Park from adjacent communities. With warranted demand, dedicated peak hour trips serving the Sutter Pointe business and industrial parks could be added from the Yuba City/Marysville area.
- Phase 4 would incorporate further expansion of the Sutter Pointe commuter bus services to Sacramento and Placer County, develop local transit services, and expand neighboring regional transit services.

Assumptions:

* Results in a 2.00% reduction in worker trips in 2020, and 5% reduction in 2030, from the Sutter Pointe development.
* Assumes ~32% of workers in 2020, and ~48% of workers in 2030, will be from the Sutter Pointe development.
* Assumes that ~34% of Conseptual Transit Plan Phase 1 is implemented by 2020, and 100% is built out by 2030.
* Measures R1-T1 through R1-T7 and R2-T1 - R2-T7 are implemented are implemented

Reductions:

		2020	2030
Afforded Reduction	=	2.00%	5.00%
% workers from Sutter Pointe		32.15%	48.20%
% of Phase 1 implemented	=	34.34%	100.00%
Reduction afforded to passenger/light duty VMT County	=	0.22%	2.41%

Energy Reduction Measures

R1-E 1 Renewable Portfolio Standard for Building Energy Use

Senate Bills (SBs) 1075 (2002) and 107 (2006) created the State's Renewable Portfolio Standard (RPS), with an initial goal of 20 percent renewable energy production by 2010. Executive Order (EO) S-14-08 establishes a RPS target of 33 percent by the year 2020 and requires State agencies to take all appropriate actions to ensure the target is met. The 33 percent RPS by 2020 goal is supported by the California Air Resources Board (CARB), though its feasibility is not certain due to current limitations in production and transmission of renewable energy.

Assumptions:

* PG&E reaches it 33% goal for 2020.
* Assumes that in 2008 PG&E's renewable portfolio was at 12% with respect to California's RPS.
* Assumes a 21% reduction in emissions from existing kWHs used.
* Assumes R1-E2 through R1-E6 have been implemented.

Reductions:

		2020	2030
% Reduction Afforded	=	21.00%	21.00%

R1-E 2 & 3 AB1109 Energy Efficiency Standard for Lighting

Assembly Bill (AB1109) mandated that the California Energy Commission (CEC) on or before December 31, 2008, adopt energy efficiency standards for general purpose lighting. These regulations, combined with other State efforts, shall be structured to reduce State-wide electricity consumption in the following ways:

- R1-E2: At least 50 percent reduction from 2007 levels for indoor residential lighting by 2018; and
- R1-E3: At least 25 percent reduction from 2007 levels for indoor commercial and outdoor lighting by 2018.

Assumptions:

* Assumes 20% of residential electrical use is from lighting.
* Assumes 37.14% of commercial/industrial electrical usage is from lighting.
* No data was available to determine outdoor lighting use, therefore no reduction was taken.

Reductions:

		2020	2030
% reduction from residential electrical use	=	10.00%	10.00%
% reduction from commercial/industrial electrical use	=	9.29%	9.29%

R1-E 4 Electrical Energy Efficiency

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the County's adopted Green Building ordinance (effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 21.3 $MMTCO_2e$, representing 17.5 percent of emissions from all electricity in the State. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);

- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

* The percent reduction from California's emissions from various energy efficiency measures is equal to the County's emissions from this measures or 17.5%.
* Assumes application only to New development

Reductions:

		2020	2030
% reduction afforded	=	17.50%	17.50%
% of 2020 from growth	=	38.56%	38.56%
% reduction applied	=	6.75%	6.75%
% reduction afforded in 2030	=	N/A	11.31%
% of 2030 growth from 2020	=	N/A	35.99%
% reduction from 2030 growth	=	N/A	4.07%
% reduction applied	=	N/A	10.82%

R1-E 5 Natural Gas Energy Efficiency

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the County's adopted Green Building ordinance(effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 4.3 $MMTCO_2e$, representing 6.2 percent of emissions from all natural gas combustion in the State. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

* The percent reduction from California's emissions from various energy efficiency measures is equal to the County's emissions from this measures or 6.2%.
* Assumes application only to New development

Reductions:

		2020	2030
% reduction afforded	=	6.20%	
% of 2020 from growth	=	38.56%	
% reduction applied	=	2.39%	
% reduction afforded in 2030	=	N/A	2.20%
% of 2030 growth from 2020	=	N/A	35.99%
% reduction from 2030 growth	=	N/A	0.79%
% reduction applied	=	N/A	3.18%

R1-E 6 Increased Combined Heat and Power

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power activities, as outlined in CARB's AB32 Scoping Plan. The Scoping Plan suggests that increased combined heat and power systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 GWh State-wide in 2020. Approaches to lowering market barriers include utility-provided incentive payments, a possible CHP portfolio standard, transmission and distribution support systems, or the use of feed-in tariffs. By 2020, this requirement will reduce emissions in California by approximately 6.7 $MMTCO_2e$, representing 7.6 percent of emissions from all electricity in the State.

Assumptions:

* The percent reduction from California's emissions is equal to the County's emissions from this measures or 7.6%.

Reductions:

		2020	2030
% reduction afforded	=	7.60%	7.60%

R1-E 7 Industrial Efficiency Measures

This measure captures the reduction in industrial building energy emissions associated with the energy efficiency measures for industrial sources included in CARB's AB32 Scoping Plan. By 2020, this requirement will reduce emissions in California by approximately 1.0 $MMTCO_2e$, representing 3.9 percent of emissions from all industrial natural gas combustion in the State. CARB proposes the following possible State-wide measures:

- Oil and gas extraction;
- GHG leak reduction from oil and gas transmission;
- Refinery flare recovery process improvements; and
- Removal of methane exemption from existing refinery regulations.

Assumptions:

* The percent reduction from California's emissions is equal to the County's emissions from this measures or 3.9%.
* Assumes applies to all residential, commercial, and industrial land uses.

Reductions:

		2020	2030
% reduction afforded	=	3.90%	3.90%

R1-E 8 Renewable Portfolio Standard (33% by 2020) Related to Water Supply and Conveyance

This measure would increase electricity production from eligible renewable power sources to 33 percent by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 $MMTCO_2e$, representing 15.2 percent of emissions from electricity generation (in-State and imports).

Assumptions:

* The percent reduction from California's emissions is equal to the County's emissions from electricity used for water supply and conveyance or 21%.
* Assumes applies to all residential, commercial, and industrial land uses.

Reductions:

		2020	2030
% reduction afforded	=	21.00%	21.00%

R2-E 1 Residential Energy Efficiency Program

This measure involves the adoption of a program that facilitates energy efficient design for all new residential buildings within the Sutter Pointe Specific Plan to be 20% beyond the current Title 24 Standards which will implement the new development requirements set forth in the Sutter Pointe Specific Plan EIR. This energy efficiency requirement for the Sutter Pointe Specific Plan is equal to that of the LEED for Homes and ENERGY STAR programs.

The 2008 Title 24 Energy Standards were adopted by the Energy Commission on April 23, 2008, with the 2008 Residential Compliance Manual adopted by the Commission on December 17, 2008. Compliance with the 2008 standards went into effect January 1, 2010. In an effort to meet the overall goal of the California Energy Efficiency Strategic Plan of reaching zero net energy for residential buildings by 2020, the stringency of the Title 24 Energy Standards as regulated and required by the State will continue to increase every three years. As energy efficiency standards increase the County may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

As described in the Sutter Pointe Specific Plan DEIR and to facilitate the implementation of this program, the County could provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment prior to design development. The developer will then submit to the County a mitigation report demonstrating which of the proposed reduction measures are feasible as well as why the unselected measures are infeasible. The County will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- Use features that incorporate natural ventilation;
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in buildings design and layouts.

Sutter Pointe is implementing a pilot solar program which will offer solar as a standard feature on a percentage of homes in the Phase 1 development stage and as an upgrade for all homes. Given the success of the program it will be continued through the additional phases of the specific plan development.

Residential developments within the unincorporated portions of Sutter County that are not within the Sutter Pointe Specific Plan are encouraged to participate in the volunteer Residential Energy Efficiency Program. This volunteer program would set a minimum goal of achieving energy efficiency of 5% greater than current Title 24 Standards. Incentives to participate in this volunteer program include prioritization and streamlining of the application process for residential projects that achieve the minimum goal. The County will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (33 points) the developer will meet the requirements of this measure. This system will assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the strategies outlined in the bullet points above.

Assumptions:

- Applies to new development only.
- Assumes new development within Sutter Pointe to be 20% beyond current Title 24.
- Assumes new development within the remainder of Unincorporated County to be 10% beyond current Title 24.

Reductions:

		2020	2030
% 2020 residential growth	=	35.66%	52.71%
% of new residential development from Sutter Pointe	=	47.85%	33.60%
% new development from Sutter Pointe	=	17.06%	34.47%
% Development from Unincorporated County	=	18.60%	18.24%
% reduction afforded to Sutter Pointe	=	20.00%	20.00%
% reduction afforded to Unincorporated County	=	5.00%	10.00%
% reduction from Sutter Pointe	=	3.41%	6.89%
% reduction from Unincorporated County	=	0.93%	1.82%
Reduction from growth between 2008 and 2020	=	N/A	4.34%
Total % reduction	=	4.34%	13.06%

R2-E 2 Residential Renewable Energy Program

This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments. For participating developments, renewable energy application should be such that the new home's projected energy use from the grid is reduced by 50%. The California Energy Commissions' New Solar Homes Partnership is a component of the California Solar Initiative and provides rebates to developers of 6 or more units where 50% of the units include solar power. In addition this measure would encourage that all residents be equipped with "solar ready" features where feasible, to encourage future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20^{O} to 55^{O} from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. The incentive program should provide enough funding and other incentives as shown in the R3 measures to result in approximately fifty percent of new residential development participation in this program, thereby resulting in a 25% reduction in electrical consumption from new residential developments.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into a purchased energy offset program that will allow for the purchase of electricity generated from renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal to 25% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

* Applies to new development only.
* Assumes that 50% of new development will participate.
* Assumes that those developments participating will reduce electrical use by 50%.

Reductions:

		2020	2030
% 2020 residential growth	=	35.66%	52.71%
% reduction from energy use	=	25.00%	25.00%
Total % reduction	=	8.91%	13.18%

R2-E 3 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. AB 811 is a potential funding source to the County for implementing incentive programs to encourage residences within the County to undertake energy efficiency retrofitting and reducing energy consumption in retrofitted homes by a minimum of 15%. As with the new development, the County will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will be provided to assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

Assumptions:

* Applies to existing development only.
* Assumes that 25% of existing development will participate.
* Assumes that those developments participating will increase efficiency by 15%.
* Assumes reduction from electrical and natural gas.

Reductions:		2020	2030
% of 2020 that is existing residential development	=	64.34%	47.29%
% reduction applied	=	15.00%	15.00%
% existing homes participating	=	5.00%	25.00%
Total % reduction	=	0.48%	1.77%

R2-E 4 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.

Assumptions:

* Applies to existing development only.
* Assumes that 25% of existing development will participate.
* Assumes that those developments participating will reduce emissions from electricity by 50%.
* Assumes reduction from electricity.

Reductions:		2020	2030
% of 2020 that is existing residential development	=	64.34%	47.29%
% reduction applied	=	50.00%	50.00%
% existing homes participating	=	5.00%	25.00%
Total % reduction	=	1.61%	5.91%

R2-E 5 Commercial Energy Efficiency Program

This measure involves the adoption of a County Program that facilitates the energy efficient design for all new commercial buildings within Sutter Pointe to be 20% beyond the current Title 24 Standards which expands the new development requirements set forth in the Sutter Pointe Specific Plan EIR. This voluntary energy efficiency requirement is 10% greater than the minimum requirements of the LEED and ENERGY STAR programs. As energy efficiency standards increase the County may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

As described in R2-E1 above, the County could provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment. The County will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (100 points) the developer will meet the requirements of this measure. This system will provide flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- Use features that incorporate natural ventilation;
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in buildings design and layouts.

The Sutter Pointe Specific Plan requires all non-residential buildings (25,000 sq feet or more) to install Energy Star (or equivalent) cool roofing systems and energy efficient furnaces. These features are intended to reduce energy consumption for non-residential projects.

Commercial developments within the unincorporated portions of Sutter County that are not within the Sutter Pointe Specific Plan are encouraged to participate in the volunteer Commercial Energy Efficiency Program. This volunteer program would set a minimum goal of achieving energy efficiency of 5% greater than current Title 24 Standards. Incentives to participate in this volunteer program include prioritization and streamlining of the application process for commercial projects that achieve the minimum goal. The County will develop a menu of options with points assigned to them. As long as a developer meets the required point allotment (33 points) the developer will meet the requirements of this program. This system will assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the strategies outlined in the bullet points above.

Assumptions:

- Applies to new development only.
- Assumes new development within Sutter Pointe to be 20% beyond current Title 24.
- Assumes new development within the remainder of Unincorporated County to be 10% beyond current Title 24.

Reductions:		2020	2030
% new com/ind development that is commercial	=	16.63%	32.58%
% of new commercial development from Sutter Pointe	=	28.13%	42.93%
% new development from Sutter Pointe	=	4.68%	62.88%
% Development from Unincorporated County	=	11.95%	37.12%
% reduction afforded to Sutter Pointe	=	20.00%	20.00%
% reduction afforded to Unincorporated County	=	5.00%	10.00%
% reduction from Sutter Pointe	=	0.94%	12.58%
% reduction from Unincorporated County	=	0.60%	3.71%
Reduction from growth between 2008 and 2020	=	N/A	1.53%
Total % reduction	=	1.53%	17.82%

R2-E 6 Commercial/Industrial Renewable Energy Program

This measure would facilitate the voluntary incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation shall be incorporated such that a minimum of 20% of the project's total energy needs are offset. In addition this measure would encourage all facilities be equipped with "solar ready" features where feasible, to facilitate future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20^{O} to 55^{O} from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into an offset program that will allow for the purchase of renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

* Applies to new development only.
* Assumes that 25% of new development will participate in 2020, and 35% in 2030.
* Assumes that those developments participating will reduce electrical use by 20%.

Reductions:

		2020	2030
% of com/ind development from growth	=	60.47%	47.43%
% reduction from program	=	20.00%	20.00%
% of participation	=	5.00%	35.00%
Total % reduction	=	0.60%	3.32%

R2-E 7 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%. As with the new development, a menu of options will be provided to assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

Assumptions:

* Applies to existing development only.
* Assumes that 25% of existing development will participate in 2020, and 35% in 2030.
* Assumes that those developments participating will increase efficiency by 20%.
* Assumes reduction from electrical and natural gas.

Reductions:

		2020	2030
% from existing com/ind development	=	39.53%	39.33%
% reduction applied	=	20.00%	20.00%
% of participation	=	5.00%	35.00%
Total % reduction	=	0.40%	2.75%

R2-E 8 Agricultural Alternative Energy Programs

This program combines Agricultural Draft 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.

Assumptions:

* Applies to agricultural development only.
* Program furthers success of commercial/industrial energy efficiency measures.
* Assumes no reduction specific to this program. Reduction included in Electrical and natural gas usage from commercial and industrial usage.
* Utilities classify agricultural usage with the non-residential or commercial/industrial uses. Therefore this measure is quantified by applying the reduction to the fraction of the non-residential consumption that is associated with agricultural use.

R2-E 9 Water Use Reduction Initiative

This initiative would reduce emissions associated with electricity consumption for water treatment and reduction and therefore are included with the energy reductions. 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 percent per capita. The County's adoption of a water use reduction goal would introduce requirements for new development and would provide cooperative support for water purveyors that are required to implement these reductions for existing developments. The County would also provide internal reduction measures such that County facilities will support this reduction requirement. The following represent potential programs that can be implemented to attain this reduction goal.

Water Conservation Program:

Under this program the excessive watering of landscaping, excessive fountain operation, watering during peak daylight hours, water of non-permeable surfaces, excessive water use for noncommercial washing, and water use resulting in flooding or runoff would be prohibited. In addition the program would encourage efficient water use for construction activities, the installation of low-flow toilets and showerheads for all new developments, use of drought-tolerant plants with efficient landscape watering systems for all new developments, recycling of water used for cooling systems, use of pool covers, and the posting of water conservation signage at all hotels.

Sutter Pointe Water Conservation and Efficiency Requirement

Under the provisions in the Sutter Pointe Specific Plan EIR, new developments within the Sutter Pointe Specific Plan area are required to adhere to the following water conservation and efficiency measures:

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought resistant species in all public areas and commercial landscaping. Use water-efficient turf in parks and other turf-dependant spaces;
- Install the infrastructure to use reclaimed water for landscape irrigation and/or washing cars;
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls;
- Design buildings and lots to be water efficient. Only install water-efficient fixtures and appliances;
- Restrict water methods (prohibit systems that apply water to non-vegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces;
- Provide education about water conservation and available programs and incentives; and
- Construct driveways to single family detached residences, multi-family residences and parking lots with pervious surfaces.

New Development Incentives:

Provide incentives for developers to comply with the California Green Building Standards Code as requirements for all new development. Under this Code new developments are required to reduce indoor potable water use by 20% beyond the Energy Policy Act of 1992 fixture performance requirements, and to reduce outdoor potable water use by 50% from a mid-summer baseline average consumption through irrigation efficiency, native plant selection, the use of recycled water and/or captured rainwater for example.

Water Meter Program:

Encourage water providers to install water meters for all County homes not using wells. This would provide for a better accounting of County water usage and provide potential costing per usage to help offset costs of the implementation of water conservation programs.

Water Efficiency Pricing Program

Under this program, the County would encourage water suppliers to adopt a water conservation pricing schedule (i.e. tiered rate) to encourage efficient water use. Notices could be provided in each billing showing water use budgets and the relationship between the budget and the actual usage.

Water Efficiency Retrofit Program:

This program would encourage upgrades in water efficiency for renovations or additions of residential, commercial, office, and industrial properties equivalent to that of new developments. The County would work with local water purveyors to achieve consistent standards, and to develop, approve, and review procedures for implementation.

Water Efficiency Training and Education:

Under this measure the County, in coordination with local water purveyors would implement a public information and education program that promotes water conservation. The program could include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping.

Increased Recycled Water Use:

Promote the use of municipal wastewater and graywater for agricultural, industrial and irrigation purposes. This measure would be subject to approval of the State Health Department and compliance with Title 22 provisions. This measure would facilitate the following:

- Inventory of non-potable water uses that could be substituted with recycled or graywater;
- Determination of the feasibility of producing and distributing recycled water for groundwater replenishment;
- Determine the associated energy/GHG tradeoffs for treatment/use vs. out of basin water supply usage; and
- Cooperation and coordination with responsible agencies to encourage the use of recycled water where energy tradeoffs are favorable.

Assumptions:

- Applies to all land uses (existing and new development)
- Assumes emission reduction of 20% in 2020, and 30% in 2030.
- Assumes reduction to electricity used to treat and convey water and wastewater.
- Assumes that approximately 14% of the electricity usage is used to pump water from wells in 2020, and 10% in 2030.

Reductions:

		2020	2030
% reduction applied to water usage directly	=	20.00%	30.00%
% of electricity from water pumps	=	15.26%	10.61%
% reduction applied to electricity:	=	3.05%	3.18%

Solid Waste Reduction Measures

R1-W 1 Waste Measures

The CARB AB32 Scoping Plan recommends three measures for reducing emissions from Municipal Solid Waste at the State level, including: 1) landfill methane control; 2) increase the efficiency of landfill methane capture; and 3) high recycling/zero waste. CARB is in the process of developing a discrete early action program for methane recovery (1), likely to be adopted in early 2010. This measure is expected to result in a 1.0 $MMTCO_2e$ reduction by 2020. Other measures proposed by CARB include increasing efficiency of landfill methane capture (2) and instituting high recycling/zero waste policies (3). Potential reductions associated with these measures are still to be determined. CARB estimates a preliminary one-time cost for adoption of these measures to be approximately $70 per ton of CO_2 reduced. Capital cost is estimated to be approximately $3,440,000 and annual operation cost is estimated to be approximately $706,400 per landfill. Total industry cost estimates will be evaluated further in the staff report for the landfill methane control measure.

Assumptions:

* Currently Not Quantified because complete life cycle emissions vs. reductions are unknown.

R2-W 1 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. The following is a potential list of waste reduction measures that will further strengthen existing waste reduction/diversion programs.

- Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing County diversion programs;
- Increase disposal fees and/or reduce residential pick-up frequency;
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, recyclable, or compostable;
- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products;
- Expand list of recyclable materials;
- Work with Recology to develop and provide waste audits;
- Make recycling and composting opportunities mandatory at all public events;
- Establish an appliance end-of-life requirement;
- For new developments, require the use of recycled-content materials, or recycled materials;
- Require a minimum of 15% of materials used in construction be sourced locally, as feasible; and
- Encourage the use of recycled building materials and cement substitutes for new developments.

Assumptions:

* Applies to existing and future development not associated with Sutter Pointe.
* Assumes an existing diversion rate of 50%
* Assumes 2020 goal of 75% diversion rate and 80% in 2030.
* Does not apply to construction activities

Reductions:		2020	2030
% of development in 2020 that existed in 2008	=	61.44%	39.33%
% waste from non-Sutter Pointe uses	=	20.88%	26.72%
% reduction applied	=	25.00%	30.00%
% not from construction activities	=	71.00%	71.00%
% reduction applied to Existing	=	10.91%	8.38%
% reduction applied to non-Sutter Pointe new	=	3.71%	5.69%
% reduction applied	=	14.61%	14.07%

R2-W 2 County Diversion Program

This reduction measure would encourage a diversion of 60% of construction waste by 2020. This provides a 10% increase in diversion beyond AB2176, § 42911, that requires development projects to provide adequate areas for collecting and loading recyclable materials and ensures a 50% diversion rate prior to being issued a building permit.

Assumptions:

* Applies to new development
* Assumes an existing diversion rate of 50%
* Assumes 2020 goal of 60% diversion rate, and 70% in 2030.
* Only applies to construction activities

Reductions:

	2020	2030
% waste from Construction Activities	29.00%	29.00%
% reduction	10.00%	20.00%
% reduction applied	2.90%	5.80%

R2-W 3 Sutter Pointe Solid Waste Reduction Measures

All development within the Sutter Pointe Specific Plan area would be required to abide by the following solid waste reduction measures:

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard);
- Provide interior and exterior storage areas for recyclables and green waste at all buildings;
- Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development; and
- Provide education and publicity about reducing waste and available recycling services.

Assumptions:

* Applies to Sutter Pointe only.
* Assumes all development meets the existing 50% diversion rate.
* Assumes 2020 goal of 75% diversion rate, and 80% in 2030.
* Assumes reduction from construction activities accounted for in R2-W2.
* Assumes R2-W1 is implemented.

Reductions:

	2020	2030
% waste from Sutter Pointe	17.68%	33.95%
% reduction	25.00%	30.00%
% reduction applied	4.42%	10.19%

Industrial Reduction Measures

R1-I 1 Oil and Gas Extraction Combustion Related GHG Emission Reduction

This AB 32 measure would reduce combustion emissions from oil and gas extraction. By 2020, this requirement will reduce emissions in California by approximately 1.8 MMTCO2e, representing 13 percent of combustion emissions from oil and gas extraction in the State.

Reductions:

	2020	2030
% reduction applied	13.00%	13.00%

R1-I 2 Stationary Internal Combustion Engine Electrification

This AB 32 measure would affect owners and operators of industrial and commercial engines over 50 horsepower used as primary power sources by replacing internal combustion engines with electric motors. By 2020, this requirement will reduce emissions in California by approximately 0.3 $MMTCO_2e$, representing 0.5 Percent of combustion emissions from industrial sources (non-coal) in the State.

Reductions:	2020	2030
% reduction applied	0.50%	0.50%

Agricultural Reduction Measures

R1-A 1 Methane Capture at Large Dairies

This is an AB 32 voluntary measure to encourage the installation of methane digesters to capture methane emissions at large dairies. By 2020, this requirement will reduce emissions in California by approximately one (1) $MMTCO_2$ representing 7.8 percent of CH_4 and N_2O emissions from manure management and enteric fermentation at dairies in the State.

Assumptions:

* All cows reported are from large dairies.
* Assumes no methane capture systems were in place in 2008
* Assumes reductions are to methane and nitrous oxide emissions.

Reductions:	2020	2030
% reduction applied	7.80%	7.80%

R2-A 2 Agricultural Water Management

Encourage 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. Further, this would encourage the County to explore the feasibility of and promote water management. This measure enhances the Agricultural policies AG 3.1 (Efficient Water Management), 3.2 (Water Conservation and Recycling), 3.3 (Water Quality and Quantity), and 3.5 (Groundwater Resources).

Assumptions:

* Agricultural Water Use is included in the water use for the County under commercial/industrial uses.
* Assumes this measure fosters and improves the success of water reduction measure R2-E9.
* Assumes reductions are accounted for in reduction taken from R2-E9. No additional reduction applied.

Appendix H:2020 Reduced URBEMIS Output and GHG Calculations

Sutter County
Emissions by Land Use
2020
Reduced Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/RAN/ER	160,827.23	4,882.60	5,533.60	171,243
	Low Density Residential	85,421.84	2,593.33	2,939.10	90,954
	Medium Density Residential	30,471.10	925.15	1,044.35	32,441
	High Density Residential	12,364.03	375.40	423.77	13,163
	Total Residential	289,084.20	8,776.48	9,940.82	**307,801**
Commercial	Park	95.99	1.73	1.94	100
	Commercial	63,031.78	1,147.84	1,291.92	65,472
	Mixed Use	9,847.92	179.32	201.83	10,229
	Total Commercial	73,127.52	1,331.58	1,496.31	**75,955**
Industrial	Industrial	146,254.57	2,688.46	3,131.45	152,074
	Total Industrial	146,254.57	2,688.46	3,131.45	**152,074**
Agriculture		0.00	192,880.80	559,858.41	752,739
	Total	**508,466.29**	**205,677.32**	**574,426.99**	**1,288,571**

Sutter County
Emissions by Source
2020
Reduced Inventory
By Source

Transportation		
	Source:	**Metric tons of CO_2e**
1	On-Road Vehicles	348,058
2	Airport Operations	155
	Total	**348,213**

Energy		
	Sources:	**Metric tons of CO_2e**
1	Electric	46,600
2	Natural Gas	131,623
	Total	**178,223**

Solid Waste		
	Source	**Metric tons of CO_2e**
1	Solid Waste Disposal	9,359
2	Green Waste Recycling	Data Not Available
3	Materials Recycling	Data Not Available
	Total	**9,359**

Landscape Emissions		
	Sources:	**Metric tons of CO_2e**
1	Landscape Emissions	36
2	Carbon sink from CO_2 sequestration	Data Not Available
	Total	**36**

Agriculture		
	Sources:	**Metric tons of CO_2e**
1	Enteric Fermentation	22,572
2	Manure Management	27,515
3	Rice Cultivation	142,346
4	Agricultural Residue Burning	3,011
5	Crop Growth	378,097
6	Animals and Runoff	77,806
7	Fertilizer Use	101,392
	Total	**752,739**

Net Total Emissions	
Category	**Metric tons of CO_2e**
Energy	178,223
Solid Waste	9,359
Landscape Emissions	36
Agriculture	752,739
Transportation	348,213
Total	**1,288,571**

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Carbon Dioxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	457,219.54	35.57	15,710.48

Transportation Emission Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6
Passenger & Light Duty Vehicles		17.30%	2.50%	6.90%	0.30%	0.30%	1.70%
Medium Duty Vehicles	**Unmitigated**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	377,663.34	312,327.58	304,519.40	283,507.56	282,657.03	281,809.06	277,018.31
Medium Duty Vehicles	48,922.49	48,922.49	48,922.49	48,922.49	48,922.49	48,922.49	48,922.49
Heavy Duty Vehicles	30,633.71	30,633.71	30,633.71	30,633.71	30,633.71	30,633.71	30,633.71

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.20%		0.20%
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	1.60%	1.90%	0.20%		0.00%
Passenger & Light Duty Vehicles	277,018.31	275,356.20	275,356.20	275,356.20	274,805.49		274,255.88
Medium Duty Vehicles	48,922.49	48,922.49	48,139.73	48,139.73	48,043.45		48,043.45
Heavy Duty Vehicles	30,633.71	30,633.71	30,143.57	29,570.84	29,511.70		29,511.70

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7
Passenger & Light Duty Vehicles		4.00%	0.10%	1.00%	0.10%	0.02%	2.00%
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	274,255.88	263,286.74	263,023.45	260,393.22	260,132.82	260,080.80	254,879.18
Medium Duty Vehicles	48,043.45	48,043.45	48,043.45	48,043.45	48,043.45	48,043.45	48,043.45
Heavy Duty Vehicles	29,511.70	29,511.70	29,511.70	29,511.70	29,511.70	29,511.70	29,511.70

		R2-T 8						
Passenger & Light Duty Vehicles		0.22%					**Reduced**	
Medium Duty Vehicles		0.00%					**MT/yr**	**%**
Heavy Duty Vehicles	**MT/yr**	0.00%					**(ECele)**	**Reduction**
Passenger & Light Duty Vehicles	254,879.18	254,316.39					254,316	**32.66%**
Medium Duty Vehicles	48,043.45	48,043.45					48,043	**1.80%**
Heavy Duty Vehicles	29,511.70	29,511.70					29,512	**3.66%**
Reduced Total (MT/yr)							**331,872**	**27.42%**
Unmitigated Total (MT/yr)							**457,220**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Carbon Dioxide

Airport Fuel Emission Reductions

(U_{AAF})	Unmitigated MT/yr (E_{CWD})						Reduced MT/yr (ECele)	% Reduction
Reductions								
Annual Fuel Usage	151.84						151.84	0.00%

A4. Stationary Sources (Natural Gas) Emission Reductions

Unit Type		R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Multi Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Commercial Reduction	Unmitigated	2.39%	3.90%	0.00%	0.00%	1.53%	0.40%
Industrial Reduction	MT/yr	2.39%	3.90%	0.00%	0.00%	0.00%	0.40%
AG/RAN/ER	21,197.79	20,691.03	19,884.08	19,020.73	18,928.94	18,928.94	18,928.94
Low Density Residential	11,258.65	10,989.50	10,560.91	10,102.36	10,053.61	10,053.61	10,053.61
Medium Density Residential	4,016.81	3,920.78	3,767.87	3,604.27	3,586.88	3,586.88	3,586.88
High Density Residential	1,629.66	1,590.70	1,528.67	1,462.29	1,455.23	1,455.23	1,455.23
Park	40.60	39.63	38.09	38.09	38.09	37.50	37.35
Commercial	26,353.15	25,723.15	24,719.95	24,719.95	24,719.95	24,340.85	24,244.62
Mixed Use	4,117.74	4,019.30	3,862.55	3,862.55	3,862.55	3,803.31	3,788.28
Industrial	63,910.41	62,382.56	59,949.64	59,949.64	59,949.64	59,949.64	59,712.63

Unit Type		R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction	MT/yr (E_{Cng})	13.00%	0.50%					
AG/RAN/ER	18,928.94	18,928.94	18,928.94				18,929	10.70%
Low Density Residential	10,053.61	10,053.61	10,053.61				10,054	10.70%
Medium Density Residential	3,586.88	3,586.88	3,586.88				3,587	10.70%
High Density Residential	1,455.23	1,455.23	1,455.23				1,455	10.70%
Park	37.35	37.35	37.35				37	8.00%
Commercial	24,244.62	24,244.62	24,244.62				24,245	8.00%
Mixed Use	3,788.28	3,788.28	3,788.28				3,788	8.00%
Industrial	59,712.63	51,949.99	51,690.24				51,690	19.12%
Total Reduced (MT/yr)							**113,785**	**14.14%**
Total Unmitigated (MT/yr)	**132,524.81**							

Sutter County
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B. Indirect Sources

B1. Electricity Emission Reductions

Unit Type		R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Multi Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Commercial Reduction	Unmitigated	21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
Industrial Reduction	MT/yr (E_{Cele})	21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
AG/RAN/ER	16,071.06	12,696.14	11,426.52	10,655.49	9,845.68	9,418.18	8,578.64
Low Density Residential	8,535.72	6,743.22	6,068.90	5,659.39	5,229.27	5,002.22	4,556.32
Medium Density Residential	3,045.34	2,405.82	2,165.24	2,019.13	1,865.68	1,784.67	1,625.58
High Density Residential	1,235.52	976.06	878.45	819.18	756.92	724.06	659.51
Park	23.14	18.28	16.45	15.34	14.18	14.18	14.18
Commercial	15,016.84	11,863.30	10,676.97	9,956.52	9,199.83	9,199.83	9,199.83
Mixed Use	2,346.42	1,853.67	1,668.30	1,555.73	1,437.50	1,437.50	1,437.50
Industrial	36,418.12	28,770.31	26,098.99	24,337.91	22,488.23	22,488.23	22,488.23

Unit Type		R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	
Single Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%	
Multi Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%	
Commercial Reduction		0.00%	0.00%	1.53%	0.60%	0.40%	
Industrial Reduction	MT/yr (E_{Cele})	0.00%	0.00%	0.00%	0.60%	0.40%	
AG/RAN/ER	8,578.64	8,537.24	8,399.91	8,399.91	8,399.91	8,399.91	
Low Density Residential	4,556.32	4,534.33	4,461.39	4,461.39	4,461.39	4,461.39	
Medium Density Residential	1,625.58	1,617.74	1,591.72	1,591.72	1,591.72	1,591.72	
High Density Residential	659.51	656.33	645.77	645.77	645.77	645.77	
Park	14.18	14.18	14.18	13.96	13.87	13.82	
Commercial	9,199.83	9,199.83	9,199.83	9,058.74	9,003.97	8,968.37	
Mixed Use	1,437.50	1,437.50	1,437.50	1,415.45	1,406.89	1,401.33	
Industrial	22,488.23	22,488.23	22,488.23	22,488.23	22,352.25	22,263.88	

Unit Type		R2-E 9					Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		3.05%						
Multi Family Residential Reduction		3.05%						
Commercial Reduction		3.05%						
Industrial Reduction	MT/yr (ECele)	3.05%						
AG/RAN/ER	8,399.91	8,143.55					8,144	49.33%
Low Density Residential	4,461.39	4,325.23					4,325	49.33%
Medium Density Residential	1,591.72	1,543.14					1,543	49.33%
High Density Residential	645.77	626.06					626	49.33%
Park	13.82	13.40					13	42.10%
Commercial	8,968.37	8,694.66					8,695	42.10%
Mixed Use	1,401.33	1,358.56					1,359	42.10%
Industrial	22,263.88	21,584.40					21,584	40.73%
Reduced total (MT/year)							**46,289**	**44.02%**
Unmitigated total (MT/year)							**82,692**	

Sutter County
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B2. Potable Water Emission Reductions

Unit Type	Unmitigated MT/yr	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	20.00%					
Multi Family Residential Reduction		21.00%	20.00%					
Commercial Reduction		21.00%	20.00%					
Industrial Reduction		21.00%	20.00%					
AG/RAN/ER	23.49	18.56	14.85				14.85	36.80%
Low Density Residential	12.48	9.86	7.89				7.89	36.80%
Medium Density Residential	0.02	0.02	0.01				0.01	36.80%
High Density Residential	0.01	0.01	0.01				0.01	36.80%
Park	0.00	0.00	0.00				0.00	0.00%
Commercial	0.67	0.53	0.42				0.42	36.80%
Mixed Use	0.10	0.08	0.06				0.06	36.80%
Industrial	1.62	1.28	1.02				1.02	36.80%
Reduced total (MT/year)							**24**	**36.80%**
Unmitigated total (MT/year)							**38**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	Unmitigated MT/yr	R1-E 1	R2-W 1	R2-W 2	R2-W 3		Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		21.00%	14.61%	2.90%	4.42%			
Multi Family Residential Reduction		21.00%	14.61%	2.90%	4.42%			
Commercial Reduction		21.00%	14.61%	2.90%	4.42%			
Industrial Reduction		21.00%	14.61%	2.90%	4.42%			
AG/RAN/ER	424.00	334.96	286.02	277.72	265.45		265.45	37.39%
Low Density Residential	225.20	177.91	151.91	147.51	140.99		140.99	37.39%
Medium Density Residential	80.34	63.47	54.19	52.62	50.30		50.30	37.39%
High Density Residential	32.60	25.75	21.99	21.35	20.41		20.41	37.39%
Park	0.07	0.06	0.05	0.05	0.04		0.04	37.39%
Commercial	47.75	37.72	32.21	31.28	29.89		29.89	37.39%
Mixed Use	7.46	5.89	5.03	4.89	4.67		4.67	37.39%
Industrial	115.80	91.48	78.12	75.85	72.50		72.50	37.39%
Total Reduced (MT/year)							**584**	**37.39%**
Total Unmitigated (MT/yr)							**933.22**	

Sutter County
Input data for Green House Gas Emissions
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Carbon Dioxide

B3c. Exhaust Emissions (Disposal Equipment) Emission Reductions

Vehicle Type	Unmitigated MT/yr						Reduced MT/yr (ECele)	% Reduction
Reduction								
Excavator	0.00	0.00					0.00	0.00%
Grader	0.00	0.00					0.00	0.00%
Off-Highway Tractor	0.00	0.00					0.00	0.00%
Off-Highway Truck	0.00	0.00					0.00	0.00%
Rubber Tired Dozer	0.00	0.00					0.00	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.00**	**0.00%**
Total Unmitigated (MT/yr)							**0.00**	

B4. Wastewater Emission Reductions

Unit Type	Unmitigated MT/yr	R2-E 9					Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		20.00%						
Multi Family Residential Reduction		20.00%						
Commercial Reduction		20.00%						
Industrial Reduction		20.00%						
AG/RAN/ER	8.34	6.67					6.67	20.00%
Low Density Residential	5.59	4.47					4.47	20.00%
Medium Density Residential	1.99	1.59					1.59	20.00%
High Density Residential	0.81	0.65					0.65	20.00%
Park	0.00	0.00					0.00	20.00%
Commercial	0.26	0.21					0.21	20.00%
Mixed Use	0.04	0.03					0.03	20.00%
Industrial	0.71	0.57					0.57	20.00%
Total Reduced (MT/year)							**14**	**20.00%**
Total Unmitigated (MT/yr)							**17.73**	

Sutter County
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C. AG emissions for CH_4 and N_2O, not applicable for CO_2.

D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	332,023.38	332,023.38
	Landscape equipment	35.57	35.57
	Cooling and heating	129,495.63	129,495.63
	Total direct, tons/yr	**461,554.58**	**461,554.58**
Indirect	Electricity	46,289.02	46,289.02
	Potable water	24.26	24.26
	Solid waste	584.24	584.24
	Wastewater	14.19	14.19
	Total indirect, tons/yr	**46,911.71**	**46,911.71**
Agriculture		0.00	0.00
	Total, tons/yr	**508,466.29**	**508,466.29**
	Global warming potential index	**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	160,827.23	160,827.23
	Low Density Residential	85,421.84	85,421.84
	Medium Density Residential	30,471.10	30,471.10
	High Density Residential	12,364.03	12,364.03
	Total Residential	**289,084.20**	**289,084.20**
Commercial	Park	95.99	95.99
	Commercial	63,031.78	63,031.78
	Mixed Use	9,847.92	9,847.92
	Total Commercial	**73,127.52**	**73,127.52**
Industrial	Industrial	146,254.57	146,254.57
	Total Industrial	**146,254.57**	**146,254.57**
Agricultural		**0.00**	**0.00**
	Total, tons/yr	**508,466.29**	**508,466.29**
	Global warming potential index	1	

Sutter County
Input data for Green House Gas Emissions
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Methane

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	145.20	0.0020	76.35

Transportation Emission Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6
Passenger & Light Duty Vehicles		17.30%	2.50%	6.90%	0.30%	0.30%	1.70%
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	MT/yr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	119.94	99.19	96.71	90.03	89.76	89.49	87.97
Medium Duty Vehicles	15.54	15.54	15.54	15.54	15.54	15.54	15.54
Heavy Duty Vehicles	9.73	9.73	9.73	9.73	9.73	9.73	9.73

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.00%		0.20%
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%
Heavy Duty Vehicles	MT/yr	0.00%	1.60%	1.90%	0.20%		0.00%
Passenger & Light Duty Vehicles	87.97	87.45	87.45	87.45	87.45		87.27
Medium Duty Vehicles	15.54	15.54	15.29	15.29	15.26		15.26
Heavy Duty Vehicles	9.73	9.73	9.57	9.39	9.37		9.37

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7
Passenger & Light Duty Vehicles		4.00%	0.10%	1.00%	0.10%	0.02%	2.00%
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	MT/yr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	87.27	83.78	83.70	82.86	82.78	82.76	81.10
Medium Duty Vehicles	15.26	15.26	15.26	15.26	15.26	15.26	15.26
Heavy Duty Vehicles	9.37	9.37	9.37	9.37	9.37	9.37	9.37

		R2-T 8					Reduced MT/yr (ECele)	% Reduction
Passenger & Light Duty Vehicles		0.22%						
Medium Duty Vehicles		0.00%						
Heavy Duty Vehicles	MT/yr	0.00%						
Passenger & Light Duty Vehicles	81.10	80.93					81	**32.53%**
Medium Duty Vehicles	15.26	15.26					15	**1.80%**
Heavy Duty Vehicles	9.37	9.37					9	**3.66%**
Reduced Total (MT/yr)							**106**	**27.30%**
Unmitigated Total (MT/yr)	145.20							

Sutter County
Input data for Green House Gas Emissions
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Methane

Airport Fuel Emissions Reductions

(U_{AAF})	MT/yr (E_{CWD})						Reduced MT/yr (ECele)	% Reduction
Reductions								
Annual Fuel Usage	0.13						0.13	0.00%

A4. Stationary Sources (Natural Gas) Emission Reductions

Unit Type		R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Multi Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Commercial Reduction		2.39%	3.90%	0.00%	0.00%	1.53%	0.40%
Industrial Reduction	MT/yr (E_{Cng})	2.39%	3.90%	0.00%	0.00%	0.00%	0.40%
AG/RAN/ER	2.00	1.95	1.87	1.79	1.78	1.78	1.78
Low Density Residential	1.06	1.04	0.99	0.95	0.95	0.95	0.95
Medium Density Residential	0.38	0.37	0.35	0.34	0.34	0.34	0.34
High Density Residential	0.15	0.15	0.14	0.14	0.14	0.14	0.14
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.48	2.42	2.33	2.33	2.33	2.29	2.28
Mixed Use	0.39	0.38	0.36	0.36	0.36	0.36	0.36
Industrial	1.20	1.18	1.13	1.13	1.13	1.13	1.13

Unit Type		R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction	MT/yr (E_{Cng})	13.00%	0.50%					
AG/RAN/ER	1.78	1.78	1.78				2	10.70%
Low Density Residential	0.95	0.95	0.95				1	10.70%
Medium Density Residential	0.34	0.34	0.34				0	10.70%
High Density Residential	0.14	0.14	0.14				0	10.70%
Park	0.00	0.00	0.00				0	8.00%
Commercial	2.28	2.28	2.28				2	8.00%
Mixed Use	0.36	0.36	0.36				0	8.00%
Industrial	1.13	0.98	0.97				1	19.12%
Total Reduced (MT/yr)							**7**	**11.01%**
Total Unmitigated (MT/yr)							**7.67**	

Sutter County
Input data for Green House Gas Emissions
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Methane

B. Indirect Sources

B1. Electricity Emission Reductions

Unit Type	Unmitigated MT/yr (E_{Cele})	R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Multi Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Commercial Reduction		21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
Industrial Reduction		21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
AG/RAN/ER	0.93	0.73	0.66	0.61	0.57	0.54	0.49
Low Density Residential	0.49	0.39	0.35	0.33	0.30	0.29	0.26
Medium Density Residential	0.18	0.14	0.12	0.12	0.11	0.10	0.09
High Density Residential	0.07	0.06	0.05	0.05	0.04	0.04	0.04
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	0.87	0.68	0.62	0.57	0.53	0.53	0.53
Mixed Use	0.14	0.11	0.10	0.09	0.08	0.08	0.08
Industrial	2.10	1.66	1.50	1.40	1.30	1.30	1.30

Unit Type	MT/yr (E_{Cele})	R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%		
Multi Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%		
Commercial Reduction		0.00%	0.00%	1.53%	0.60%	0.40%		
Industrial Reduction		0.00%	0.00%	0.00%	0.60%	0.40%		
AG/RAN/ER	0.49	0.49	0.48	0.48	0.48	0.48	0.4841	47.73%
Low Density Residential	0.26	0.26	0.26	0.26	0.26	0.26	0.2571	47.73%
Medium Density Residential	0.09	0.09	0.09	0.09	0.09	0.09	0.0917	47.73%
High Density Residential	0.04	0.04	0.04	0.04	0.04	0.04	0.0372	47.73%
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.0008	40.28%
Commercial	0.53	0.53	0.53	0.52	0.52	0.52	0.5169	40.28%
Mixed Use	0.08	0.08	0.08	0.08	0.08	0.08	0.0808	40.28%
Industrial	1.30	1.30	1.30	1.30	1.29	1.28	1.2831	38.87%

Unit Type	MT/yr (ECele)	R2-E 9					Reduced MT/yr (ECele)	% reduction
Single Family Residential Reduction		3.05%						
Multi Family Residential Reduction		3.05%						
Commercial Reduction		3.05%						
Industrial Reduction		3.05%						
AG/RAN/ER	0.48	0.46934					0.4693	49.33%
Low Density Residential	0.257123761	0.24928					0.2493	49.33%
Medium Density Residential	0.09173434	0.08893					0.0889	49.33%
High Density Residential	0.037219545	0.03608					0.0361	49.33%
Park	0.000794304	0.00077					0.0008	42.10%
Commercial	0.516876723	0.5011					0.5011	42.10%
Mixed Use	0.080762175	0.0783					0.0783	42.10%
Industrial	1.283149197	1.24399					1.2440	40.73%
Reduced total (MT/year)							**2.67**	**44.02%**
Unmitigated total (MT/year)							**4.77**	

Sutter County
Input data for Green House Gas Emissions
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Methane

B2. Potable Water Emission Reductions

Unit Type	MT/yr (E_{Cpot})	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	20.00%					
Multi Family Residential Reduction		21.00%	20.00%					
Commercial Reduction		21.00%	20.00%					
Industrial Reduction		21.00%	20.00%					
AG/RAN/ER	0.00135	0.001069	0.000856				0.00086	36.80%
Low Density Residential	0.00072	0.000568	0.000454				0.00045	36.80%
Medium Density Residential	0.00026	0.000203	0.000162				0.00016	36.80%
High Density Residential	0.00010	0.000082	0.000066				0.00007	36.80%
Park	0.00000	0.000000	0.000000				0.00000	36.80%
Commercial	0.00004	0.000030	0.000024				0.00002	36.80%
Mixed Use	0.00001	0.000005	0.000004				0.00000	36.80%
Industrial	0.00009	0.000074	0.000059				0.00006	36.80%
Reduced total (MT/year)							**0.00163**	**36.80%**
Unmitigated total (MT/year)							**0.00257**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	MT/yr (E_{CWF})	R2-W 1	R2-W 2	R2-W 3			Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		14.61%	2.90%	4.42%				
Multi Family Residential Reduction		14.61%	2.90%	4.42%				
Commercial Reduction		14.61%	2.90%	4.42%				
Industrial Reduction		14.61%	2.90%	4.42%				
AG/RAN/ER	202.43	172.86	167.84	160.42			160.42	20.75%
Low Density Residential	107.52	91.81	89.15	85.21			85.21	20.75%
Medium Density Residential	38.36	32.75	31.80	30.40			30.40	20.75%
High Density Residential	15.56	13.29	12.90	12.33			12.33	20.75%
Park	0.07	0.06	0.06	0.05			0.05	20.75%
Commercial	45.60	38.93	37.80	36.13			36.13	20.75%
Mixed Use	7.12	6.08	5.91	5.64			5.64	20.75%
Industrial	110.58	94.42	91.68	87.63			87.63	20.75%
Total Reduced (MT/year)							**418**	**20.75%**
Total Unmitigated (MT/yr)							**527.24**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Methane

B3c. Exhaust Emissions (Disposal Equipment) Reductions

Vehicle Type							Reduced MT/yr	%
Reductions	MT/yr (E_{CWD})						(ECele)	Reduction
Excavator	0.00	0.00					0.00	0.00%
Grader	0.00	0.00					0.00	0.00%
Off-Highway Tractor	0.00	0.00					0.00	0.00%
Off-Highway Truck	0.00	0.00					0.00	0.00%
Rubber Tired Dozer	0.00	0.00					0.00	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.00**	**0.00%**
Total Unmitigated (MT/yr)							**0.00**	

B4. Wastewater Emission Reductions

Unit Type		R2-E 9					Reduced MT/yr	%
Single Family Residential Reduction		20.00%						
Multi Family Residential Reduction		20.00%						
Commercial Reduction		20.00%						
Industrial Reduction	MT/yr	20.00%					(E_{Cele})	Reduction
AG/RAN/ER	0.0004804	0.000384					0.000384	20.00%
Low Density Residential	0.0003219	0.000258					0.000258	20.00%
Medium Density Residential	0.0001148	0.000092					0.000092	20.00%
High Density Residential	0.0000466	0.000037					0.000037	20.00%
Park	0.0000000	0.000000					0.000000	20.00%
Commercial	0.0000150	0.000012					0.000012	20.00%
Mixed Use	0.0000023	0.000002					0.000002	20.00%
Industrial	0.0000409	0.000033					0.000033	20.00%
Total Reduced (MT/year)							**0.000818**	**20.00%**
Total Unmitigated (MT/yr)							**0.0010220**	

C. AG emissions Reductions for CH_4

		R1-A 1	R2-E 9				Reduced	%
Emissions Source	MT/yr	7.80%	20.00%				MT/yr	Reduction
Enteric Fermentation - Dairy Cows	1,023.51	943.67					943.67	7.80%
Enteric Fermentation - Other Animals	131.18	131.18					131.18	0.00%
Manure Management - Dairy Cows	1,332.76	1,228.80					1,228.80	7.80%
Manure Management - Other Animals	4.36	4.36					4.36	0.00%
Rice Cultivation	8473.00	8,473.00	6,778.40				6,778.40	20.00%
Agricultural Crop Burning	98.39	98.39					98.39	0.00%
Total Reduced (MT/year)							**9,184.80**	**16.98%**
Total Unmitigated (MT/yr)							**11,063.19**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Methane

D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	105.68	2,219.35
	Landscape equipment	0.00	0.04
	Cooling and heating	83.18	1,746.75
	Total direct, tons/yr	**188.86**	**3,966.14**
Indirect	Electricity	2.67	56.02
	Potable water	0.00	0.03
	Solid waste	417.82	8,774.31
	Wastewater	0.00	0.02
	Total indirect, tons/yr	**420.49**	**8,830.38**
Agriculture		9,184.80	192,880.80
	Total, tons/yr	**9,794.16**	**205,677.33**
	Global warming potential index	**21**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	232.50	4,882.60
	Low Density Residential	123.49	2,593.33
	Medium Density Residential	44.05	925.15
	High Density Residential	17.88	375.40
	Total Residential	**417.93**	**8,776.48**
Commercia	Park	0.08	1.73
	Commercial	54.66	1,147.84
	Mixed Use	8.54	179.32
	Total Commercial	**63.41**	**1,331.58**
Industrial	Industrial	128.02	2,688.46
	Total Industrial	**128.02**	**2,688.46**
Agricultural		**9,184.80**	**192,880.80**
	Total, tons/yr	**9,794.16**	**205,677.32**
	Global warming potential index	21	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	61.99	0.0008893	1.0148345

Transportation Emissions Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6	
Passenger & Light Duty Vehicles		17.30%	2.50%	6.90%	0.30%	0.30%	1.70%	
Medium Duty Vehicles	**Unmitigated**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Passenger & Light Duty Vehicles	51.20	42.35	41.29	38.44	38.32	38.21	37.56	
Medium Duty Vehicles	6.63	6.63	6.63	6.63	6.63	6.63	6.63	
Heavy Duty Vehicles	4.15	4.15	4.15	4.15	4.15	4.15	4.15	

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1	
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.00%		0.20%	
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	1.60%	1.90%	0.20%		0.00%	
Passenger & Light Duty Vehicles	37.56	37.33	37.33	37.33	37.33		37.26	
Medium Duty Vehicles	6.63	6.63	6.53	6.53	6.51		6.51	
Heavy Duty Vehicles	4.15	4.15	4.09	4.01	4.00		4.00	

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7	
Passenger & Light Duty Vehicles		4.00%	0.10%	1.00%	0.10%	0.02%	2.00%	
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Passenger & Light Duty Vehicles	37.26	35.77	35.73	35.37	35.34	35.33	34.63	
Medium Duty Vehicles	6.51	6.51	6.51	6.51	6.51	6.51	6.51	
Heavy Duty Vehicles	4.00	4.00	4.00	4.00	4.00	4.00	4.00	

		R2-T 8						
Passenger & Light Duty Vehicles		0.22%					**Reduced**	
Medium Duty Vehicles		0.00%					**MT/yr**	**%**
Heavy Duty Vehicles	**MT/yr**	0.00%					**(ECele)**	**Reduction**
Passenger & Light Duty Vehicles	34.63	34.55					35	**32.53%**
Medium Duty Vehicles	6.51	6.51					7	**1.80%**
Heavy Duty Vehicles	4.00	4.00					4	**3.66%**
Reduced Total (MT/yr)							**45**	**27.30%**
Unmitigated Total (MT/yr)							61.99	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

Airport Fuel Emissions Reductions

(U_{AAF})	Unmitigated MT/yr (E_{CWD})						Reduced MT/yr (ECele)	% Reduction
Reductions								
Annual Fuel Usage	0.0020075						0.0020075	0.00%

A4. Stationary Sources (Natural Gas)

Unit Type	Unmitigated MT/yr	R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Multi Family Residential Reduction		2.39%	3.90%	4.34%	0.48%	0.00%	0.00%
Commercial Reduction		2.39%	3.90%	0.00%	0.00%	1.53%	0.40%
Industrial Reduction		2.39%	3.90%	0.00%	0.00%	0.00%	0.40%
AG/RAN/ER	0.0399430	0.0389881	0.0374676	0.0358408	0.0356678	0.0356678	0.0356678
Low Density Residential	0.0212150	0.0207078	0.0199002	0.0190362	0.0189443	0.0189443	0.0189443
Medium Density Residential	0.0075690	0.0073881	0.0070999	0.0067916	0.0067589	0.0067589	0.0067589
High Density Residential	0.0030710	0.0029976	0.0028807	0.0027556	0.0027423	0.0027423	0.0027423
Park	0.0000770	0.0000752	0.0000722	0.0000722	0.0000722	0.0000711	0.0000708
Commercial	0.0496570	0.0484699	0.0465796	0.0465796	0.0465796	0.0458652	0.0456839
Mixed Use	0.0077590	0.0075735	0.0072781	0.0072781	0.0072781	0.0071665	0.0071382
Industrial	0.1204270	0.1175481	0.1129637	0.1129637	0.1129637	0.1129637	0.1125171

Unit Type	MT/yr (E_{Cng})	R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction		13.00%	0.50%					
AG/RAN/ER	0.0356678	0.0356678	0.0356678				0.0356678	10.70%
Low Density Residential	0.0189443	0.0189443	0.0189443				0.0189443	10.70%
Medium Density Residential	0.0067589	0.0067589	0.0067589				0.0067589	10.70%
High Density Residential	0.0027423	0.0027423	0.0027423				0.0027423	10.70%
Park	0.0000708	0.0000708	0.0000708				0.0000708	8.00%
Commercial	0.0456839	0.0456839	0.0456839				0.0456839	8.00%
Mixed Use	0.0071382	0.0071382	0.0071382				0.0071382	8.00%
Industrial	0.1125171	0.0978899	0.0974004				0.0974004	19.12%
Total Reduced (MT/yr)							**0.2144066**	**14.14%**
Total Unmitigated (MT/yr)							**0.2497180**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

B. Indirect Sources

B1. Electricity Emissions Reductions

Unit Type		R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Multi Family Residential Reduction		21.00%	10.00%	6.75%	7.60%	4.34%	8.91%
Commercial Reduction	Unmitigated	21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
Industrial Reduction	MT/yr	21.00%	9.29%	6.75%	7.60%	0.00%	0.00%
AG/RAN/ER	0.2484300	0.1962597	0.1766337	0.1647150	0.1521967	0.1455884	0.1326105
Low Density Residential	0.1319453	0.1042368	0.0938131	0.0874829	0.0808342	0.0773244	0.0704316
Medium Density Residential	0.0215033	0.0169876	0.0152888	0.0142572	0.0131737	0.0126017	0.0114783
High Density Residential	0.0087241	0.0068920	0.0062028	0.0057843	0.0053447	0.0051126	0.0046569
Park	0.0003576	0.0002825	0.0002543	0.0002371	0.0002191	0.0002191	0.0002191
Commercial	0.2321305	0.1833831	0.1650448	0.1539080	0.1422110	0.1422110	0.1422110
Mixed Use	0.0362709	0.0286540	0.0257886	0.0240485	0.0222208	0.0222208	0.0222208
Industrial	0.5629518	0.4447319	0.4034386	0.3762157	0.3476233	0.3476233	0.3476233

Unit Type		R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%		
Multi Family Residential Reduction		0.48%	1.61%	0.00%	0.00%	0.00%		
Commercial Reduction		0.00%	0.00%	1.53%	0.60%	0.40%		
Industrial Reduction	MT/yr (E_{Cele})	0.00%	0.00%	0.00%	0.60%	0.40%		
AG/RAN/ER	0.1326105	0.1319705	0.1298477	0.1298477	0.1298477	0.1298477	0.1298477	47.73%
Low Density Residential	0.0704316	0.0700917	0.0689642	0.0689642	0.0689642	0.0689642	0.0689642	47.73%
Medium Density Residential	0.0114783	0.0114229	0.0112392	0.0112392	0.0112392	0.0112392	0.0112392	47.73%
High Density Residential	0.0046569	0.0046344	0.0045599	0.0045599	0.0045599	0.0045599	0.0045599	47.73%
Park	0.0002191	0.0002191	0.0002191	0.0002157	0.0002144	0.0002136	0.0002136	40.28%
Commercial	0.1422110	0.1422110	0.1422110	0.1400301	0.1391834	0.1386332	0.1386332	40.28%
Mixed Use	0.0222208	0.0222208	0.0222208	0.0218800	0.0217477	0.0216617	0.0216617	40.28%
Industrial	0.3476233	0.3476233	0.3476233	0.3476233	0.3455214	0.3441554	0.3441554	38.87%

Unit Type		R2-E 9					Reduced MT/yr (ECele)	% reduction
Single Family Residential Reduction		3.05%						
Multi Family Residential Reduction		3.05%						
Commercial Reduction		3.05%						
Industrial Reduction	MT/yr (ECele)	3.05%						
AG/RAN/ER	0.1298477	0.12588					0.1258848	49.33%
Low Density Residential	0.068964247	0.06686					0.0668595	49.33%
Medium Density Residential	0.011239195	0.0109					0.0108962	49.33%
High Density Residential	0.004559852	0.00442					0.0044207	49.33%
Park	0.000213566	0.00021					0.000207	42.10%
Commercial	0.138633173	0.1344					0.1344022	42.10%
Mixed Use	0.021661737	0.021					0.0210006	42.10%
Industrial	0.344155371	0.33365					0.333652	40.73%
Reduced total (MT/year)							**0.70**	**43.87%**
Unmitigated total (MT/year)							**1.24**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

B2. Potable Water Emissions Reductions

Unit Type	Unmitigated MT/yr	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	20.00%					
Multi Family Residential Reduction		21.00%	20.00%					
Commercial Reduction		21.00%	20.00%					
Industrial Reduction		21.00%	20.00%					
AG/RAN/ER	0.0003631	0.0002868	0.0002295				0.0002295	36.80%
Low Density Residential	0.0001928	0.0001523	0.0001219				0.0001219	36.80%
Medium Density Residential	0.0000688	0.0000544	0.0000435				0.0000435	36.80%
High Density Residential	0.0000279	0.0000221	0.0000176				0.0000176	36.80%
Park	0.0000000	0.0000000	0.0000000				0.0000000	36.80%
Commercial	0.0000103	0.0000082	0.0000065				0.0000065	36.80%
Mixed Use	0.0000016	0.0000013	0.0000010				0.0000010	36.80%
Industrial	0.0000251	0.0000198	0.0000159				0.0000159	36.80%
Reduced total (MT/year)							**0.0004359**	**36.80%**
Unmitigated total (MT/year)							**0.0006897**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	Unmitigated MT/yr	R2-W 1	R2-W 2	R2-W 3			Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		14.61%	2.90%	4.42%				
Multi Family Residential Reduction		14.61%	2.90%	4.42%				
Commercial Reduction		14.61%	2.90%	4.42%				
Industrial Reduction		14.61%	2.90%	4.42%				
AG/RAN/ER	0.0005875	0.0005017	0.0004871	0.0004656			0.0004656	20.75%
Low Density Residential	0.0003120	0.0002664	0.0002587	0.0002473			0.0002473	20.75%
Medium Density Residential	0.0001113	0.0000951	0.0000923	0.0000882			0.0000882	20.75%
High Density Residential	0.0000452	0.0000386	0.0000375	0.0000358			0.0000358	20.75%
Park	0.0000001	0.0000001	0.0000001	0.0000001			0.0000001	20.75%
Commercial	0.0000662	0.0000565	0.0000549	0.0000524			0.0000524	20.75%
Mixed Use	0.0000103	0.0000088	0.0000086	0.0000082			0.0000082	20.75%
Industrial	0.0001605	0.0001370	0.0001330	0.0001272			0.0001272	20.75%
Total Reduced (MT/year)							**0.0010247**	**20.75%**
Total Unmitigated (MT/yr)							**0.0012931**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

B3c. Exhaust Emissions (Disposal Equipment) Reductions

Vehicle Type							Reduced MT/yr	%
Reductions	MT/yr (E_{CWD})						(ECele)	Reduction
Excavator	0.0000000	0.0000000					0.0000000	0.00%
Grader	0.0000000	0.0000000					0.0000000	0.00%
Off-Highway Tractor	0.0000000	0.0000000					0.0000000	0.00%
Off-Highway Truck	0.0000000	0.0000000					0.0000000	0.00%
Rubber Tired Dozer	0.0000000	0.0000000					0.0000000	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.0000000**	**0.00%**
Total Unmitigated (MT/yr)							**0.0000000**	

B4. Wastewater Emissions Reduction

Unit Type		R2-E 9					Reduced MT/yr	%
Single Family Residential Reduction		20.00%						
Multi Family Residential Reduction		20.00%						
Commercial Reduction	Unmitigated	20.00%						
Industrial Reduction	MT/yr	20.00%					(E_{Cele})	Reduction
AG/RAN/ER	0.0001289	0.0001031					0.0001031	20.00%
Low Density Residential	0.0000863	0.0000691					0.0000691	20.00%
Medium Density Residential	0.0000141	0.0000113					0.0000113	20.00%
High Density Residential	0.0000057	0.0000046					0.0000046	20.00%
Park	0.0000000	0.0000000					0.0000000	20.00%
Commercial	0.0000040	0.0000032					0.0000032	20.00%
Mixed Use	0.0000006	0.0000005					0.0000005	20.00%
Industrial	0.0000110	0.0000088					0.0000088	20.00%
Total Reduced (MT/year)							**0.0002005**	**20.00%**
Total Unmitigated (MT/yr)							**0.0002506**	

C. AG Emissions Reductions for N_2O.

Emissions Source	Unmitigated	R1-A 1					Reduced	%
Reductions	MT/yr	7.80%					MT/yr	Reduction
Manure Management - Dairy Cows	3.39	3.13					3.13	7.80%
Manure Management - Other Animals	2.10	2.10					2.10	0.00%
Animals and Runoff	250.99	250.99					250.99	0.00%
Crop Growth	1219.67	1,219.67					1,219.67	0.00%
Fertilizer Use	327.07	327.07					327.07	0.00%
Agricultural Residue Burning	3.05	3.05					3.05	0.00%
Total Reduced (MT/year)							**1,805.99**	**0.01%**
Total Unmitigated (MT/yr)							**1,806.26**	

Sutter County
Input data for Green House Gas Emissions
2020
Reduced Inventory
Nitrous Oxide

D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	45.07	13,970.58
	Landscape equipment	0.00	0.28
	Cooling and heating	1.23	381.06
	Total direct, tons/yr	**46.30**	**14,351.92**
Indirect	Electricity	0.70	216.17
	Potable water	0.00	0.14
	Solid waste	0.00	0.32
	Wastewater	0.00	0.06
	Total indirect, tons/yr	**0.70**	**216.69**
Agriculture		1,805.99	559,858.41
	Total, tons/yr	**1,852.99**	**574,427.01**
	Global warming potential index	310	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	17.85	5,533.60
	Low Density Residential	9.48	2,939.10
	Medium Density Residential	3.37	1,044.35
	High Density Residential	1.37	423.77
	Total Residential	**32.07**	**9,940.82**
Commercial	Park	0.01	1.94
	Commercial	4.17	1,291.92
	Mixed Use	0.65	201.83
	Total Commercial	**4.83**	**1,496.31**
Industrial	Industrial	10.10	3,131.45
	Total Industrial	**10.10**	**3,131.45**
Agricultural		**1,805.99**	**559,858.41**
	Total, tons/yr	**1,852.99**	**574,426.99**
	Global warming potential index	310	

Appendix I: 2030 Reduced URBEMIS Output and GHG Calculations

Sutter County
Emissions by Source
2030
Reduced Inventory
By Source

Transportation		
	Source:	**Metric tons of CO_2e**
1	On-Road Vehicles	362,245
2	Airport Operations	87
	Total	**362,332**

Energy		
	Sources:	**Metric tons of CO_2e**
1	Electric	60,768
2	Natural Gas	174,018
	Total	**234,786**

Solid Waste		
	Source	**Metric tons of CO_2e**
1	Solid Waste Disposal	15,671
2	Green Waste Recycling	Data Not Available
3	Materials Recycling	Data Not Available
	Total	**15,671**

Landscape Design		
	Sources:	**Metric tons of CO_2e**
1	Landscape Maintenance Emissions	40
2	Carbon sink from CO2 sequestration	Data Not Available
	Total	**40**

Agriculture		
	Sources:	**Metric tons of CO_2e**
1	Enteric Fermentation	22,572
2	Manure Management	27,515
3	Rice Cultivation	120,164
4	Agricultural Residue Burning	3,011
5	Crop Growth	372,557
6	Animals and Runoff	76,704
7	Fertilizer Use	99,760
	Total	**722,283**

Net Total Emissions	
Category	**Metric tons of CO_2e**
Energy	234,786
Solid Waste	15,671
Landscape Design	40
Agriculture	722,283
Transportation	362,332
Total	**1,335,112**

Sutter County
Emissions by Land Use
2030
Reduced Inventory
By Land Use Category

Source Type		CO_2e MT/yr			
		CO_2	CH_4	N_2O	combined CO_2e
Residential	AG/RAN/ER	133,991.87	5,376.46	4,150.61	143,519
	Low Density Residential	89,478.33	3,590.28	2,771.70	95,840
	Medium Density Residential	56,775.66	2,278.33	1,750.53	60,805
	High Density Residential	25,510.77	1,023.71	786.56	27,321
	Total Residential	305,756.64	12,268.78	9,459.40	**327,485**
Commercial	Park	56.73	1.61	1.25	60
	Commercial	67,154.59	1,932.68	1,508.16	70,595
	Mixed Use	18,084.59	520.47	406.15	19,011
	Total Commercial	85,409.80	2,456.78	1,916.03	**89,783**
Industrial	Industrial	186,511.58	5,029.37	4,019.87	195,561
	Total Industrial	186,511.58	5,029.37	4,019.87	**195,561**
Agriculture		0.00	170,698.73	551,584.68	722,283
	Total	**577,678.01**	**190,453.66**	**566,979.98**	**1,335,112**

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	661,154.84	39.33	23,991.59

Transportation Emission Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6
Passenger & Light Duty Vehicles		19.70%	14.55%	7.20%	0.30%	0.30%	1.70%
Medium Duty Vehicles	**Unmitigated**	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	546,113.90	438,529.46	374,723.42	347,743.34	346,700.11	345,660.01	339,783.79
Medium Duty Vehicles	70,743.57	70,743.57	53,057.68	53,057.68	53,057.68	53,057.68	53,057.68
Heavy Duty Vehicles	44,297.37	44,297.37	33,223.03	33,223.03	33,223.03	33,223.03	33,223.03

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.20%		4.00%
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	1.60%	1.90%	0.20%		0.00%
Passenger & Light Duty Vehicles	339,783.79	337,745.08	337,745.08	337,745.08	337,069.59		323,586.81
Medium Duty Vehicles	53,057.68	53,057.68	52,208.75	52,208.75	52,104.34		52,104.34
Heavy Duty Vehicles	33,223.03	33,223.03	32,691.46	32,070.32	32,006.18		32,006.18

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7
Passenger & Light Duty Vehicles		6.00%	0.88%	1.50%	3.00%	0.07%	7.00%
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	323,586.81	304,171.60	301,510.10	296,987.45	288,077.83	287,879.25	267,727.70
Medium Duty Vehicles	52,104.34	52,104.34	52,104.34	52,104.34	52,104.34	52,104.34	52,104.34
Heavy Duty Vehicles	32,006.18	32,006.18	32,006.18	32,006.18	32,006.18	32,006.18	32,006.18

		R2-T 8						
Passenger & Light Duty Vehicles		2.41%					**Reduced**	
Medium Duty Vehicles		0.00%					**MT/yr**	**%**
Heavy Duty Vehicles	**MT/yr**	0.00%					**(ECele)**	**Reduction**
Passenger & Light Duty Vehicles	267,727.70	261,275.67					261,276	**52.16%**
Medium Duty Vehicles	52,104.34	52,104.34					52,104	**26.35%**
Heavy Duty Vehicles	32,006.18	32,006.18					32,006	**27.75%**
Reduced Total (MT/yr)							**345,386**	**47.76%**
Unmitigated Total (MT/yr)							**661,155**	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

Airport Fuel Emission Reductions

(U_{AAF})	Unmitigated MT/yr (E_{CWD})	R1-T 2					Reduced MT/yr (ECele)	% Reduction
Reductions		25.00%						
Annual Fuel Usage	151.84	113.88					113.88	25.00%

A4. Stationary Sources (Natural Gas) Emission Reductions

Unit Type	Unmitigated MT/yr	R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Multi Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Commercial Reduction		3.18%	3.90%	0.00%	0.00%	17.82%	2.75%
Industrial Reduction		3.18%	3.90%	0.00%	0.00%	0.00%	2.75%
AG/RAN/ER	32,144.32	31,121.69	29,907.95	26,002.67	25,541.55	25,541.55	25,541.55
Low Density Residential	21,465.74	20,782.83	19,972.30	17,364.39	17,056.46	17,056.46	17,056.46
Medium Density Residential	13,621.47	13,188.12	12,673.78	11,018.89	10,823.48	10,823.48	10,823.48
High Density Residential	6,120.49	5,925.78	5,694.67	4,951.08	4,863.28	4,863.28	4,863.28
Park	25.28	24.48	23.52	23.52	23.52	19.33	18.80
Commercial	29,351.77	28,417.99	27,309.68	27,309.68	27,309.68	22,443.53	21,825.70
Mixed Use	7,904.21	7,652.75	7,354.29	7,354.29	7,354.29	6,043.87	5,877.50
Industrial	77,638.95	75,168.97	72,237.38	72,237.38	72,237.38	72,237.38	70,248.82

Unit Type	MT/yr (E_{Cng})	R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction		13.00%	0.50%					
AG/RAN/ER	25,541.55	25,541.55	25,541.55				25,542	20.54%
Low Density Residential	17,056.46	17,056.46	17,056.46				17,056	20.54%
Medium Density Residential	10,823.48	10,823.48	10,823.48				10,823	20.54%
High Density Residential	4,863.28	4,863.28	4,863.28				4,863	20.54%
Park	18.80	18.80	18.80				19	25.64%
Commercial	21,825.70	21,825.70	21,825.70				21,826	25.64%
Mixed Use	5,877.50	5,877.50	5,877.50				5,877	25.64%
Industrial	70,248.82	61,116.48	60,810.89				60,811	21.67%
Total Reduced (MT/yr)							**146,818**	**22.02%**
Total Unmitigated (MT/yr)	**188,272.24**							

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

B. Indirect Sources

B1. Electricity Emission Reductions

Unit Type		R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Multi Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Commercial Reduction	Unmitigated	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
Industrial Reduction	MT/yr (E_{Cele})	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
AG/RAN/ER	18,479.24	14,598.60	13,138.74	11,717.13	10,826.63	9,412.92	8,172.52
Low Density Residential	12,340.30	9,748.84	8,773.95	7,824.61	7,229.94	6,285.88	5,457.55
Medium Density Residential	7,830.76	6,186.30	5,567.67	4,965.25	4,587.89	3,988.82	3,463.19
High Density Residential	3,518.57	2,779.67	2,501.70	2,231.02	2,061.46	1,792.28	1,556.10
Park	19.02	15.03	13.52	12.06	11.14	11.14	11.14
Commercial	22,082.12	17,444.87	15,700.39	14,001.61	12,937.48	12,937.48	12,937.48
Mixed Use	5,946.55	4,697.77	4,228.00	3,770.53	3,483.97	3,483.97	3,483.97
Industrial	58,409.85	46,143.78	41,859.33	37,330.15	34,493.06	34,493.06	34,493.06

Unit Type		R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	
Single Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%	
Multi Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%	
Commercial Reduction		0.00%	0.00%	17.82%	3.32%	2.75%	
Industrial Reduction	MT/yr (E_{Cele})	0.00%	0.00%	0.00%	3.32%	2.75%	
AG/RAN/ER	8,172.52	8,027.59	7,553.07	7,553.07	7,553.07	7,553.07	
Low Density Residential	5,457.55	5,360.77	5,043.88	5,043.88	5,043.88	5,043.88	
Medium Density Residential	3,463.19	3,401.77	3,200.69	3,200.69	3,200.69	3,200.69	
High Density Residential	1,556.10	1,528.51	1,438.15	1,438.15	1,438.15	1,438.15	
Park	11.14	11.14	11.14	9.16	8.85	8.61	
Commercial	12,937.48	12,937.48	12,937.48	10,632.23	10,279.20	9,996.23	
Mixed Use	3,483.97	3,483.97	3,483.97	2,863.18	2,768.11	2,691.91	
Industrial	34,493.06	34,493.06	34,493.06	34,493.06	33,347.76	32,429.76	

Unit Type		R2-E 9					Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		3.18%						
Multi Family Residential Reduction		3.18%						
Commercial Reduction		3.18%						
Industrial Reduction	MT/yr (ECele)	3.18%						
AG/RAN/ER	7,553.07	7,312.70					7,313	60.43%
Low Density Residential	5,043.88	4,883.37					4,883	60.43%
Medium Density Residential	3,200.69	3,098.83					3,099	60.43%
High Density Residential	1,438.15	1,392.39					1,392	60.43%
Park	8.61	8.34					8	56.17%
Commercial	9,996.23	9,678.11					9,678	56.17%
Mixed Use	2,691.91	2,606.24					2,606	56.17%
Industrial	32,429.76	31,397.71					31,398	46.25%
Reduced total (MT/year)							**60,378**	**53.06%**
Unmitigated total (MT/year)							**128,626**	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

B2. Potable Water Emission Reductions

Unit Type	Unmitigated MT/yr	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	30.00%					
Multi Family Residential Reduction		21.00%	30.00%					
Commercial Reduction		21.00%	30.00%					
Industrial Reduction		21.00%	30.00%					
AG/RAN/ER	23.22	18.34	12.84				12.84	44.70%
Low Density Residential	15.51	12.25	8.58				8.58	44.70%
Medium Density Residential	0.05	0.04	0.03				0.03	44.70%
High Density Residential	0.02	0.02	0.01				0.01	44.70%
Park	0.00	0.00	0.00				0.00	0.00%
Commercial	0.77	0.61	0.43				0.43	44.70%
Mixed Use	0.21	0.17	0.12				0.12	44.70%
Industrial	2.03	1.60	1.12				1.12	44.70%
Reduced total (MT/year)							**23**	**44.70%**
Unmitigated total (MT/year)							**42**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	Unmitigated MT/yr	R1-E 1	R2-W 1	R2-W 2	R2-W 3		Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		21.00%	14.07%	5.80%	10.19%			
Multi Family Residential Reduction		21.00%	14.07%	5.80%	10.19%			
Commercial Reduction		21.00%	14.07%	5.80%	10.19%			
Industrial Reduction		21.00%	14.07%	5.80%	10.19%			
AG/RAN/ER	551.39	435.60	374.32	352.61	316.69		316.69	42.56%
Low Density Residential	368.20	290.88	249.96	235.46	211.48		211.48	42.56%
Medium Density Residential	233.66	184.59	158.62	149.42	134.20		134.20	42.56%
High Density Residential	104.99	82.94	71.27	67.14	60.30		60.30	42.56%
Park	0.08	0.06	0.05	0.05	0.05		0.05	42.56%
Commercial	97.35	76.91	66.09	62.25	55.91		55.91	42.56%
Mixed Use	26.22	20.71	17.80	16.77	15.06		15.06	42.56%
Industrial	257.51	203.43	174.81	164.67	147.90		147.90	42.56%
Total Reduced (MT/year)							**942**	**42.56%**
Total Unmitigated (MT/yr)							**1,639.40**	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

B3c. Exhaust Emissions (Disposal Equipment) Emission Reductions

Vehicle Type	Unmitigated MT/yr						Reduced MT/yr (ECele)	% Reduction
Reduction								
Excavator	0.00	0.00					0.00	0.00%
Grader	0.00	0.00					0.00	0.00%
Off-Highway Tractor	0.00	0.00					0.00	0.00%
Off-Highway Truck	0.00	0.00					0.00	0.00%
Rubber Tired Dozer	0.00	0.00					0.00	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.00**	**0.00%**
Total Unmitigated (MT/yr)							**0.00**	

B4. Wastewater Emission Reductions

Unit Type	Unmitigated MT/yr	R2-E 9					Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		30.00%						
Multi Family Residential Reduction		30.00%						
Commercial Reduction		30.00%						
Industrial Reduction		30.00%						
AG/RAN/ER	8.24	5.77					5.77	30.00%
Low Density Residential	6.94	4.86					4.86	30.00%
Medium Density Residential	4.41	3.08					3.08	30.00%
High Density Residential	1.98	1.39					1.39	30.00%
Park	0.00	0.00					0.00	30.00%
Commercial	0.30	0.21					0.21	30.00%
Mixed Use	0.08	0.06					0.06	30.00%
Industrial	0.89	0.62					0.62	30.00%
Total Reduced (MT/year)							**16**	**30.00%**
Total Unmitigated (MT/yr)							**22.83**	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Carbon Dioxide

C. AG emissions for CH_4 and N_2O, not applicable for CO_2.

D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	345,500.07	345,500.07
	Landscape equipment	39.33	39.33
	Cooling and heating	170,809.26	170,809.26
	Total direct, tons/yr	**516,348.65**	**516,348.65**
Indirect	Electricity	60,377.67	60,377.67
	Potable water	23.12	23.12
	Solid waste	941.59	941.59
	Wastewater	15.98	15.98
	Total indirect, tons/yr	**61,358.37**	**61,358.37**
Agriculture		0.00	0.00
	Total, tons/yr	**577,707.02**	**577,707.02**
	Global warming potential index	**1**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	133,991.87	133,991.87
	Low Density Residential	89,478.33	89,478.33
	Medium Density Residential	56,775.66	56,775.66
	High Density Residential	25,510.77	25,510.77
	Total Residential	**305,756.64**	**305,756.64**
Commercial	Park	56.73	56.73
	Commercial	67,154.59	67,154.59
	Mixed Use	18,084.59	18,084.59
	Total Commercial	**85,409.80**	**85,409.80**
Industrial	Industrial	186,511.58	186,511.58
	Total Industrial	**186,511.58**	**186,511.58**
Agricultural		**0.00**	**0.00**
	Total, tons/yr	**577,678.01**	**577,678.01**
	Global warming potential index	1	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Methane

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	210.11	0.0022	116.60

Transportation Emission Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6
Passenger & Light Duty Vehicles		19.70%	14.55%	7.20%	0.30%	0.30%	1.70%
Medium Duty Vehicles		0.00%	25.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	MT/yr	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	173.55	139.36	119.08	110.51	110.18	109.85	107.98
Medium Duty Vehicles	22.48	22.48	16.86	16.86	16.86	16.86	16.86
Heavy Duty Vehicles	14.08	14.08	10.56	10.56	10.56	10.56	10.56

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.00%		4.00%
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%
Heavy Duty Vehicles	MT/yr	0.00%	1.60%	1.90%	0.20%		0.00%
Passenger & Light Duty Vehicles	107.98	107.33	107.33	107.33	107.33		103.04
Medium Duty Vehicles	16.86	16.86	16.59	16.59	16.56		16.56
Heavy Duty Vehicles	10.56	10.56	10.39	10.19	10.17		10.17

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7
Passenger & Light Duty Vehicles		6.00%	0.88%	1.50%	3.00%	0.07%	7.00%
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Heavy Duty Vehicles	MT/yr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Passenger & Light Duty Vehicles	103.04	96.86	96.01	94.57	91.73	91.67	85.25
Medium Duty Vehicles	16.56	16.56	16.56	16.56	16.56	16.56	16.56
Heavy Duty Vehicles	10.17	10.17	10.17	10.17	10.17	10.17	10.17

		R2-T 8					Reduced MT/yr (ECele)	% Reduction
Passenger & Light Duty Vehicles		2.41%						
Medium Duty Vehicles		0.00%						
Heavy Duty Vehicles	MT/yr	0.00%						
Passenger & Light Duty Vehicles	85.25	83.20					83	**52.06%**
Medium Duty Vehicles	16.56	16.56					17	**26.35%**
Heavy Duty Vehicles	10.17	10.17					10	**27.75%**
Reduced Total (MT/yr)							**110**	**47.68%**
Unmitigated Total (MT/yr)	210.11							

Sutter County
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Airport Fuel Emissions Reductions

(U_{AAF})	Unmitigated MT/yr (E_{CWD})	R1-T 2					Reduced MT/yr (ECele)	% Reduction
Reductions		25.00%						
Annual Fuel Usage	0.13	0.10					0.10	25.00%

A4. Stationary Sources (Natural Gas) Emission Reductions

Unit Type		R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Multi Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Commercial Reduction		3.18%	3.90%	0.00%	0.00%	17.82%	2.75%
Industrial Reduction	MT/yr (E_{Cng})	3.18%	3.90%	0.00%	0.00%	0.00%	2.75%
AG/RAN/ER	3.03	2.93	2.82	2.45	2.41	2.41	2.41
Low Density Residential	2.02	1.96	1.88	1.64	1.61	1.61	1.61
Medium Density Residential	1.28	1.24	1.19	1.04	1.02	1.02	1.02
High Density Residential	0.58	0.56	0.54	0.47	0.46	0.46	0.46
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.77	2.68	2.57	2.57	2.57	2.11	2.06
Mixed Use	0.74	0.72	0.69	0.69	0.69	0.57	0.55
Industrial	1.46	1.42	1.36	1.36	1.36	1.36	1.32

Unit Type		R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction	MT/yr (E_{Cng})	13.00%	0.50%					
AG/RAN/ER	2.41	2.41	2.41				2	20.54%
Low Density Residential	1.61	1.61	1.61				2	20.54%
Medium Density Residential	1.02	1.02	1.02				1	20.54%
High Density Residential	0.46	0.46	0.46				0	20.54%
Park	0.00	0.00	0.00				0	25.64%
Commercial	2.06	2.06	2.06				2	25.64%
Mixed Use	0.55	0.55	0.55				1	25.64%
Industrial	1.32	1.15	1.15				1	21.67%
Total Reduced (MT/yr)							**9**	**22.19%**
Total Unmitigated (MT/yr)							**11.89**	

Sutter County
Input data for Green House Gas Emissions
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B. Indirect Sources

B1. Electricity Emission Reductions

Unit Type		R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Multi Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Commercial Reduction	Unmitigated	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
Industrial Reduction	MT/yr (E_{Cele})	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
AG/RAN/ER	1.07	0.84	0.76	0.68	0.62	0.54	0.47
Low Density Residential	0.71	0.56	0.51	0.45	0.42	0.36	0.31
Medium Density Residential	0.45	0.36	0.32	0.29	0.26	0.23	0.20
High Density Residential	0.20	0.16	0.14	0.13	0.12	0.10	0.09
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	1.27	1.01	0.90	0.81	0.75	0.75	0.75
Mixed Use	0.34	0.27	0.24	0.22	0.20	0.20	0.20
Industrial	3.37	2.66	2.41	2.15	1.99	1.99	1.99

Unit Type		R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%		
Multi Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%		
Commercial Reduction		0.00%	0.00%	17.82%	3.32%	2.75%		
Industrial Reduction	MT/yr (E_{Cele})	0.00%	0.00%	0.00%	3.32%	2.75%		
AG/RAN/ER	0.47	0.46	0.44	0.44	0.44	0.44	0.4353	59.13%
Low Density Residential	0.31	0.31	0.29	0.29	0.29	0.29	0.2907	59.13%
Medium Density Residential	0.20	0.20	0.18	0.18	0.18	0.18	0.1845	59.13%
High Density Residential	0.09	0.09	0.08	0.08	0.08	0.08	0.0829	59.13%
Park	0.00	0.00	0.00	0.00	0.00	0.00	0.0005	54.73%
Commercial	0.75	0.75	0.75	0.61	0.59	0.58	0.5761	54.73%
Mixed Use	0.20	0.20	0.20	0.17	0.16	0.16	0.1551	54.73%
Industrial	1.99	1.99	1.99	1.99	1.92	1.87	1.8690	44.48%

Unit Type	MT/yr (ECele)	R2-E 9					Reduced MT/yr (ECele)	% reduction
Single Family Residential Reduction		3.18%						
Multi Family Residential Reduction		3.18%						
Commercial Reduction		3.18%						
Industrial Reduction		3.18%						
AG/RAN/ER	0.44	0.42146					0.4215	60.43%
Low Density Residential	0.29069885	0.28145					0.2814	60.43%
Medium Density Residential	0.184465142	0.17859					0.1786	60.43%
High Density Residential	0.082886898	0.08025					0.0802	60.43%
Park	0.000497953	0.00048					0.0005	56.17%
Commercial	0.576117772	0.55778					0.5578	56.17%
Mixed Use	0.155143975	0.15021					0.1502	56.17%
Industrial	1.86904378	1.80956					1.8096	46.25%
Reduced total (MT/year)							**3.48**	**53.06%**
Unmitigated total (MT/year)							**7.41**	

Sutter County
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B2. Potable Water Emission Reductions

Unit Type	MT/yr (E_{Cpot})	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	30.00%					
Multi Family Residential Reduction		21.00%	30.00%					
Commercial Reduction		21.00%	30.00%					
Industrial Reduction		21.00%	30.00%					
AG/RAN/ER	0.00134	0.001057	0.000740				0.00074	44.70%
Low Density Residential	0.00089	0.000706	0.000494				0.00049	44.70%
Medium Density Residential	0.00057	0.000448	0.000314				0.00031	44.70%
High Density Residential	0.00025	0.000201	0.000141				0.00014	44.70%
Park	0.00000	0.000000	0.000000				0.00000	0.00%
Commercial	0.00004	0.000035	0.000024				0.00002	44.70%
Mixed Use	0.00001	0.000009	0.000007				0.00001	44.70%
Industrial	0.00012	0.000093	0.000065				0.00006	44.70%
Reduced total (MT/year)							**0.00178**	**44.70%**
Unmitigated total (MT/year)							**0.00323**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	MT/yr (E_{CWF})	R2-W 1	R2-W 2	R2-W 3			Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		14.07%	5.80%	10.19%				
Multi Family Residential Reduction		14.07%	5.80%	10.19%				
Commercial Reduction		14.07%	5.80%	10.19%				
Industrial Reduction		14.07%	5.80%	10.19%				
AG/RAN/ER	263.25	226.22	213.10	191.39			191.39	27.30%
Low Density Residential	175.79	151.06	142.30	127.81			127.81	27.30%
Medium Density Residential	111.56	95.86	90.30	81.10			81.10	27.30%
High Density Residential	50.13	43.07	40.58	36.44			36.44	27.30%
Park	0.08	0.07	0.06	0.06			0.06	27.30%
Commercial	92.96	79.88	75.25	67.58			67.58	27.30%
Mixed Use	25.03	21.51	20.26	18.20			18.20	27.30%
Industrial	245.89	211.30	199.04	178.77			178.77	27.30%
Total Reduced (MT/year)							**701**	**27.30%**
Total Unmitigated (MT/yr)							**964.69**	

Sutter County
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B3c. Exhaust Emissions (Disposal Equipment) Reductions

Vehicle Type							Reduced MT/yr	%
Reductions	MT/yr (E_{CWD})						(ECele)	Reduction
Excavator	0.00	0.00					0.00	0.00%
Grader	0.00	0.00					0.00	0.00%
Off-Highway Tractor	0.00	0.00					0.00	0.00%
Off-Highway Truck	0.00	0.00					0.00	0.00%
Rubber Tired Dozer	0.00	0.00					0.00	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.00**	**0.00%**
Total Unmitigated (MT/yr)							**0.00**	

B4. Wastewater Emission Reductions

Unit Type		R2-E 9					Reduced MT/yr	%
Single Family Residential Reduction		30.00%						
Multi Family Residential Reduction		30.00%						
Commercial Reduction		30.00%						
Industrial Reduction	MT/yr	30.00%					(E_{Cele})	Reduction
AG/RAN/ER	0.0004749	0.000332					0.000332	30.00%
Low Density Residential	0.0004001	0.000280					0.000280	30.00%
Medium Density Residential	0.0002539	0.000178					0.000178	30.00%
High Density Residential	0.0001141	0.000080					0.000080	30.00%
Park	0.0000000	0.000000					0.000000	30.00%
Commercial	0.0000172	0.000012					0.000012	30.00%
Mixed Use	0.0000046	0.000003					0.000003	30.00%
Industrial	0.0000512	0.000036					0.000036	30.00%
Total Reduced (MT/year)							**0.000921**	**30.00%**
Total Unmitigated (MT/yr)							**0.0013160**	

C. AG emissions Reductions for CH_4

		R1-A 1	R2-E 9				Reduced	%
Emissions Source	MT/yr	7.80%	30.00%				MT/yr	Reduction
Enteric Fermentation - Dairy Cows	1,023.51	943.67					943.67	7.80%
Enteric Fermentation - Other Animals	131.18	131.18					131.18	0.00%
Manure Management - Dairy Cows	1,332.76	1,228.80					1,228.80	7.80%
Manure Management - Other Animals	4.36	4.36					4.36	0.00%
Rice Cultivation	8174.45	8,174.45	5,722.11				5,722.11	30.00%
Agricultural Crop Burning	98.39	98.39					98.39	0.00%
Total Reduced (MT/year)							**8,128.51**	**24.49%**
Total Unmitigated (MT/yr)							**10,764.63**	

Sutter County
Input data for Green House Gas Emissions
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Methane

D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	110.02	2,310.50
	Landscape equipment	0.00	0.05
	Cooling and heating	125.85	2,642.85
	Total direct, tons/yr	**235.88**	**4,953.40**
Indirect	Electricity	3.48	73.08
	Potable water	0.00	0.04
	Solid waste	701.35	14,728.40
	Wastewater	0.00	0.02
	Total indirect, tons/yr	**704.83**	**14,801.53**
Agriculture		8,128.51	170,698.73
	Total, tons/yr	**9,069.22**	**190,453.66**
	Global warming potential index	**21**	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	256.02	5,376.46
	Low Density Residential	170.97	3,590.28
	Medium Density Residential	108.49	2,278.33
	High Density Residential	48.75	1,023.71
	Total Residential	**584.23**	**12,268.78**
Commercia	Park	0.08	1.61
	Commercial	92.03	1,932.68
	Mixed Use	24.78	520.47
	Total Commercial	**116.99**	**2,456.78**
Industrial	Industrial	239.49	5,029.37
	Total Industrial	**239.49**	**5,029.37**
Agricultural		**8,128.51**	**170,698.73**
	Total, tons/yr	**9,069.22**	**190,453.66**
	Global warming potential index	21	

Sutter County
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Nitrous Oxide

A. Direct Sources

A1-3. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) Unreduced Emissions

Con (MT/yr)	Motor Vehicles (MT/yr)	Landscape (MT/yr) (E_{Cls})	Hearth (MT/yr) (E_{Cwood})
	89.71	0.0009832	1.5497605

Transportation Emissions Reductions

		R1-T 1	R1-T 2	R1-T 3	R1-T 4	R1-T 5	R1-T 6	
Passenger & Light Duty Vehicles		19.70%	14.55%	7.20%	0.30%	0.30%	1.70%	
Medium Duty Vehicles	**Unmitigated**	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	
Passenger & Light Duty Vehicles	74.10	59.50	50.85	47.18	47.04	46.90	46.10	
Medium Duty Vehicles	9.60	9.60	7.20	7.20	7.20	7.20	7.20	
Heavy Duty Vehicles	6.01	6.01	4.51	4.51	4.51	4.51	4.51	

		R1-T 7	R1-T 8	R1-T 9	R1-T 10		R2-T 1	
Passenger & Light Duty Vehicles		0.60%	0.00%	0.00%	0.00%		4.00%	
Medium Duty Vehicles		0.00%	1.60%	0.00%	0.20%		0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	1.60%	1.90%	0.20%		0.00%	
Passenger & Light Duty Vehicles	46.10	45.83	45.83	45.83	45.83		43.99	
Medium Duty Vehicles	7.20	7.20	7.08	7.08	7.07		7.07	
Heavy Duty Vehicles	4.51	4.51	4.44	4.35	4.34		4.34	

		R2-T 2	R2-T 3	R2-T 4	R2-T 5	R2-T 6	R2-T 7	
Passenger & Light Duty Vehicles		6.00%	0.88%	1.50%	3.00%	0.07%	7.00%	
Medium Duty Vehicles		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Heavy Duty Vehicles	**MT/yr**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Passenger & Light Duty Vehicles	43.99	41.35	40.99	40.38	39.17	39.14	36.40	
Medium Duty Vehicles	7.07	7.07	7.07	7.07	7.07	7.07	7.07	
Heavy Duty Vehicles	4.34	4.34	4.34	4.34	4.34	4.34	4.34	

		R2-T 8					**Reduced MT/yr (ECele)**	**% Reduction**
Passenger & Light Duty Vehicles		2.41%						
Medium Duty Vehicles		0.00%						
Heavy Duty Vehicles	**MT/yr**	0.00%						
Passenger & Light Duty Vehicles	36.40	35.52					36	**52.06%**
Medium Duty Vehicles	7.07	7.07					7	**26.35%**
Heavy Duty Vehicles	4.34	4.34					4	**27.75%**
Reduced Total (MT/yr)							**47**	**47.68%**
Unmitigated Total (MT/yr)							89.71	

Sutter County
Input data for Green House Gas Emissions
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Nitrous Oxide

Airport Fuel Emissions Reductions

(U_{AAF})	Unmitigated MT/yr (E_{CWD})	R1-T 2					Reduced MT/yr (ECele)	% Reduction
Reductions		25.00%						
Annual Fuel Usage	0.0020075	0.0015056					0.0015056	25.00%

A4. Stationary Sources (Natural Gas)

Unit Type	Unmitigated MT/yr	R1-E 5	R1-E 7	R2-E 1	R2-E 3	R2-E 5	R2-E 7
Single Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Multi Family Residential Reduction		3.18%	3.90%	13.06%	1.77%	0.00%	0.00%
Commercial Reduction		3.18%	3.90%	0.00%	0.00%	17.82%	2.75%
Industrial Reduction		3.18%	3.90%	0.00%	0.00%	0.00%	2.75%
AG/RAN/ER	0.0605700	0.0586430	0.0563560	0.0489972	0.0481283	0.0481283	0.0481283
Low Density Residential	0.0404480	0.0391612	0.0376339	0.0327198	0.0321396	0.0321396	0.0321396
Medium Density Residential	0.0256670	0.0248504	0.0238813	0.0207629	0.0203947	0.0203947	0.0203947
High Density Residential	0.0115330	0.0111661	0.0107306	0.0093294	0.0091640	0.0091640	0.0091640
Park	0.0000480	0.0000465	0.0000447	0.0000447	0.0000447	0.0000367	0.0000357
Commercial	0.0553080	0.0535484	0.0514601	0.0514601	0.0514601	0.0422907	0.0411265
Mixed Use	0.0148940	0.0144202	0.0138578	0.0138578	0.0138578	0.0113885	0.0110750
Industrial	0.1462950	0.1416408	0.1361168	0.1361168	0.1361168	0.1361168	0.1323698

Unit Type	MT/yr (E_{Cng})	R1-I 1	R1-I 2				Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		0.00%	0.00%					
Multi Family Residential Reduction		0.00%	0.00%					
Commercial Reduction		0.00%	0.00%					
Industrial Reduction		13.00%	0.50%					
AG/RAN/ER	0.0481283	0.0481283	0.0481283				0.0481283	20.54%
Low Density Residential	0.0321396	0.0321396	0.0321396				0.0321396	20.54%
Medium Density Residential	0.0203947	0.0203947	0.0203947				0.0203947	20.54%
High Density Residential	0.0091640	0.0091640	0.0091640				0.0091640	20.54%
Park	0.0000357	0.0000357	0.0000357				0.0000357	25.64%
Commercial	0.0411265	0.0411265	0.0411265				0.0411265	25.64%
Mixed Use	0.0110750	0.0110750	0.0110750				0.0110750	25.64%
Industrial	0.1323698	0.1151617	0.1145859				0.1145859	21.67%
Total Reduced (MT/yr)							**0.2766498**	**22.02%**
Total Unmitigated (MT/yr)							**0.3547630**	

Sutter County
Input data for Green House Gas Emissions
2030
Reduced Inventory
Nitrous Oxide

B. Indirect Sources

B1. Electricity Emissions Reductions

Unit Type		R1-E 1	R1-E 2 & 3	R1-E 4	R1-E 6	R2-E 1	R2-E 2
Single Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Multi Family Residential Reduction		21.00%	10.00%	10.82%	7.60%	13.06%	13.18%
Commercial Reduction	Unmitigated	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
Industrial Reduction	MT/yr	21.00%	9.29%	10.82%	7.60%	0.00%	0.00%
AG/RAN/ER	0.2856500	0.2256635	0.2030972	0.1811220	0.1673568	0.1455039	0.1263299
Low Density Residential	0.1907565	0.1506976	0.1356279	0.1209529	0.1117605	0.0971672	0.0843629
Medium Density Residential	0.0552935	0.0436819	0.0393137	0.0350599	0.0323954	0.0281653	0.0244538
High Density Residential	0.0248449	0.0196275	0.0176647	0.0157534	0.0145561	0.0126555	0.0109878
Park	0.0002940	0.0002323	0.0002090	0.0001864	0.0001722	0.0001722	0.0001722
Commercial	0.3413458	0.2696632	0.2426969	0.2164371	0.1999878	0.1999878	0.1999878
Mixed Use	0.0919219	0.0726183	0.0653565	0.0582849	0.0538552	0.0538552	0.0538552
Industrial	0.9029003	0.7132912	0.6470621	0.5770500	0.5331942	0.5331942	0.5331942

Unit Type		R2-E 3	R2-E 4	R2-E 5	R2-E 6	R2-E 7	Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%		
Multi Family Residential Reduction		1.77%	5.91%	0.00%	0.00%	0.00%		
Commercial Reduction		0.00%	0.00%	17.82%	3.32%	2.75%		
Industrial Reduction	MT/yr (E_{Cele})	0.00%	0.00%	0.00%	3.32%	2.75%		
AG/RAN/ER	0.1263299	0.1240896	0.1167545	0.1167545	0.1167545	0.1167545	0.1167545	59.13%
Low Density Residential	0.0843629	0.0828668	0.0779684	0.0779684	0.0779684	0.0779684	0.0779684	59.13%
Medium Density Residential	0.0244538	0.0240201	0.0226003	0.0226003	0.0226003	0.0226003	0.0226003	59.13%
High Density Residential	0.0109878	0.0107929	0.0101549	0.0101549	0.0101549	0.0101549	0.0101549	59.13%
Park	0.0001722	0.0001722	0.0001722	0.0001416	0.0001369	0.0001331	0.0001331	54.73%
Commercial	0.1999878	0.1999878	0.1999878	0.1643532	0.1588960	0.1545219	0.1545219	54.73%
Mixed Use	0.0538552	0.0538552	0.0538552	0.0442591	0.0427895	0.0416116	0.0416116	54.73%
Industrial	0.5331942	0.5331942	0.5331942	0.5331942	0.5154901	0.5012997	0.5012997	44.48%

Unit Type		R2-E 9					Reduced MT/yr (ECele)	% reduction
Single Family Residential Reduction		3.18%						
Multi Family Residential Reduction		3.18%						
Commercial Reduction		3.18%						
Industrial Reduction	MT/yr (ECele)	3.18%						
AG/RAN/ER	0.1167545	0.11304					0.1130389	60.43%
Low Density Residential	0.077968414	0.07549					0.0754871	60.43%
Medium Density Residential	0.02260026	0.02188					0.021881	60.43%
High Density Residential	0.010154922	0.00983					0.0098318	60.43%
Park	0.000133089	0.00013					0.0001289	56.17%
Commercial	0.154521896	0.1496					0.1496044	56.17%
Mixed Use	0.041611604	0.04029					0.0402873	56.17%
Industrial	0.501299676	0.48535					0.4853462	46.25%
Reduced total (MT/year)							**0.90**	**52.69%**
Unmitigated total (MT/year)							**1.89**	

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B2. Potable Water Emissions Reductions

Unit Type	Unmitigated MT/yr	R1-E 8	R2-E 9				Reduced MT/yr (E_{Cele})	% reduction
Single Family Residential Reduction		21.00%	30.00%					
Multi Family Residential Reduction		21.00%	30.00%					
Commercial Reduction		21.00%	30.00%					
Industrial Reduction		21.00%	30.00%					
AG/RAN/ER	0.0003589	0.0002835	0.0001985				0.0001985	44.70%
Low Density Residential	0.0002397	0.0001893	0.0001325				0.0001325	44.70%
Medium Density Residential	0.0001521	0.0001202	0.0000841				0.0000841	44.70%
High Density Residential	0.0000683	0.0000540	0.0000378				0.0000378	44.70%
Park	0.0000000	0.0000000	0.0000000				0.0000000	44.70%
Commercial	0.0000119	0.0000094	0.0000066				0.0000066	44.70%
Mixed Use	0.0000032	0.0000025	0.0000018				0.0000018	44.70%
Industrial	0.0000314	0.0000248	0.0000174				0.0000174	44.70%
Reduced total (MT/year)							**0.0004787**	**44.70%**
Unmitigated total (MT/year)							**0.0008656**	

B3. Solid Waste

Combined: B3a. Anthropogenic Carbon and B3b. Exhaust Emissions Reductions

Unit Type	Unmitigated MT/yr	R2-W 1	R2-W 2	R2-W 3			Reduced MT/yr (E_{Cele})	% Reduction
Single Family Residential Reduction		14.07%	5.80%	10.19%				
Multi Family Residential Reduction		14.07%	5.80%	10.19%				
Commercial Reduction		14.07%	5.80%	10.19%				
Industrial Reduction		14.07%	5.80%	10.19%				
AG/RAN/ER	0.0007640	0.0006565	0.0006184	0.0005555			0.0005555	27.30%
Low Density Residential	0.0005102	0.0004384	0.0004130	0.0003709			0.0003709	27.30%
Medium Density Residential	0.0003238	0.0002782	0.0002621	0.0002354			0.0002354	27.30%
High Density Residential	0.0001455	0.0001250	0.0001178	0.0001058			0.0001058	27.30%
Park	0.0000001	0.0000001	0.0000001	0.0000001			0.0000001	27.30%
Commercial	0.0001349	0.0001159	0.0001092	0.0000981			0.0000981	27.30%
Mixed Use	0.0000363	0.0000312	0.0000294	0.0000264			0.0000264	27.30%
Industrial	0.0003568	0.0003066	0.0002888	0.0002594			0.0002594	27.30%
Total Reduced (MT/year)							**0.0016515**	**27.30%**
Total Unmitigated (MT/yr)							**0.0022716**	

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B3c. Exhaust Emissions (Disposal Equipment) Reductions

Vehicle Type							Reduced MT/yr	%
Reductions	MT/yr (E_{CWD})						(ECele)	Reduction
Excavator	0.0000000	0.0000000					0.0000000	0.00%
Grader	0.0000000	0.0000000					0.0000000	0.00%
Off-Highway Tractor	0.0000000	0.0000000					0.0000000	0.00%
Off-Highway Truck	0.0000000	0.0000000					0.0000000	0.00%
Rubber Tired Dozer	0.0000000	0.0000000					0.0000000	0.00%
Disposal Facility run by City?							No	
Total Reduced (MT/year)							**0.0000000**	**0.00%**
Total Unmitigated (MT/yr)							**0.0000000**	

B4. Wastewater Emissions Reduction

Unit Type		R2-E 9					Reduced MT/yr	%
Single Family Residential Reduction		30.00%						
Multi Family Residential Reduction		30.00%						
Commercial Reduction	Unmitigated	30.00%						
Industrial Reduction	MT/yr	30.00%					(E_{Cele})	Reduction
AG/RAN/ER	0.0001274	0.0000892					0.0000892	30.00%
Low Density Residential	0.0001073	0.0000751					0.0000751	30.00%
Medium Density Residential	0.0000311	0.0000218					0.0000218	30.00%
High Density Residential	0.0000140	0.0000098					0.0000098	30.00%
Park	0.0000000	0.0000000					0.0000000	30.00%
Commercial	0.0000046	0.0000032					0.0000032	30.00%
Mixed Use	0.0000012	0.0000009					0.0000009	30.00%
Industrial	0.0000137	0.0000096					0.0000096	30.00%
Total Reduced (MT/year)							**0.0002095**	**30.00%**
Total Unmitigated (MT/yr)							**0.0002994**	

C. AG Emissions Reductions for N_2O.

Emissions Source	Unmitigated	R1-A 1					Reduced	%
Reductions	MT/yr	7.80%					MT/yr	Reduction
Manure Management - Dairy Cows	3.39	3.13					3.13	7.80%
Manure Management - Other Animals	2.10	2.10					2.10	0.00%
Animals and Runoff	247.43	247.43					247.43	0.00%
Crop Growth	1201.80	1,201.80					1,201.80	0.00%
Fertilizer Use	321.81	321.81					321.81	0.00%
Agricultural Residue Burning	3.05	3.05					3.05	0.00%
Total Reduced (MT/year)							**1,779.31**	**0.01%**
Total Unmitigated (MT/yr)							**1,779.57**	

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D. Summary Table

Source Type		Emissions, MT /yr	CO_2e metric tons/yr
Direct	Motor vehicles & Aircraft	46.94	14,550.44
	Landscape equipment	0.00	0.30
	Cooling and heating	1.83	566.19
	Total direct, tons/yr	**48.76**	**15,116.93**
Indirect	Electricity	0.90	277.64
	Potable water	0.00	0.15
	Solid waste	0.00	0.51
	Wastewater	0.00	0.06
	Total indirect, tons/yr	**0.90**	**278.36**
Agriculture		1,779.31	551,584.68
	Total, tons/yr	**1,828.97**	**566,979.98**
	Global warming potential index	310	

Source Type		Emissions, MT/yr	CO_2e metric tons/yr
Residential	AG/RAN/ER	13.39	4,150.61
	Low Density Residential	8.94	2,771.70
	Medium Density Residential	5.65	1,750.53
	High Density Residential	2.54	786.56
	Total Residential	**30.51**	**9,459.40**
Commercial	Park	0.00	1.25
	Commercial	4.87	1,508.16
	Mixed Use	1.31	406.15
	Total Commercial	**6.18**	**1,916.03**
Industrial	Industrial	12.97	4,019.87
	Total Industrial	**12.97**	**4,019.87**
Agricultural		**1,779.31**	**551,584.68**
	Total, tons/yr	**1,828.97**	**566,979.98**
	Global warming potential index	310	