4.6 GREENHOUSE GAS EMISSIONS

This chapter summarizes the results of the Greenhouse Gas Analysis prepared for the Community Plan (Appendix B). The County uses guidance from the San Luis Obispo Air Pollution Control District (SLOAPCD) for assessing the significant of GHG impacts. This analysis uses the recommended efficiency threshold of 4.9 metric tons of carbon dioxide equivalent (MT CO_2E) per service population for determining significance of GHG impacts.

The emission sources include construction (off-road vehicles); mobile (on-road vehicles); area sources (landscape maintenance equipment); water and wastewater; and solid waste. Emissions estimates in this report incorporate Community Plan compliance with applicable regulations, including the 2013 and 2016 Title 24 Part 6 (California Energy Code) and Part 11 (California Green Building Standards) requirements. The Community Plan would result in GHG emissions of 4.3 MT CO_2E per service population. By emitting less than 4.9 MT CO_2E per service population, the Community Plan's contribution of GHGs to cumulative statewide emissions would be less than cumulatively considerable. Therefore, direct and indirect GHG emissions would have a less than significant impact on the environment. In addition, the Community Plan would not conflict with the goals and strategies of local and state plans, policies, and regulations adopted to reduce GHG emissions. Thus, impacts associated with applicable policies, plans, and regulations would be less than significant.

4.6.1 Setting

a. Climate Change and Greenhouse Gases.

Understanding Global Climate Change. To evaluate the incremental effect of the Community Plan on statewide GHG emissions and global climate change, it is important to have a basic understanding of the nature of the global climate change problem. Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. The earth's climate is in a state of constant flux with periodic warming and cooling cycles. Extreme periods of cooling are termed "ice ages," which may then be followed by extended periods of warmth. For most of the earth's geologic history, these periods of warming and cooling have been the result of many complicated interacting natural factors that include: volcanic eruptions that spew gases and particles (dust) into the atmosphere; the amount of water, vegetation and ice covering the earth's surface; subtle changes in the earth's orbit; and the amount of energy released by the sun (sun cycles). However, since the beginning of the Industrial Revolution around 1750, the average temperature of the earth has been increasing at a rate that is faster than can be explained by natural climate cycles alone.

With the Industrial Revolution came an increase in the combustion of carbon-based fuels such as wood, coal, oil, natural gas, and biomass. Industrial processes have also created emissions of substances not found in nature. This in turn has led to a marked increase in the emissions of gases shown to influence the world's climate. These gases, termed "greenhouse" gases (or GHG), influence the amount of heat

trapped in the earth's atmosphere. Because recently observed increased concentrations of GHGs in the atmosphere are related to increased emissions resulting from human activity, the current cycle of "global warming" is generally believed to be largely due to human activity. Of late, the issue of global warming or global climate change has arguably become the most important and widely debated environmental issue in the United States and the world. The effects of global warming or global climate change may impact ecosystems in a broad variety of ways, including rising surface temperatures, loss of snow pack, sea level rise, more extreme weather events, and more drought years. Even though there has been improvements over the past decade in understanding what is responsible for global climate change, scientific uncertainties remain regarding the response of the Earth's climate system to combinations of changes, particularly at a regional and local level. Because it is the collective of human actions taking place throughout the world that contributes to climate change, it is quintessentially a global or cumulative issue.

Greenhouse Gases of Primary Concern. There are numerous GHGs, both naturally occurring and manmade. Table 4.6-1 summarizes some of the most common. Each GHG has variable atmospheric lifetime and global warming potential (GWP).

Table 4.6-1. Global Warming Potentials and Atmospheric Lifetimes *(in years)*

Gas	Atmospheric Lifetime	100-year GWP	20-year GWP
Carbon dioxide (CO_2)	50–200	1	1
Methane (CH_4)*	12.4	28	84
Nitrous oxide (N_2O)	121	265	264
HFC-23	222	12,400	10,800
HFC-32	5.2	677	2,430
HFC-125	28.2	3,170	6,090
HFC-134a	13.4	1,300	3,710
HFC-143a	47.1	4,800	6,940
HFC-152a	1.5	138	506
HFC-227ea	38.9	3,350	5,360
HFC-236fa	242	8,060	6,940
HFC-43-10mee	16.1	1,650	4,310
CF_4	50,000	6,630	4,880
C_2F_6	10,000	11,100	8,210
C_3F_8	2,600	8,900	6,640
C_4F_{10}	2,600	9,200	6,870
c-C_4F_8	3,200	9,540	7,110
C_5F_{12}	4,100	8,550	6,350
C_6F_{14}	3,100	7,910	5,890
SF_6	3,200	23,500	17,500

Source: Intergovernmental Panel on Climate Change (IPCC) 2013.

The atmospheric lifetime of the gas is the average time a molecule stays stable in the atmosphere. Most GHGs have a long atmospheric lifetime, staying in the atmosphere hundreds or thousands of years. GWP is a measure of the potential for a gas to trap heat and warm the atmosphere. Although GWP is related

to its atmospheric lifetime, many other factors including chemical reactivity of the gas also influence GWP. GWP is reported as a unitless factor representing the potential for the gas to affect global climate relative to the potential of CO_2. Because CO_2 is the reference gas for establishing GWP, by definition its GWP is 1. Although methane (CH_4) has a shorter atmospheric lifetime than CO_2, it has a 100-year GWP of 25; this means that CH_4 has 25 times more effect on global warming than CO_2 on a molecule-by-molecule basis.

All of the gases in **Table 4.6-1** are produced by both biogenic (natural) and anthropogenic (human) sources. These are the GHGs of primary concern in this analysis. CO_2 would be emitted by the future land uses consistent with the Community Plan due to the combustion of fossil fuels in vehicles (including construction); from electricity generation and natural gas consumption; water use and from solid waste disposal. Smaller amounts of CH_4 and nitrous oxide (N_2O) also would be emitted from operations of future development.

State and Regional GHG Inventories. The California Air Resources Board (CARB) performs statewide GHG inventories. The inventory is divided into nine broad sectors of economic activity: agriculture, commercial, electricity generation, forestry, high GWP emitters, industrial, recycling and waste, residential and transportation. Emissions are quantified in million metric tons of CO_2 equivalent (MMT CO_2E). **Table 4.6-2** shows the estimated statewide GHG emissions for the years 1990, 2008 and 2012.

Table 4.6-2. California GHG Emissions by Sector in 1990, 2008, and 2012

Sector	1990 Emissions in MMT CO_2E (% total) [1,2]	2008 Emissions in MMT CO_2E (% total) [2,3]	2012 Emissions in MMT CO_2E (% total) [2,3]
Sources[4]			
Agriculture	23.4 (5%)	37.99 (7%)	37.86 (7%)
Commercial	14.4 (3%)	13.37 (3%)	14.20 (3%)
Electricity Generation	110.6 (26%)	120.15 (25%)	95.09 (19%)
High GWP	--	12.87 (2%)	18.41 (3%)
Industrial	103.0 (24%)	87.54 (18%)	89.16 (21%)
Recycling and Waste	--	8.09 (1%)	8.49 (2%)
Residential	29.7 (7%)	29.07 (6%)	28.09 (7%)
Transportation	150.7 (35%)	178.02 (37%)	167.38 (38%)
Forestry (Net CO_2 flux)[5]	-6.5	--	--
Not Specified	1.3	--	--
Total	**426.6**	**487.10**	**458.68**

Source: CARB 2007 and 2014a.

1 *1990 data was retrieved from the CARB 2007 source.*
2 *Percentages may not total 100 due to rounding.*
3 *2008 and 2012 data was retrieved from the CARB 2014a source.*
4 *Reported emissions for key sectors. The inventory totals for 2008 and 2012 did not include Forestry or Not Specified sources.*
5 *Forestry includes 6.69 MMT CO2E sink from forests sequestration and a 0.19 MMT CO2E source from forest and range management.*

As shown in **Table 4.6-2**, statewide GHG source emissions totaled about 427 MMT CO_2E in 1990, 487 MMT CO_2E in 2008, and 459 MMT CO_2E in 2012. Many factors affect year-to-year changes in GHG emissions, including economic activity, demographic influences, environmental conditions such as drought, and the impact of regulatory efforts to control GHG emissions. The CARB has adopted multiple GHG emission reduction measures, the effect of those which will be seen over the following years. According to the CARB, substantial reductions since 2008 have been driven by economic factors (recession), previous energy efficiency actions, and the renewable portfolio standard (CARB 2014a). Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

A 2006 baseline GHG inventory for the County was prepared as part of the County's update of the Conservation and Open Space Element of the General Plan. The inventory identifies the major sources of GHG emissions within the unincorporated county and from County government operations. **Table 4.6-3** summarizes the 2006 County inventory. As shown, transportation is the greatest source of community-wide and government operation emissions.

Table 4.6-3. San Luis Obispo County GHG Emissions in 2006

Sector	2006 GHG Emissions (MT CO_2E)	Percent of Total
Unincorporated San Luis Obispo County		
Residential	136,360	15%
Commercial/Industrial	215,970	24%
Transportation	365,260	40%
Waste	30,540	3%
Other – Crops	22,630	2%
Other – Livestock	83,420	9%
Other – Off-Road Equipment	63,280	7%
Other – Aircraft	240	<0.1%
Total	**917,710**	**100%**
San Luis Obispo County Operations		
Buildings	4,970	30%
Vehicle Fleet	3,360	20%
Employee Commute	7,800	46%
Streetlights	60	0.4%
Water/Sewage	410	2%
Waste	270	2%
Other	<10	<0.1%
Total	**16,870**	**100%**

Source: County of San Luis Obispo 2011.
Note: Totals may vary due to independent rounding.

Existing Los Osos GHG Emissions. The Community Plan area is a current source of GHG emissions. Current sources of GHG emissions are associated with the vehicle use, energy use, water use, area sources (landscaping and other equipment use), and waste disposal practices with these existing land uses. Existing GHG emissions associated with the existing uses were calculated using the California Emissions Estimator Model (CalEEMod) version 2013.2.2 released in September 2013 by the California Air Pollution Control Officers Association (CAPCOA 2013), and the results are summarized in **Table 4.6-4**.

Table 4.6-4. Existing (2016) Annual GHG Emissions *(in MT CO_2E)*

Emission Source	**Existing GHG Emissions**
Vehicles	46,494
Energy Use	25,281
Area Sources	8,189
Water Use	1,530
Solid Waste Disposal	3,389
Total	**84,883**
Service Population	*16,676*
GHG Emissions per Service Population	***5.0***
Note: Totals may vary due to independent rounding.	

b. Regulatory Setting. In response to rising concern associated with increasing GHG emissions and global climate change impacts, several plans and regulations have been adopted at the international, national, and state levels with the aim of reducing GHG emissions. The following is a discussion of the federal, state, and local plans and regulations most applicable to the Community Plan.

Federal.

Environmental Protection Agency

The U.S. EPA has many federal level programs and projects to reduce GHG emissions. The U.S. EPA provides technical expertise and encourages voluntary reductions from the private sector. One of the voluntary programs applicable to the Community Plan is the Energy Star program.

Energy Star is a joint program of the U.S. EPA and the U.S. Department of Energy, which promotes energy-efficient products and practices. Tools and initiatives include the Energy Star Portfolio Manager, which helps track and assess energy and water consumption across an entire portfolio of buildings, and the Energy Star Most Efficient 2013, which provides information on exceptional products that represent the leading edge in energy-efficient products in 2013 (U.S. EPA 2013).

The U.S. EPA also partners with the public sector, including states, tribes, localities, and resource managers to encourage smart growth, sustainability preparation and renewable energy and climate change preparation. These initiatives include the Clean Energy–Environment State Partnership Program,

the Climate Ready Water Utilities Initiative, the Climate Ready Estuaries Program and the Sustainable Communities Partnership (U.S. EPA 2014).

Corporate Average Fuel Economy Standards

The federal Corporate Average Fuel Economy (CAFE) standards determine the fuel efficiency of certain vehicle classes in the U.S. Current CAFE standards require vehicle manufacturers of passenger cars and light-duty trucks to achieve an average fuel economy of 35.5 miles per gallon by 2016 and an average fuel economy of 54.5 miles per gallon by 2025. With improved gas mileage, fewer gallons of transportation fuel would be combusted to travel the same distance, thereby reducing nationwide GHG emissions associated with vehicle travel.

State. The State of California has a number of policies and regulations that are either directly or indirectly related to GHG emissions. Only those most relevant to land use planning and development are included in this discussion.

S-3-05—Statewide GHG Emission Targets

This executive order (EO) established the following GHG emission reduction targets for the State of California:

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

This EO also directs the secretary of the California EPA to oversee the efforts made to reach these targets, and to prepare biannual reports on the progress made toward meeting the targets and on the impacts to California related to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. With regard to impacts, the report shall also prepare and report on mitigation and adaptation plans to combat the impacts. The first Climate Action Team Assessment Report was produced in March 2006, and has been updated every two years.

B-30-15—2030 Statewide GHG Emission Goal

This EO, issued on April 29, 2015, establishes an interim GHG emission reduction goal for the State of California to reduce GHG emissions 40 percent below 1990 levels by 2030. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05. Additionally, this EO directed the CARB to update its Climate Change Scoping Plan to address the 2030 goal. The CARB is expected to develop statewide inventory projection data for 2030, as well as commence its efforts to identify reduction strategies capable of securing emission reductions that allow for achievement of the EO's new interim goal.

Assembly Bill 32—California Global Warming Solutions Act

In response to EO S-3-05, the California Legislature passed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, and thereby enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 requires that the CARB establish an emissions cap and adopt rules and regulations that would reduce GHG emissions to 1990 levels by 2020. AB 32 also required the CARB to adopt a plan by January 1, 2009 indicating how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions.

Senate Bill 32—California Global Warming Solutions Act: Emissions Limit

In August 2016, the California Legislature approved Senate Bill (SB) 32; and in September 2016, it was signed by the governor. Under SB 32, the state would reduce its GHG emissions to 40 percent below 1990 levels by 2030. SB 32 is tied to AB 197, which would establish a legislative oversight committee to which the chair of the CARB would report once a year, and would add two members of the Legislature to the air board. Additionally, in implementing the 40 percent reduction target, AB 197 would require the CARB to prioritize emissions reductions to consider the social costs of the emissions of GHGs. AB 197 defines "social costs" to mean "an estimate of the economic damages, including, but not limited to, changes in net agricultural productivity; impacts to public health; climate adaptation impacts, such as property damages from increased flood risk; and changes in energy system costs, per metric ton of GHG emission per year."

Climate Change Scoping Plan

As directed by the California Global Warming Solutions Act of 2006, in 2008, the CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan). The 2008 Scoping Plan identifies the main strategies the State of California will implement to achieve the GHG reductions necessary to reduce statewide forecasted business as usual (BAU) GHG emissions in 2020 to the state's historic 1990 emissions level.

In 2014, the CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (2014 Scoping Pan) (CARB 2014b). The 2014 Scoping Plan "highlights California's success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050" (CARB 2014b). The 2014 Scoping Plan found that California is on track to meet the 2020 emissions reduction mandate established by AB 32 and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals (CARB 2014b).

The 2008 Scoping Plan and the 2014 Scoping Plan represent important milestones in California's efforts to reduce GHG emissions statewide. The law also requires the Scoping Plan to be updated every five years. The Scoping Plan process, as stated, is also thorough and encourages public input and participation.

In January 2017, the CARB released proposed the 2017 Climate Change Scoping Plan Update, the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (Proposed Second Update to the Scoping Plan; CARB 2017). The comment period for the Proposed Second Update to the Scoping Plan will last until March 2017. The Propose Second Update to the Scoping Plan identifies State strategy for achieving the State's 2030 interim reduction target codified by SB 32. The plan proposes to build-on existing programs such as the Cap-and-Trade Regulation, Low Carbon Fuel Standard, Advanced Clean Cars Program, Renewable Portfolio Standard (RPS), Sustainable Communities Strategy, and the Short-lived Climate Pollutant Reduction Strategy. It also proposes further strategies to reduce waste emissions through cogeneration, reduce GHG emissions from the refinery sector by 20 percent, and new policies to address GHG emissions from natural and working lands.

Regional Emissions Targets – Senate Bill 375

Senate Bill (SB) 375, the 2008 Sustainable Communities and Climate Protection Act, was signed into law in September 2008 and requires the CARB to set regional targets for reducing passenger vehicle GHG emissions in accordance with the Scoping Plan. The purpose of SB 375 is to align regional transportation planning efforts, regional GHG reduction targets, and fair-share housing allocations under state housing law. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy or Alternative Planning Strategy to address GHG reduction targets from cars and light-duty trucks in the context of that MPO's Regional Transportation Plan. The San Luis Obispo Council of Governments (SLOCOG) is the San Luis Obispo region's MPO. The CARB targets for the SLOCOG region require a 8 percent reduction in GHG emissions per capita from automobiles and light-duty trucks compared to 2005 levels by 2020, and an 8 percent reduction by 2035 (SLOCOG 2014).

Renewables Portfolio Standard

The RPS promotes diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Originally adopted in 2002 with a goal to achieve a 20 percent renewable energy mix by 2020 (referred to as the "Initial RPS"), the goal has been accelerated and increased by EOs S-14-08 and S-21-09 to a goal of 33 percent by 2020. In April 2011, SB 2 (1X) codified California's 33 percent RPS goal. In September 2015, the California Legislature passed SB 350, which increases California's renewable energy mix goal to 50 percent by year 2030. Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.

AB 341 – Solid Waste Diversion

The Commercial Recycling Requirements mandate that businesses (including public entities) that generate 4 cubic yards or more of commercial solid waste per week and multi-family residential with five units or more arrange for recycling services. Businesses can take one or any combination of the following in order to reuse, recycle, compost, or otherwise divert solid waste from disposal. Additionally, AB 341 mandates that 75 percent of the solid waste generated be reduced, recycled, or composted by 2020.

California Code of Regulations, Title 24 – California Building Code

The California Code of Regulations, Title 24, is referred to as the California Building Code (CBC). It consists of a compilation of several distinct standards and codes related to building construction including plumbing, electrical, interior acoustics, energy efficiency, handicap accessibility, and so on. Of particular relevance to GHG reductions are the CBC's energy efficiency and green building standards.

The California Code of Regulations, Title 24, Part 6 is the Energy Efficiency Standards or California Energy Code. The previous version of the Energy Code, known as the 2013 Energy Code, became effective July 1, 2014. The most current version of the Energy Code, the 2016 Energy Code, became effective January 1, 2017.

Based on an impact analysis prepared by the California Energy Commission (CEC) for single-family residences, the 2013 Energy Code was estimated to achieve a 36.4 percent increase in electricity efficiencies and a 6.5 percent increase in natural gas efficiencies over the 2008 Energy Code (CEC 2013). The same report estimates increased efficiencies for multi-family residences of 23.3 percent for electricity use and 3.8 percent for natural gas use. Non-residential structures were estimated to achieve a 21.8 and 16.8 percent increase in electricity and natural gas efficiencies, respectively. Until the 2016 Title 24 requirements take effect, the CEC cannot complete a comprehensive study characterizing the resulting electricity demand and natural gas use reductions. However, preliminary CEC estimates indicate that residences built consistent with 2016 Title 24 requirements will be 28 percent more energy efficient than homes built consistent with 2013 Title 24 requirements and non-residential uses built consistent with 2016 Title 24 requirements will be 5 percent more energy efficient than those built consistent with 2013 Title 24 requirements (CEC 2015).

The California Green Building Standards Code, referred to as CalGreen, was added to Title 24 as Part 11 first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 CBC). The 2013 CalGreen institutes mandatory minimum environmental performance standards for all ground-up new construction of non-residential and residential structures. It also includes voluntary tiers (I and II) with stricter environmental performance standards for these same categories of residential and non-residential buildings.

The mandatory standards require:

- 20 percent reduction in indoor water use relative to specified baseline levels;
- 50 percent construction/demolition waste diverted from landfills;
- Inspections of energy systems to ensure optimal working efficiency;
- Low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards;
- Dedicated circuitry to facilitate installation of electric vehicle charging stations in newly constructed attached garages for single family and duplex dwellings; and
- Installation of electric vehicle charging stations at least three percent of the parking spaces for all new multi-family developments with 17 or more units.

Local. The County of San Luis Obispo General Plan Conservation and Open Space Element Goal 4 sets forth a countywide GHG emissions reduction target to reduce emissions to 15 percent below 2006 levels by the year 2020. In addition, Implementation Strategy AQ 4.2.5 required that the County develop and implement a Climate Action Plan in order to achieve the reduction target. The Board of Supervisors adopted a Climate Action Plan called the EnergyWise Plan on November 22, 2011. The EnergyWise Plan outlines the County's approach to reducing GHG emissions through a number of goals, measures, and actions that provide a road map to achieving the County's GHG reduction target of 15 percent below baseline levels by 2020 (County of San Luis Obispo 2011). The EnergyWise Plan includes reduction measures associated with energy conservation, renewable energy, solid waste, land use and transportation, water conservation, and agriculture. The Implementation Program of the EnergyWise Plan provides a strategy for action with specific measures and steps to achieve the identified reduction targets.

4.6.2 Impact Analysis

a. Methodology and Significance Thresholds.

Methodology. GHG emissions were estimated using CalEEMod (CAPCOA 2013). In brief, the model estimates criteria air pollutants and GHG emissions by multiplying emission source intensity factors by estimated quantities of emission sources based on the land use information. All CalEEMod estimates are in terms of total MT CO_2E. Emission estimates were calculated for the three GHGs of primary concern (CO_2, CH_4, and N_2O) that would be emitted from the five primary operational sources that would be associated with Community Plan buildout: mobile sources, area sources, energy use, water use, and solid waste disposal. The following is a brief discussion of the methodology used to calculate GHG emissions from each of these sources.

Construction: Construction activities emit GHGs primarily though combustion of fuels (mostly diesel) in the engines of off-road construction equipment and through combustion of diesel and gasoline in on-road construction vehicles and in the commute vehicles of the construction workers. Smaller amounts of

GHGs are also emitted indirectly through the energy use embodied in any water use (for fugitive dust control) and lighting for the construction activity. At a program level, it would be speculative to estimate the schedule and construction requirements of individual projects included in the Community Plan. Thus, this analysis relies on the SLOAPCD which forecasts that 2020 construction emissions would comprise 1.96 percent of total GHG emissions within the county (SLOAPCD 2012). Therefore, construction emissions are estimated at 1.96 percent of the total operational GHG emissions associated with the Community Plan area.

Vehicles: GHG emissions from vehicles come from the combustion of fossil fuels in vehicle engines. The vehicle emissions are calculated based on the vehicle type and the trip rate for each land use. The vehicle emission factors and fleet mix used in CalEEMod are derived from the CARB's Emission Factors 2011 model, which includes GHG reducing effects from the implementation of Pavley I (Clean Car Standards) and the Low Carbon Fuel Standard, and are thus considered in the calculation of standards for Community Plan emissions. The emissions from mobile sources were reduced by an additional 3 percent to account for implementation of Low Emission Vehicles III and the Tire Pressure Program. Community Plan trip generation rates were obtained from the Transportation Impact Analysis Report prepared for the Community Plan (Appendix E). Trip lengths were based on the average trip length in County. Based on data reported by SLOAPCD, the existing, year 2020, and year 2035 average regional trip length trip lengths in the County are 5.56, 5.67, and 5.20, respectively (CARB 2014c).

Electricity and Natural Gas: GHGs are emitted as a result of activities in buildings for which electricity and natural gas are used as energy sources. As identified by the CEC, the 2013 Energy Code required various improvements in the built environment that would achieve a 36.4 percent increase in electricity efficiencies and a 6.5 percent increase in natural gas efficiencies in single family residential buildings, a 23.3 percent increase in electricity efficiencies and a 3.8 percent increase in natural gas efficiencies in multi-family residential buildings, and a 21.8 percent increase in electricity efficiency and a 16.8 percent increase in natural gas efficiency in non-residential buildings (CEC 2013). Additionally, the 2016 Energy Code, which became effective January 1, 2017, would increase residential energy efficiency by an additional 28 percent over the 2013 Energy Code and would increase non-residential energy efficiency by an additional 5 percent over the 2013 Energy Code (CEC 2015). The Community Plan would be served by Pacific Gas & Electric (PG&E). Therefore, PG&E's specific energy-intensity factors (i.e., the amount of CO_2, CH_4, and N_2O per kilowatt-hour) are used in the calculations of GHG emissions. PG&E currently has renewable energy procurement of 28.0 percent. As discussed, the state mandate for renewable energy is 33 percent by 2020 and 50 percent by 2030.

Area Sources: Area sources include GHG emissions that would occur from the use of landscaping equipment. The use of landscape equipment emits GHGs associated with the equipment's fuel combustion. The landscaping equipment emission values were derived from the 2011 In-Use Off-Road Equipment Inventory Model (CARB 2011).

Water and Wastewater: The amount of water used and wastewater generated by a project has indirect GHG emissions associated with it. These emissions are a result of the energy used to supply, distribute, and treat the water and wastewater. In addition to the indirect GHG emissions associated with energy use, wastewater treatment can directly emit both CH_4 and N_2O. New development would be subject to California Green Building Standards Code (CalGreen), which requires a 20 percent increase in indoor water use efficiency. Thus, in order to demonstrate compliance with CalGreen, a 20 percent reduction in indoor water use was included in the water consumption calculations for new development.

Solid Waste: The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. To calculate the GHG emissions generated by disposing of solid waste for the Community Plan, the total volume of solid waste was calculated using waste disposal rates identified by California Department of Resources Recycling and Recovery. The methods for quantifying GHG emissions from solid waste are based on the Intergovernmental Panel on Climate Change method, using the degradable organic content of waste. GHG emissions associated with the Community Plan's waste disposal were calculated using these parameters. According to a CalRecyle report to the Legislature, as of 2013 California has achieved a statewide 50 percent diversion of solid waste from landfills through "reduce/recycle/compost" programs (CalRecycle 2015). However, AB 341 mandates that 75 percent of the solid waste generated be reduced, recycled, or composted by 2020. Therefore, to account for the continuing actions of recycling requirements under State law (i.e. AB 341), a 25 percent solid waste diversion rate was included in the model.

Significance Thresholds. In accordance with Appendix G of the State CEQA Guidelines, impacts would be significant if development under the Community Plan would result in any of the following:

- *Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or*
- *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs.*

The County uses guidance from the SLOAPCD for assessing the significant of GHG impacts. The SLOAPCD's document *GHG Thresholds and Supporting Evidence* (SLOAPCD 2012) describes the SLOAPCD's approach to developing a threshold of significance for GHG emissions to identify the emissions level for which a project would not be expected to substantially conflict with existing legislation adopted to reduce statewide GHG emissions.

Different thresholds have been developed to accommodate various development types and patterns. Three options are recommended for residential/commercial development: Qualitative Reduction Strategies, Bright-Line Threshold, and Efficiency-Based Threshold. Residential and commercial projects may use any of the three options to determine the significance of a projects GHG emission impact to a level of certainty for lead agencies (SLOAPCD 2012). This analysis uses the recommended efficiency threshold for determining significance of GHG impacts.

An efficiency threshold is a GHG emission threshold in terms of GHG emissions per residential and employment population (i.e., service population). The SLOAPCD recommends an efficiency threshold of 4.9 MT CO_2E per service population (SLOAPCD 2012). This method allows highly efficient projects (e.g., compact and mixed use development) with higher mass emissions to meet the overall GHG reduction goals of AB 32. This approach allows the threshold to be applied evenly to all project types (residential, commercial/retail and mixed use) and uses an emissions inventory comprised only of emission sources from land-use related sectors. The efficiency-based threshold encourages infill and transit-oriented development and puts highly auto-dependent suburban and rural development at a severe disadvantage. GHG efficiency thresholds are determined by dividing the statewide GHG emissions inventory goal (allowable emissions) by the estimated statewide 2020 population and employment (i.e., service population).

b. Impacts and Mitigation Measures.

Threshold: Would actions under the Community Plan generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Impact GHG-1 The Community Plan would generate GHG emissions from construction and operation. GHG emissions would be less than the emission threshold of 4.9 MT CO_2E per service population. The Community Plan's contribution of GHGs to cumulative statewide emissions would be less than cumulatively considerable. Therefore, impacts related to GHG emissions from development under the Community Plan are Class III, *less than significant*.

The impact analysis for the year 2020 calculated primary sources of direct and indirect GHG emissions. Additionally, for informational purposes, the buildout year 2035 GHG emissions have been calculated. **Table 4.6-5** summarizes the Community Plan emissions.

Table 4.6-5. Year 2020 and Year 2035 Annual GHG Emissions *(in MT CO_2E)*		
Emission Source	**Year 2020 GHG Emissions**	**Year 2035 GHG Emissions**
Vehicles	51,965	44,364
Energy Use	26,787	22,160
Area Sources	10,599	10,599
Water Use	1,726	1,380
Solid Waste Disposal	3,249	3,249
Construction	405	349
Total	**94,731**	**82,100**
Service Population	*21,942*	*21,942*
GHG Emissions per Service Population	***4.3***	***3.7***
Note: Totals may vary due to independent rounding.		

As shown, year 2020 GHG emissions associated with implementation of the Community Plan would be 94,731 MT CO_2E and year 2035 GHG emissions would be 82,100 MT CO_2E. This decrease is a result of federal, state, and local implementation measures such as increased vehicle efficiency standards and PG&E's increase in renewable sources of energy in accordance with RPS goals.

The service population for the Community Plan was determined using the average household size for Los Osos and employment densities provided by SLOCOG. In Los Osos, there is an average of 2.2 persons per occupied dwelling unit. Retail uses have on average 2.39 employees per 1,000 square feet and office uses have on average 2.52 employees per 1,000 square feet (SLOAPCD 2012). Using this data, it was calculated that buildout of the Community Plan would have a service population of 20,469 (see **Table 4.6-6**).

Table 4.6-6. Service Population Calculations			
Land Use	**Household Size/Employment Density**	**Amount**	**Population**
Residential	2.20 person per dwelling unit	8,182 dwelling units	18,000
Retail	2.39 employees per 1,000 square feet	668,100 square feet	1,597
Office	2.52 employees per 1,000 square feet	346,200 square feet[1]	872
Total			**20,469**
[1]Includes Commercial/Service and Office land uses			

As shown in **Table 4.6-5**, in year 2020, the Community Plan would result in GHG emissions of 4.3 MT CO_2E per service population annually. By year 2035, GHG emissions would decrease to 3.7 MT CO_2E per service population annually. By emitting less than 4.9 MT CO_2E per service population, the Community Plan's contribution of GHGs to cumulative statewide emissions would be less than cumulatively

considerable. Therefore, GHG emission impacts associated with the Community Plan would be **Class III**, *less than significant*.

Additionally, the proposed Community Plan includes many policies and programs that would further reduce GHG emissions. These include:

> *Program PS-2.1: Water – **Groundwater management.** The Los Osos Groundwater Basin Watermaster, the County, and the Water Purveyors should work cooperatively to reduce water demands in the Los Osos Groundwater Basin. Actions should include, but not be limited to, the following programs identified in the Basin Plan:*
>
> *A. Groundwater Monitoring Program (M)*
> *B. Urban Water Efficiency Program (E)*
> *C. Urban Water Reinvestment Program (U)*
> *D. Wellhead Protection (P)*
> *E. Infrastructure Program A (A)*
> *F. Infrastructure Program C (C)*
>
> *Program LU-3.2: **CBD design and enhancement.** If there is property owner interest, the County should facilitate development of a design plan and possible accompanying standards and guidelines for the central business district that implement the following design principles, in addition to design standards and guidelines listed for the central business district in Chapter 7, Planning Area Standards:*
>
> *A. Design streets, streetscapes, landscaping, parking lots, and buildings to encourage pedestrian use and activities.*
> *B. Promote a mixture of commercial and residential uses.*
> *C. Emphasize the importance of public spaces.*
>
> *The design plan should be developed together with property and business owners, with participation by surrounding neighborhoods. Also, if there is property owner interest, facilitate formation of a business improvement district or other entity in order to finance, implement and maintain improvements.*
>
> *Policy LU-4: Promote pedestrian travel and activities so that commercial areas become pedestrian-oriented rather than automobile-oriented.*
>
> *A. Concentrate a variety of retail trade, office and professional, service, and residential uses in the central business district. Offer flexibility in the types of uses that are allowable.*
> *B. In the central business district and the Baywood commercial area, encourage shared or common off-site parking accompanied by reduced parking requirements.*
> *C. Direct new commercial development towards the central business district and the Baywood commercial area. Do not establish new, competing commercial areas other than possible neighborhood-serving commercial areas.*

Policy LU-5: Plan for flexible combination of residential, service, office, and lodging uses at the Morro Shores Mixed Use Area.

A. *Emphasize development of higher intensity residential development and encourage development of a multi-use business or commerce park.*
B. *Require new development to provide convenient street, pedestrian and bicycle links to surrounding neighborhoods, commercial areas, the community center, schools, parks, and the bay.*

Program LU-6.1: ***Baywood Commercial Area Design and Enhancement.*** *If there is property owner interest, the County should facilitate development of a design plan and possible accompanying standards and guidelines that implement the following design principles for the Baywood Commercial area, in addition to design standards and guidelines listed for the Baywood Commercial Area in Chapter 7, Planning Area Standards:*

A. *Design streets, streetscapes, landscaping, parking lots, and buildings to encourage pedestrian use and activities.*
B. *Emphasize the importance of public spaces.*
C. *Provide landscaped pedestrian spaces that are inter-connected by a network of walkways and plazas.*
D. *Provide traffic calming measures on 2nd Street.*
E. *Provide for a balance of neighborhood and visitor-serving uses.*
F. *Provide access to the bay, and promote visitor-serving or tourist-oriented recreation focused on the bay.*
G. *Encourage use of sidewalks and public spaces for restaurant seating, arts and crafts displays and other uses that encourage pedestrian activity.*
H. *Encourage mixed residential and commercial/office uses throughout the Baywood Commercial area, as well as bed and breakfast accommodations on 3rd Street.*

The design plan should be developed together with property and business owners, with participation by surrounding neighborhoods. Also, if there is property owner interest, facilitate formation of a business improvement district or other entity in order to finance, implement and maintain improvements.

Policy CIR-2: Provide safe, convenient access to multiple transportation modes from shopping areas, schools, residential areas, and recreation facilities.

A. *Plan new development to provide public transit access and pedestrian and bicycle pathways from residential areas to shopping areas, businesses and public facilities.*
B. *Link bicycle and pedestrian routes between residential areas, schools and commercial areas.*

*Program CIR-2.1: **Transit system.** Improve the public transit system to provide routes located within convenient walking distance of residences. Establish a local transit loop that connects with a regional transit system that provides frequent, fast and convenient connections to major employment centers. Work with Regional Transportation Authority to make its designated bus stops Americans with Disabilities Act-compliant as part of its overall plan and meet encroachment permit requirements.*

*Program CIR-2.2: **Transportation Demand Management.** The SLOCOG, in consultation with the County Public Works and Planning and Building Departments, should develop and implement a transportation demand program that includes measures such as: marketing and commuter information programs, transit and ridesharing incentives, transit service improvements, parking management programs, and alternative work schedules.*

Policy CIR-4: Design the Los Osos community circulation system to be compatible with the community's character and responsive to local environmental needs.

- *A. Allow use of permeable and environmentally-friendly surfaces, where appropriate, as an alternative to conventional pavement. On proposed local residential streets in new land divisions, encourage alternative walkways for pedestrian use.*
- *B. Provide logical street connections between neighborhoods to encourage an efficient, interconnected circulation system, and to reduce vehicular travel.*
- *C. Develop new streets using minimum street widths, consistent with traffic volumes that provide maximum safety and reasonable traffic flow and use by emergency vehicles. Using narrow streets can result in several benefits, for example, more efficient use of land, reduced amounts of impervious surfaces, slower traffic, increased safety, increased livability, and a greater sense of community.*

*Program CIR-4.1: **Narrow streets.** The County Planning and Building, and Public Works Departments should collaborate to encourage, on a trial basis, construction of public or private streets having widths less than those specified in the Standard Improvement Specifications in new land divisions.*

*Program CIR-4.2: **Trees.** Take the following actions to increase the presence of trees in Los Osos.*

- *A. **New Development.** Require tree planting on the property frontage of new development and subdivisions at a scale consistent with the roadway classification. An encroachment permit is required to plant trees within the public road right-of-way.*
- *B. **Tree Master Plan.** The County Planning and Building Department, in consultation with the County Public Works Department and County Parks, should work with the community to create a tree master plan that defines areas to be planted, any key corridors or locations to have special treatment, a list of appropriate trees, planting requirements, planting and maintenance information, and ways to provide and pay for trees in existing neighborhoods.*

C. ***Tree Funding.*** *The County should assist in efforts to obtain funding to plant trees in existing neighborhoods through grants and other sources.*

Program CIR-4.3: ***Commercial streetscape.*** *In commercial areas, require curbs, gutters, wide sidewalks, street lights, gathering areas, and undergrounded utilities. Maintenance responsibilities for improvements in gathering areas, including tree planters, street lights and pedestrian amenities, rest with the fronting property owner, an established maintenance entity or as defined with the encroachment permit.*

Mitigation Measures. No mitigation is required.

Residual Impacts. GHG emission impacts associated with the Community Plan would be **Class III**, *less than significant*.

Threshold: Would actions under the Community Plan conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs?

Impact GHG-2 The Community Plan would not conflict with any local or state plan, policy, or regulation aimed at reducing GHG emissions from land use and development. Thus, impacts would be Class III, *less than significant*.

The following analysis is based on the whether the Community Plan and subsequent development would conflict with policies, plans, or regulations. Thus, the question is not whether the GHG emissions from future development would be controlled by regulations to the extent they are not considered significant, but rather would the Community Plan result in a conflict with a policy, plans, or regulations that would result in the policy, plan, or regulation not be implemented or creating a situation where the goals of the plan, policy, or regulation could not be achieved.

EO S-3-05 established GHG emission reduction targets for the state, and AB 32 codified the 2020 goal of Executive Order S-3-05 and launched the Climate Change Scoping Plan that outlined the reduction measures needed to reach these targets. The Community Plan would not exceed the efficiency threshold of 4.9 MT CO_2E per service population. This threshold was developed by the SLOAPCD and is based on comprehensive policy and regulatory analysis, as well as technical evaluation of development trends in the County. As the Community Plan is below the efficiency threshold, it would not conflict with the AB 32 mandate for reducing GHG emissions at the state level nor would it conflict with the County's EnergyWise Plan for reducing GHG emissions at the local level (SLOAPCD 2012).

EO S-3-05 establishes an executive policy of reducing GHG emissions to 80 percent below 1990 levels by 2050. Additionally, EO B-30-15 establishes an interim GHG emission reduction policy by the executive branch for the state of California to reduce GHG emissions 40 percent below 1990 levels by 2030. The 2020 GHG emission policy of EO S-3-05, to reduce GHG emissions to 1990 levels by 2020, was codified by the Legislature's adoption of AB 32. As discussed, the Community Plan would be consistent with the reduction goals of AB 32. The 2030 GHG emission policy of EO B-30-15, to reduce statewide GHG emissions to 40 percent below 1990 levels by 2030, was codified by the adopted of SB 32. The 2050 goal of EO S-3-05 has not been codified by the Legislature. This analysis renders a determination as to whether the Community Plan would conflict with or impede substantial progress towards the statewide reduction policies established by EO B-30-15 for 2030 and by EO S-3-05 for 2050.

As discussed under Impact GHG-1, the Community Plan would emit less than 4.9 MT CO_2E per service population annually and would not interfere with the County's ability to achieve the GHG reduction goals outlined in the EnergyWise Plan. Further, the Community Plan's 2020 emissions represent the maximum emissions inventory; as emissions would continue to decline from 2020 through at least 2050 based on regulatory forecasting. Given the reasonably anticipated decline in Community Plan emissions, due to existing regulatory programs, once the Community Plan is fully built out, the Community Plan emissions would continue to decline in line with the GHG reductions needed to achieve the EOs' interim (2030) and horizon-year (2050) goals. Therefore, the Community Plan would not conflict with the long-term GHG policy goals of the state. As such, the Community Plan's impacts with respect to the state's post-2020 GHG emissions goals under EO B-30-15 and EO S-3-05 would be **Class III**, *less than significant*.

Mitigation Measures. No mitigation is required.

Residual Impacts. Impacts associated with conflicts with applicable plans, policies, and regulations adopted for the purpose of reducing the emission of GHGs would be **Class III**, *less than significant*.

c. Cumulative Impacts. GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. It is generally the case that an individual project is not of sufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory. As the Community Plan would comply with the SLOAPCD thresholds, the additive effect of the Community Plan's GHG emissions would not result in a reasonably foreseeable cumulatively considerable contribution to global climate change. In addition, the Community Plan as well as other cumulative related projects would also be subject to all applicable regulatory requirements, which would also reduce the statewide GHG emissions. Therefore, the Community Plan's cumulative GHG emissions would have a **Class III**, ***less than significant***, impact on the environment.

d. Subsequent Environmental Review for Future Development Projects in the Community Plan Area. Pursuant to CEQA Guidelines Section 15183, additional CEQA review is not required for projects that are consistent with the development density established by existing zoning, community plan or general plan policies for which an EIR was certified, except as might be necessary to examine whether there are project-specific effects which are peculiar to the project or its site. **Table 4.6-7** describes conditions under which future development in the study area would require additional CEQA review, pursuant to Section 15183.

Table 4.6-7. Conditions Under Which Future Development in the Community Plan Area Would Require Additional CEQA Review

Condition	Impact to Address
The future project is inconsistent with underlying General Plan and zoning designations.	GHG-1 and GHG-2
The future project is inconsistent with Community Plan policies or design guidelines.	GHG-1 and GHG-2
The future project would result in greenhouse gas-related impacts peculiar to the project or parcel. An effect is not considered peculiar if uniformly applied development policies or standards previously adopted by the County would substantially mitigate the environmental effect.	Impact that is peculiar to the project or parcel
The future project would result in an impact or impacts not analyzed above, including off-site or cumulative effects.	Impact other than GHG-1 and GHG-2
The future project would result in an impact or impacts analyzed above, but at a higher level of severity as a result of substantial new information not known at the time the EIR was certified. This may include the following circumstances: • *If future APCD standards have changed such that the future project would result in a more severe significant effect;* • *If the future project would be more appropriately analyzed based on quantitative thresholds*	GHG-1, as applicable