County of San Luis Obispo General Plan

Conservation and Open Space Element

Appendices

May 2010

San Luis Obispo County
Department of Planning and Building

County of San Luis Obispo General Plan

Conservation and Open Space Element

Appendices

Adopted by the San Luis Obispo County Board of Supervisors
May 11, 2010 - Resolution 2010-151

San Luis Obispo County
Department of Planning and Building

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Introduction

The primary factors affecting air quality in San Luis Obispo County are: (1) the prevailing climatic conditions; (2) the type, quantity, and location of pollutant emissions; and, (3) the pollution control techniques employed by regulatory agencies and project applicants to avoid or reduce pollutant emissions. This appendix to the San Luis Obispo Conservation and Open Space Element provides background information to support the policies and implementation strategies included in the Air Quality chapter.

Local Setting[1]

San Luis Obispo County covers an area of about 3,300 square miles along the coast of central California. For geography, climate and meteorology the county can be divided into three general regions: 1) coastal plateau, 2) upper Salinas River valley, and 3) east county plain. The coastal plateau is immediately inland from the Pacific Ocean and is typically five to ten miles wide. It ranges in elevation from sea level to about 500 feet above sea level, and is bounded on the northeast by the Santa Lucia Mountain Range. The Santa Lucia Range rises to roughly 3,000 feet elevation and runs parallel to the coast almost the entire length of the county. The upper Salinas River valley lies inland from the Santa Lucia Range in the northern portion of the county. The east county plain lies further inland along the eastern flank of the county, and includes about one third of the county's area.

About 75 percent of the County's population and a corresponding portion of the commercial and industrial facilities are located within the Coastal Plateau. Because of higher population density and closer spacing of urban areas, emissions of air pollutants per unit area are generally higher in this region than in other regions of the county. The Upper Salinas River Valley, located in the northern one-third of the county, houses roughly 25 percent of the county's population. Historically, this region has experienced the highest ozone and particulate levels in the county. Transport of ozone precursors from the Coastal Plateau and from the San Joaquin Valley may contribute to this condition. The East County Plain is the largest region by land area. However, less than one percent of the county population resides there. Dry land farming and unpaved roads in this region contribute to county totals for particulate emissions, but these emissions rarely affect other regions of the county.

San Luis Obispo County is part of the South Central Coast Air Basin, which also includes Santa Barbara and Ventura Counties. The climate of the county is characterized as Mediterranean,

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[1] The local setting section is excerpted from the San Luis Obispo Air Pollution Control District's Clean Air Plan (2001).

with warm, dry summers and cooler, relatively damp winters. Along the coast, mild temperatures prevail most of the year due to the moderating influence of the Pacific Ocean. The effects of the Pacific Ocean are diminished inland, and by major intervening terrain features such as the coastal Santa Lucia Mountain Range. As a result, inland areas experience a wider temperature range. Typical daily maximum summer temperatures average about 70° F near the coast, while inland valleys are often in the high 90's. Minimum winter temperatures run from the low 30's along the coast to the low 20's inland. Annual rainfall ranges from 16 to 28 inches along the Coastal Plateau, while the Upper Salinas River Valley generally receives about 12 to 20 inches of rain. The East County Plain is the driest area of the county with less than 12 inches of rain in a typical year.

Local meteorology, primarily in the form of wind velocity, wind persistence and the height and strength of temperature inversions, affects the behavior and fate of suspended particulate matter in the air. The origins and sizes of particulate air pollutants also play key roles in their behavior and fate.

Regional meteorology is largely dominated by a persistent high pressure area which usually resides over the eastern Pacific Ocean. During spring and early summer, as the onshore breezes pass over the cool water of the ocean, fog and low clouds often form in the shallow marine air layer along the coast. Surface heating in the interior valleys partially dissipates this marine layer as it moves inland, although the marine layer influence is still observed inland towards the center of the county.

In the fall, onshore surface winds decline and the marine layer shallows, allowing an occasional reversal to a weak offshore flow. This, along with the diurnal alteration of land-sea breeze circulation, can sometimes produce a "sloshing" effect. Under these conditions, pollutants may accumulate over the ocean for a period of one or more days and are subsequently carried back onshore with the return of the sea breeze. Strong inversions can form at this time, trapping pollutants near the surface.

This effect is intensified when the Pacific High weakens or moves inland to the east. This may produce a "Santa Ana" condition in which air, often pollutant-laden, is transported into the County from the east and southeast. This can occur over a period of several days until the high-pressure system returns to its normal location, breaking the pattern. The breakup of this condition may result in relatively stagnant conditions and a buildup of pollutants offshore. The onset of the typical daytime sea breeze can bring these pollutants back onshore, where they combine with local emissions to cause high pollutant concentrations. Not all occurrences of the "post Santa Ana" condition lead to high ambient pollutant levels, but it does play an important role in the air pollution meteorology of the County.

Wintertime radiation inversions which result from loss of surface heat to a clear, dark night sky can severely limit vertical mixing of air pollutants emitted near the ground. In combination with smoke from open outdoor burning and the use of wood-fired stoves or fireplaces for residential heating, low wintertime radiation inversions can be a main contributor to higher levels of particulate matter that have been measured in the Upper Salinas Valley area of the county. Low inversions and burning combine to leave a smoky pall over some North County communities throughout much of the fall and winter.

LOCAL AIR QUALITY[2]

San Luis Obispo County skies are typically clear and blue with little of the characteristic brown haze associated with areas considered to have poor air quality, yet the county does have an air pollution problem. Based upon the potential for health and economic effects, certain substances have been classified as pollutants by the federal and state governments. Concentrations of the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter (PM10 and PM2.5), and lead are used as indicators of ambient air quality conditions.

Air monitoring is required to measure the amounts of these pollutants that are present in our air. When the levels are too high, our air is classified as polluted, and we are required to make efforts to clean it up. The San Luis Obispo Air Pollution Control District (APCD) maintains nine air monitoring stations which are located at different sites in the County Atascadero (Lewis Avenue), Carrizo Plains, Grover City (Lesage Drive), Morro Bay, Nipomo Regional Park, Nipomo (Guadalupe Road), Paso Robles (Santa Fe Avenue), and San Luis Obispo (Marsh Street and 3320 South Higuera Street). The APCD collects information 24 hours per day, seven days per week on ambient levels of pollutants, including ozone, particulate matter, nitrogen oxides, sulfur oxides, and carbon monoxide.

In years past, air quality in the county has exceeded established standards for lead, carbon monoxide, sulfur dioxide, ozone, and particulate matter. Violations of the state standard for particulate matter (PM10) still occur several times a year. Advancements in emission controls on vehicles and stationary pollution sources of all kinds have led to significant improvements in the county's air quality. As a result, the county meets most of the state and federal standards. With even better emission controls, and with continued help from businesses and the public, the county should be able to achieve all state and federal air quality standards in the near future.

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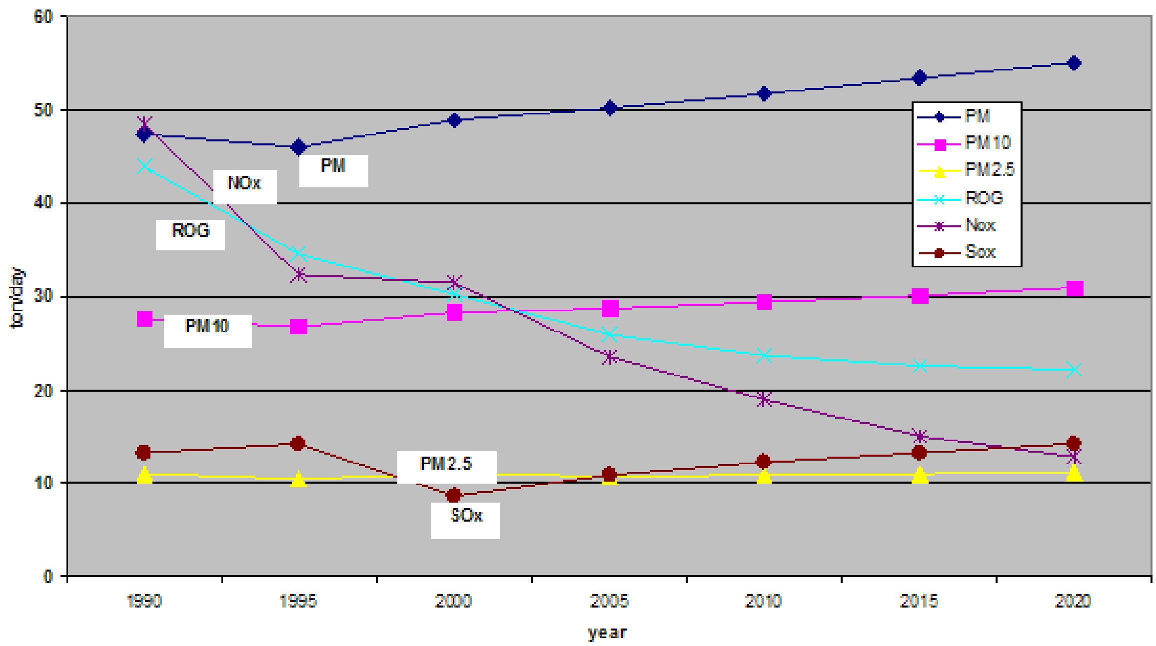
[2] The local air quality section is excerpted from the San Luis Obispo Air Pollution Control District's Annual Air Quality Report (2007).

Air pollution sources in the county are diverse, ranging from large power plants to small household painting projects, with motor vehicles as the largest contributor of air pollution in the county. Following is an overview of criteria air pollutants. Trends and future projections for criteria air pollutants based on the San Luis Obispo County Air Pollution Control District's recent Emissions Inventory are depicted in **Figure A2-1**.

FIGURE A1-1
EMISSION INVENTORY TRENDS AND PROJECTIONS 1990-2020



Ozone

On a regional basis, ozone is the pollutant of greatest concern in the county, particularly within the coastal plateau. Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions; therefore, ozone is a regional pollutant that often affects large areas.

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and is the primary component of smog. The amount of ozone formed is dependant upon both the ambient concentration of chemical precursors and the intensity and duration of sunlight. Consequently, ambient ozone concentration tends to vary seasonally with the weather. Reactive organic gases (ROG), also called reactive hydrocarbons (RHC), and nitrogen oxides (NOx) are the primary precursors to ozone formation. NOx emissions result primarily from the combustion of fossil fuels; ROG emissions are also generated by fossil fuel combustion and through the evaporation of petroleum products. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NOX are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels. A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NOX levels are present to sustain the ozone formation process. Once these precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is considered a regional pollutant.

On April 28, 2005, the California Air Resources Board (ARB) approved the nation's most health protective ozone standard with special consideration for children's health. Based on monitoring data San Luis Obispo County has been deemed non-attainment for the new ozone standard. **Figure A1-2**[3] provides the distribution of the county's ozone precursors by source for 2007. All sources combined to total 24,186.2 tons. The emission sources of reactive organic gasses (ROG) and oxides of nitrogen (NOx), the main precursors for ozone formation are primarily mobile sources from the transportation sector (68%).

Carbon Monoxide

Carbon Monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. **Figure A1-3**[4] provides the distribution of the county's carbon monoxide emission sources for 2007. All sources combined to total 60,665 tons. The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue.

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[3] San Luis Obispo Air Pollution Control District. 2007 Emissions Inventory. http://www.slocleanair.org/air/emissions.php.

[4] Ibid.

FIGURE A1-2
2007 OZONE PRECURSORS IN SAN LUIS OBISPO COUNTY

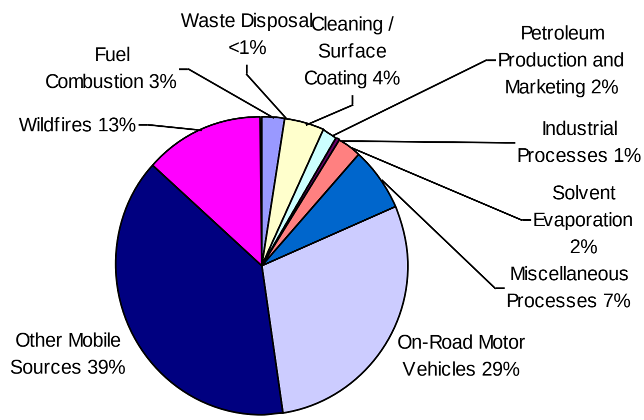
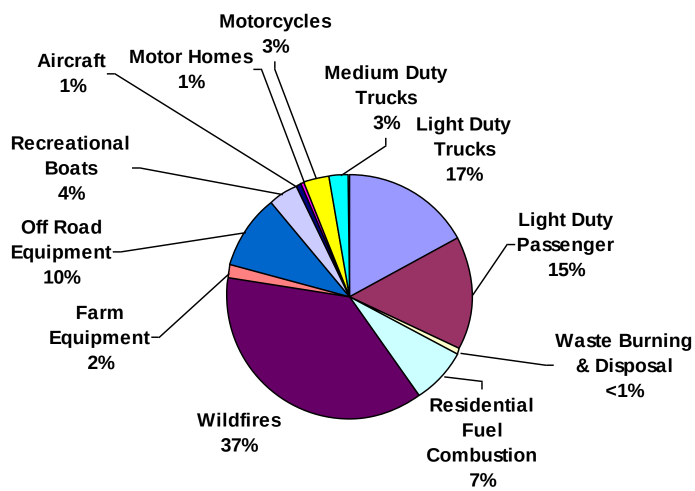


FIGURE A1-3
2007 CARBON MONOXIDE EMISSIONS SOURCES

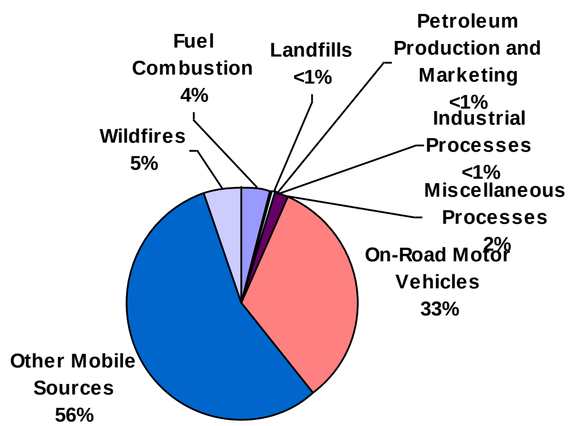


Nitrogen Dioxide

NO2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO2. The combined emissions of NO and NO2 are referred to as NOX and reported as equivalent NO2. Because NO2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO2 concentration in a particular geographical area may not be representative of the local NOX emission sources.

Figure A1-4 provides the distribution of the county's nitrogen oxide (NOX) emissions by source for 2007. All sources combined to total 13,620 tons.[5]

FIGURE A1-4
2007 NITROGEN OXIDE EMISSIONS SOURCES



Sulfur Dioxide

SO2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO 2 exposure pertain to the upper respiratory tract. SO2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO2 at 5 ppm or more. On contact with the moist mucous membranes, SO2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

The County's 2007 SO2 emission sources were predominantly ships and commercial boats (69%) and petroleum refining (22%). Other sources were wildfires (6%), fuel combustion (3%), and trains (<1%).[6]

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[5] San Luis Obispo Air Pollution Control District. 2007 Emissions Inventory. http://www.slocleanair.org/air/emissions.php.

Particulate Matter

Particulate matter is a generic term used to describe a complex group of air pollutants (mineral, metal, smoke, soot, and dust particles) that vary in size and composition, depending upon the location and time of its source. It is any material, except pure water, that exists in the solid, liquid or semi-volatile state in the atmosphere. The PM mixture of fine airborne solid particles and liquid droplets (aerosols) include components of nitrates, sulfates, elemental carbon, organic carbon compounds, acid aerosols, trace metals, and geological material. Some of the aerosols are formed in the atmosphere from gaseous combustion byproducts such as volatile organic compounds (VOCs), oxides of sulfur (SOx) and oxides of nitrogen (NOx). Airborne particles vary in size from coarse wind blown dust particles to fine particles that are directly emitted or formed chemically in the atmosphere. Particulate matter is usually referred to as PM10 and fine particulate matter is PM2.5.

While particulate matter also has many natural sources, human derived sources such as vehicle exhaust, road dust, mineral quarries, grading, demolition, agricultural tilling, and burning are major contributors to exceedances in the county. In addition to reducing visibility, particulate matter can lodge in the lungs and cause serious, long-term respiratory illness and other health problems. The smaller the size of the particle, the deeper it can penetrate into the lungs, and the more difficult it is to expel.

San Luis Obispo County is designated non-attainment for the state PM10 standard. Violations of the state standard continue to occur throughout the county several times a year. In general, the PM10 and PM2.5 levels measured in the county result from human and natural sources and processes within and closely adjoining the county. Reducing particulate matter (PM) air pollution is one of the APCD's highest public health priorities. Exposure to particulate pollution is linked to increased frequency and severity of asthma attacks, pneumonia and bronchitis, and even premature death in people with pre-existing cardiac or respiratory disease.

Table A1-1 provides the distribution of the county's PM emissions by source for 2007.[7]

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[6] San Luis Obispo Air Pollution Control District. 2007 Emissions Inventory. http://www.slocleanair.org/air/emissions.php.

[7] San Luis Obispo Air Pollution Control District. 2007 Emissions Inventory. http://www.slocleanair.org/air/emissions.php.

TABLE A1-1
2007 PARTICULATE MATTER SOURCES – PM, PM10 AND PM2.5

Emission Source	PM (tpy)	PM10 (tpy)	PM2.5 (tpy)
Wildfires	3,292.3	2,306.8	1,956.4
Ships & Commercial Boats	382.8	366.2	356.1
Waste Burning & Disposal	35.0	34.4	32.1
Unpaved Road Dust	5,449.5	3,225.6	321.2
Paved Road Dust	3,923.8	1,788.5	266.5
Construction & Demolition	3,033.2	1,485.6	149.7
Livestock	1,587.8	722.7	149.7
Residential Fuel Combustion	675.3	631.5	609.6
Mineral Processes	251.8	86.6	
Cooking		123.0	73.8
Fugitive Wind Blown Dust		638.8	105.9
Farm Equipment			62.1
Off-Road Equipment			91.3
On-Road Motor Vehicle			114.2
Petroleum Refining			9.4
TOTAL	**18,631.3**	**11,409.6**	**4,297.6**

Regulatory Framework

In 1970, Congress created the Environmental Protection Agency (EPA) and passed the Clean Air Act, giving the federal government authority to clean up air pollution across the country. Since then, EPA and states, tribes, local governments, industry, and environmental groups have worked to establish a variety of programs to reduce air pollution levels across America. Federal, state, and local government agencies protect human health and the environment through the regulatory process and voluntary programs.

The U.S. Environmental Protection Agency (EPA) is the federal agency designated to administer air quality regulation, while the California Air Resources Board (CARB) oversees pollution control in the state. CARB is part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government. Local control in air quality management is provided by the CARB through regional-level Air Pollution Control Districts (APCDs). The CARB establishes air quality standards and is responsible for the control of mobile emission sources, while the local APCDs are responsible for enforcing standards and regulating stationary sources.

The ARB traditionally has established state air quality standards by maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality standards by maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving state implementation plans.

The San Luis Obispo Air Pollution Control District (SLO APCD), one of 35 air pollution districts addresses air pollution for the county. Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing sections related to air quality of environmental documents required by the California Environmental Quality Act (CEQA). Depending on the particular problems of a region, some of the types of air pollution sources that might be regulated include manufacturers, power plants, refineries, gasoline service stations, and auto body shops. APCDs also implement transportation control measures for their respective regions.

FEDERAL REGULATIONS AND POLICIES

Clean Air Act

In 1970, Congress established a comprehensive response to air pollution control with the passage of the Clean Air Act. In 1990, Congress dramatically revised and expanded the Clean Air Act, providing EPA even broader authority to implement and enforce regulations reducing air pollutant emissions. The 1990 Amendments also placed an increased emphasis on cost-effective approaches to reduce air pollution. The act directs the U.S. Environmental Protection Agency (EPA) to establish ambient air standards for six pollutants: ozone, CO, lead, nitrogen dioxide (NO2), particulate matter, and sulfur dioxide (SO2). The standards are divided into primary and secondary standards; the former are set to protect human health within an adequate margin of safety and the latter to protect environmental values, such as plant and animal life.

The Clean Air Act also gives EPA the authority to limit emissions of air pollutants coming from sources like chemical plants, utilities, and steel mills. Individual states or tribes may have stronger air pollution laws, but they may not have weaker pollution limits than those set by EPA. EPA assists state, tribal, and local agencies by providing research, expert studies, engineering designs, and funding to support clean air progress. EPA must approve state, tribal, and local agency plans for reducing air pollution. If a plan does not meet the necessary requirements, EPA can issue sanctions against the state and, if necessary, take over enforcing the Clean Air Act in that area.

Federal Conformity Requirements

The Clean Air Act requires that all federally funded projects conform to the appropriate State Implementation Plan (SIP). Federal actions are subject to either the transportation conformity rule (40 CFR 51[T]), which applies to federal highway or transit projects, or the general conformity rule.

The purpose of the general conformity rule is to ensure that federal projects conform to applicable SIPs so that they do not interfere with strategies employed to attain the National Ambient Air Quality Standards (NAAQS). The rule applies to federal projects in areas designated as nonattainment areas for any of the six criteria pollutants and in some areas designated as maintenance areas. The rule applies to all federal projects except:

1) Programs specifically included in a transportation plan or program that is found to conform under the federal transportation conformity rule,
2) Projects with associated emissions below specified *de minimis* threshold levels, and
3) Certain other projects that are exempt or presumed to conform.

A general conformity determination must be performed to demonstrate that emissions for each affected pollutant would conform with the applicable SIP if a proposed action’s total direct and indirect emissions for any pollutant for which the region is classified as being a maintenance or nonattainment area for the national standards fail to meet either of the following two conditions.

4) Emissions are below the applicable *de minimis* levels.
5) Emissions are regionally insignificant (i.e., total emissions are less than 10% of the area’s total emissions inventory for that pollutant).

If the above two conditions are met, however, the requirements for general conformity do not apply, because the proposed action is presumed to conform to the applicable SIP for each affected pollutant. As a result, no further analysis or determination would be required.

STATE REGULATIONS AND POLICIES

California Clean Air Act

The California Clean Air Act of 1988, as amended (California CCAA) substantially added to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA focuses on attainment of the state ambient air quality standards, which, pollutants and averaging (measurement) periods are more stringent than the comparable federal standards.

The CCAA requires designation of attainment and nonattainment areas with respect to state ambient air quality standards. The CCAA also requires that local and regional air districts expeditiously adopt and prepare an air quality attainment plan if the district violates state air quality standards for carbon monoxide, sulfur dioxide, nitrogen dioxide, or ozone. These clean air plans are specifically designed to attain these standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each nonattainment pollutant or its precursors. No locally prepared attainment plans are required for areas that violate the state PM10 standards.

The California Clean Air Act requires that the state air quality standards be met as expeditiously as practicable but, unlike the federal Clean Air Act, does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The ARB maintains a website with designation maps of California for all criteria pollutants that are designated for the State and National standards. These maps show attainment status for all air districts in California and are updated annually for the State area Designations, as required by the Health and Safety Code (H&SC) section 39608. The Board makes State area designations for ten criteria pollutants: ozone, suspended particulate matter (PM10), fine suspended particulate matter (PM2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and visibility reducing particles.

Toxic Air Contaminants (TACs)

TACs in California are regulated primarily through the Tanner Air Toxics Act (AB 1807 [Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 [Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

AB 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

California Environmental Quality Act

Analysis of potential air quality of a project as defined by the California Environmental Quality Act (CEQA) is conducted on a project-by-project basis at the direction of a lead agency. Pursuant to the State CEQA Guidelines, air quality impacts of a project would be significant if they would:

1) Conflict with or obstruct implementation of the applicable air quality plan;
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4) Expose sensitive receptors to substantial pollutant concentrations; and/or
5) Create objectionable odors affecting a substantial number of people.

LOCAL REGULATIONS, PLANS AND POLICIES

San Luis Obispo County Air Pollution Control District (APCD)

At the local level, the San Luis Obispo County Air Pollution Control District (APCD) is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws. The APCD Board consists of twelve members, five County Supervisors and one city council representative from each of the seven incorporated cities. The Board is the decision making body for the District and is responsible for adopting rules, setting policies and providing direction on important air quality issues impacting the county. For more information, visit the APCD's website: http://www.slocleanair.org/who/index.php.

District staff monitors county air quality, review land use projects, develop and enforce rules and regulations, issue permits, and create a long-term Clean Air Plan for our county. The District works with government, industry, businesses, and the public to reduce air pollution from stationary sources, such as power plants, corner gas stations, and local dry cleaners. The APCD also implements programs to promote alternative means of transportation, such as carpooling, telecommuting, and use of clean vehicle technologies.

Strategic Action Plan

The APCD's Strategic Action Plan was developed to ensure that the APCD's priorities and programs remain properly aligned with its mission, to identify top goals, objectives and implementation tactics, to ensure resources are best utilized to achieve its mission, and to preserve air quality throughout the county. The 2007 update to the Strategic Action Plan included two specific measures regarding the need to build an informed public and to increase awareness on global climate change. A public opinion survey was identified as an effective means to gain a baseline understanding of how residents view air quality, climate change, and individual actions that can reduce our impacts. The APCD consolidated survey efforts with the San Luis Obispo Council of Governments to reduce survey costs and gain insight on a broader range of topics, including transportation and land use.

In January 2008, Opinions Studies conducted a scientifically-valid phone survey that produced 601 interviews with residents countywide. In addition, interested individuals were able to participate in the survey via website or mail-in response, resulting in 1,335 additional “volunteered” responses. While the telephone survey of 601 county residents provides the most reliable and statistically valid data in terms of countywide and sub-regional analysis, the “volunteer” sample provides the additional insights into respondent perspectives, especially the more proactive residents of the region.

The Public Opinion Survey report provides detailed information on the responses from the phone and “volunteer” survey, and evaluates the data on a sub-regional and countywide basis. Some key findings from the survey related to air quality, climate change, energy use and land use are listed below:

Attitudes Toward Air Quality and Climate Change

- County residents are more concerned about local air quality than they are about climate change. Moreover, the percentage of people who said they have ‘no’ concern for climate change far exceeds those who said they have ‘no’ concern for protecting air quality. North County residents are less concerned about both air quality and climate change issues than are residents of other regions.
- About one fourth of residents say they are ‘very’ knowledgeable about ways to reduce their impact on air quality and climate change.
- Approximately 1/3 of all residents have made ‘a lot’ of lifestyle changes to reduce their impact on air quality and climate change. Another third have made some changes while the remaining third have made a few or no changes.
- Messages that encourage residents to ‘buy locally grown produce or manufactured items’ and/or to ‘combine errands into one trip’ are likely to influence the greatest number of people; least effective are statements about ‘reducing car use’.

Attitudes Toward Alternative Sources of Energy

- 94% of respondents support the idea of government agencies working to provide more energy through renewable sources. Two-thirds of respondents would support such efforts even with a 5% increase over current costs.

Land Use Issues

- Respondents support development in urban areas more than they do in rural areas. 80% - 85% support development that provides single-family homes or condominiums in urban areas.
- 78% support the idea of planning communities that make it easier to get around by bus, biking or walking rather than planning communities that accommodate cars.
- Rural development is the planning issue with the least consensus among respondents.
- 54% indicated they would like planners to discourage rural development while 46% would like to allow such developments. North County respondents, followed by South County respondents, were generally more in support of rural development than were respondents the central and coastal regions.

San Luis Obispo Clean Air Plan

As part of the California Clean Air Act, the APCD is required to develop a plan to achieve and maintain the state ozone standard by the earliest practicable date. The Clean Air Plan (CAP) outlines the District's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

Analysis of several long-term air quality trends in the county demonstrates that ozone air quality in the coastal and southern areas of the county appears to be improving while air quality in the north county in declining. At the county level, transportation control measures and land use planning strategies play an important role in the implementation of the Clean Air Plan.

Certain local projects and programs require an analysis of consistency with the Clean Air Plan including General Plan Updates and Amendments, Specific Plans, Area Plans, large residential developments and large commercial/industrial developments. The consistency analysis must evaluate the following questions:

- Are the population projections used in the plan or project equal to or less than those used in the most recent CAP for the same area?
- Is rate of increase in vehicle trips and miles traveled less than or equal to the rate of population growth for the same area?

- Have all applicable land use and transportation control measures from the CAP been included in the plan or project to the maximum extent feasible?

If the answer to all of the above questions is yes, then the proposed project or plan is consistent with the CAP. If the answer to any one of the questions is no, then the emissions reductions projected in the CAP may not be achieved, which could delay or preclude attainment of the state ozone standard. This would be inconsistent with the Clean Air Plan.

Appendix E of the District's Clean Air Plan and the document "Creating Transportation Choices Through Development Design and Zoning" outline development practices that can improve local communities, reduce vehicle dependence and decrease impacts on our air quality. Recommended development practices include:

- Building compact communities to limit urban sprawl;
- Mixing complementary land uses, such as commercial services located within and/or adjacent to medium or higher density housing;
- Develop core commercial areas within 1/4 to 1/2 miles of residential housing areas;
- Develop residential housing areas within 1/4 mile of transit centers and transit corridors;
- Providing a balance of job opportunities and housing within communities;
- Increasing residential and commercial densities along transit corridors;
- Orienting buildings toward streets with automobile parking in the rear to promote a pedestrian-friendly environment and to provide convenient pedestrian and transit access;
- Providing a pedestrian-friendly and interconnected streetscape to make walking more convenient, comfortable and safe;
- Providing good access for pedestrians, bicyclists, and transit users; and,
- Directing new developments toward in-fill locations that provide development within the urban core and urban reserve lines.

CEQA Handbook

The APCD's CEQA Handbook provides information on the District's significance thresholds for determining potential air quality impacts from proposed residential and commercial development and provides recommendations on the level of mitigation necessary to reduce those impacts. Appendix A to the CEQA Handbook outlines the building permit requirements for facilities potentially subject to air district permitting.

The District has established four separate categories of evaluation for determining the significance of project impacts. Full disclosure of the potential air pollutant and/or toxic air emissions from a project is needed for these evaluations, as required by CEQA:

- Comparison of calculated project emissions to District emission thresholds;
- Consistency with the most recent Clean Air Plan (CAP) for San Luis Obispo County;
- Comparison of predicted ambient pollutant concentrations resulting from the project to state and federal health standards, when applicable; and
- The evaluation of special conditions which apply to certain projects.

Any proposed development which has the potential to exceed local CEQA construction or operation thresholds for one or more air pollutants (e.g., reactive organic gases, nitrogen oxides, sulfur dioxide or particulate matter) should be submitted to the APCD for review. This includes residential projects of greater that 35 homes, retail projects greater than 3,000 square feet, or any project that will include four or more acres of grading.

The APCD evaluation of development projects includes an estimation of air pollution produced during construction of the project (short term emissions), including diesel emissions and dust, and from new vehicle trips that will result once the development is in operation (long term emissions). The APCD estimates potential air quality impacts by performing emission calculations and using computer air modeling tools. The estimated emission levels are compared to the APCD's California Environmental Quality Act (CEQA) significance thresholds, and then mitigation measures are suggested as necessary to minimize potential air quality impacts.

Annual Air Quality Report (2007)

The San Luis Obispo Air Pollution Control District (SLOAPCD) annually reports the air quality in the County. The 2007 report concluded that most populated areas of the County enjoyed very good air quality.

Ozone and PM10 are the pollutants of main concern, since exceedences of state health-based standards for those are experienced here in most years. Ozone levels exceeding both federal and state standards were measured on numerous days in the Carrizo Plains due to transported pollution from the San Joaquin Valley. Exceedence days in Atascadero and in Paso Robles were also concurrently recorded for the state 8-hour standard. Exceedences of the state 24 hour PM10 standard were recorded at Nipomo Mesa 2, Nipomo Regional Park, San Luis Obispo, Morro Bay and Paso Robles. There was no measured exceedence of other air quality standards in 2006.

The county is designated as a non-attainment area for the state PM10 and ozone standard. In order for a district to be in attainment, the State standards for any criteria pollutant must not be exceeded for three consecutive years.

Annual Emissions Inventory

The annual emissions inventory is a compilation of emissions information from all sources within the county throughout the calendar year. Summaries are prepared for six of the main or "criteria" pollutants – reactive organic gases, nitrogen oxides, sulfur oxides, and particulate matter. Emissions sources are grouped into categories such as stationary, area, mobile and natural sources. The most recent trend data from the SLO APCD is depicted in Figure 6-1 earlier in this chapter. The projections do not take into account any emission benefits from the proposed PM control strategies.

Ambient Air Monitoring Network Plan

SLOAPCD conducts as annual examination of the SLOAPCD's network of air pollution monitoring stations. Title 40, Code of Federal Regulations, Part 58, requires the annual review of state and local air monitoring stations network. The report is a directory of existing and proposed monitoring in the SLOAPCD's network of air quality monitoring and research stations and serves as a progress report on the recommendations and issues raised in earlier network reviews.

PM Report

In 2003, the California Legislature enacted Senate Bill 656 (Sher), to reduce public exposure to particulate matter (PM10 and PM2.5 are collectively referred to as PM). SB 656 required the California Air Resource Board (ARB) in consultation with local air pollution control districts, to develop and adopt a list of PM reduction strategies.

San Luis Obispo APCD adopted the PM Report and associated control measures in July 2005. The report identifies PM control for five primary categories and associated measures. The categories include paved and unpaved roads, open burning, fugitive dust, refinery and Calciner activities and particulate exhaust concentrations. The top five sources of direct PM10 emissions are area sources - unpaved road dust, paved road dust, construction and demolition, prescribed burning, and farming operations (dust). These sources contribute 77% of the total PM10 emissions in the county.

Nipomo Mesa Particulate Study

Particulate concentrations on the Mesa have been significantly higher than other areas of San Luis Obispo County over the past 20 years. Between April 2004 and March 2005, the District initiated a particulate monitoring study to delineate the nature and extent of the particulate problem observed on the Mesa.

Central Coast Clean Cities Coalition (C5)

The APCD is also integrally involved in the Central Coast Clean Cities Coalition (C5). C5 is a partnership of public/private entities whose goal is to promote the use of alternative fuels vehicles (AFV) on the Central Coast. By working with area fleet operators, C5 sponsors training seminars, public events and grant funding workshops related to use of alternative fuels. The U.S. Department of Energy granted C5l the “Clean Cities” designation in 2006 which enables the area to compete for federal funding aimed at improving the infrastructure for alternative fuels. APCD and C5 has helped facilitate the National Alternative Fuel Vehicle (AFV) Day Odyssey which showcases local AFV that offer an option to diesel powered vehicles. C5 pursues the following goals:

- Increase the number of alternative fuel vehicles and expand the alternative fuel infrastructure in the county and improve the clean fuel corridors between Los Angles, San Francisco and the San Joaquin Valley.
- Identify local fleets and educate fleet managers / purchasers to the federal and state mandates regarding AFV requirements (i.e., identify total fleets in the county, identify fleets required to meet EPAct requirements, support the development of fleet compliance plans).
- Promote AFV maintenance and technician training programs and provide listing of training sites and dates.
- Secure grants to promote AFV's and alternative fuel infrastructure throughout the county.
- Promote AFV benefits and awareness to public and private sectors alike.

San Luis Obispo County Department of Planning and Building

Annual Resource Summary Report (2007)

The County’s Annual Resources Summary Report includes air quality criteria, San Luis Obispo air quality characteristics, existing air quality, level of severity, and suggested actions for the future. The report concludes that air quality is at a Level II planning severity in all County planning areas. Level II identifies the crucial point at which some moderation of the rate of resource use must occur to prevent exceeding the resource capacity.

Climate Change

INTRODUCTION[8]

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. The Intergovernmental Panel on Climate Change (IPCC) defines climate change as "any change in climate over time, whether due to natural variability or as a result of human activity." The IPCC is a body created by the World Meteorological Organization and the United Nations Environment Program, and was created to assess peer reviewed scientific and technical studies and reports in order to present "comprehensive, objective, open and transparent" information on climate change.

Scientific consensus supports the conclusion that humans are impacting global climate by increasing greenhouse gases (GHG) in the atmosphere. GHGs are global pollutants, unlike criteria air pollutants, which are pollutants of regional and local concern, respectively. While the climate system is very complex and difficult to model precisely, the Intergovernmental Panel on Climate Change (IPCC) is increasingly certain that humans have a discernible influence on the global climate. Confirmation of the measured warming trend is substantiated by the rise in sea level of between four and 10 inches that has occurred since 1900 and the decrease in the average snow cover and glacial ice worldwide. Unseasonable weather phenomena are becoming commonplace and intensities appear to be increasing. A continued increase in greenhouse gas emissions, and the associated temperature rise, is likely to accelerate the rate of climate change, producing further impacts.

The primary greenhouse gas contributor is Carbon Dioxide (CO2). Scientists have established direct links between increased CO2 concentrations and the atmospheric warming that has occurred since the industrial revolution. After remaining relatively constant from 1000 to 1700 C.E., CO2 concentrations began to rise sharply and have increased 30% since pre-industrial times. They are continuing to increase by approximately one-half percent per year. (Visit http://www.ipcc.ch/ to review the IPCC complete reports).

Greenhouse gas emissions resulting from human activities are substantially increasing the atmospheric levels of the greenhouse gases which include carbon dioxide, methane, halocarbons (HFCs), and nitrous oxide. Carbon dioxide emissions have increased 30% during the past century largely due to fossil fuel combustion which produces the largest amount of CO2 emissions (about 80% of United States GHG emissions and about 87% of California emissions).

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[8] This section is excerpted from the State of California's Climate Change Portal's Frequently Asked Questions about Global Climate Change website - http://www.climatechange.ca.gov/publications/faqs.html#ie.

California produces roughly 1.4 percent of the worlds, and 6.2 percent of the total U.S., greenhouse gases.[9] In California, transportation contributes 39% of California's gross GHG emissions, and electricity production (both in-state and imported) contributes about 28% of the gross GHG emissions.[10] Methane emissions have doubled in the past 100 years. Over the same period, nitrous oxide levels have risen about 15%. Agriculture is a major source of both methane and nitrous oxide, with additional methane coming primarily from landfills. Halocarbons are another greenhouse gas. Most halocarbon emissions come from their use as refrigerants, solvents, propellant agent, and industrial processes. Manufactured compounds, like HFCs, persist in the atmosphere for long periods of time and have far greater effects at lower concentrations as compared to CO2. Although the amount released of these compounds is small, they are very effective at trapping heat in the atmosphere.

CLIMATE CHANGE IN CALIFORNIA[11]

Because California has such a diverse topography, producing a variety of drastically different microclimates, the effect of climate change on California is complex. Climate variability and change will impact natural ecosystems and water resources. Major alterations to natural ecosystems due to climate change could possibly have negative consequences for our economy, which depends in part on our state's lands, waters, and native plant and animal communities.

Potential impacts to water supply

Over the past 150 years, monitored mountain glaciers have been shrinking. If glaciers continue to shrink, summer water flows will drop sharply, disrupting a source of water for irrigation and power in many areas that rely on mountain watersheds. This will likely lead to more flooding during the winter and worsen drought conditions. In California's Central Valley, for example, melting snow provides much of the summer water supply; warmer temperatures would cause the snow to melt earlier and thus reduce summer supplies even if rainfall increased during the spring. Instead of increasing the amount of water supply available, the disrupted cycle is likely to cause excess rainfall and run-off, thus causing flooding and overflow of reservoirs which are not equipped to contain such large inflows of water.

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[9] http://climatechange.ca.gov/index.php

[10] http://climatechange.ca.gov/ab32/index.html

[11] This section is excerpted from the State of California's Climate Change Portal's Frequently Asked Questions about Global Climate Change website - http://www.climatechange.ca.gov/publications/faqs.html#ie.

The shortage of water in the summer due to runoff changes could worsen drought and increase diversions of rivers in California. This would mean higher cost and further adverse effects downstream. Together with changing temperatures, flows, and the ability of watersheds to assimilate wastes and pollutants, changing runoff patterns could also have the potential to alter water quality significantly. Additionally, sewage systems could be overwhelmed by storm runoff and high tides.

Rising sea levels can cause an increase in the intrusion of salt water into coastal aquifers, contaminating fresh water supplies. Sea level rise could especially affect the Sacramento San Joaquin River Delta, the hub of California's water transfer system. Higher tide levels would pose additional problems to the precarious Delta levee systems with a risk of more inland inundation and the corresponding threat to export water quality.

Potential impacts to agriculture[12]

Potential impacts, such as reduced water supply, more severe droughts, more winter floods, and drier growing seasons will affect agriculture (a $26 billion Californian industry in 1997). Many farms especially in the fruit and nut business require long-term investments, making fast adaptation difficult, and could thus experience serious losses if decisions continue to be made with no regard to expected climate changes.

Water is needed year-round, especially for perennial crops. Perennial crop growers cannot shift quickly to new types of cultivars and they need reasonable water supply projections such as several decades for trees and vines. Problems with crops can persist many years if there is an extreme weather or pest-related event. Fruit trees are particularly vulnerable. Too much rain or too little rain can be a problem, as well as pest impacts, too much or too little fog, less frost days, and changes in the timing of the season can all disrupt their market.

In order to better deal with water shortage issues, irrigation practices need to improve, because there is already an increase in salts in the land. Some areas may lose productive capacity in a matter of decades with or without climate change, but climate change could make the problem worse. Even vineyards can be susceptible to fungi because of increased rainfall at the wrong time.

Coastal agriculture is also at risk due to potential impacts of sea level rise. Even if farmers move crops closer to the fog, they may permanently lose agriculture lands to the ocean.

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[12] Ibid.

Potential impacts to California's fisheries[13]

Studies found that as a result of changes in ocean conditions, the distribution and abundance of major fish stocks will change substantially. Impacts to fisheries related to El Nino/ Southern Oscillation illustrate how climate directly impacts marine fisheries on short term scales. Higher sea surface temperatures in 1997-1998 during the El Nino had a great impact on market squid, California's largest fishery by volume. The California Regional Assessment reports that landings fell to less than 1,000 metric tons in that season, down from 110,000 tons in the 1996-1997 season. Other unusual events also occurred such as poor salmon returns, a series of plankton blooms, and seabird die-offs.

Potential impacts for California's coastline[14]

With climate changes, recreational facilities and developed coastlines will also be more vulnerable to hurricanes, storm surges, flooding increases. Increasing population growth in coastal areas is a reason for further concern, since these areas could be more vulnerable to climate change impacts. Impacts of expected sea level rise and increased storm surges are numerous. Beachfront homes and harbors as well as wetlands may flood. Sewage systems may be overwhelmed by storm runoff and high tides. Jetties and seawalls may have to be raised and strengthened to protect harbors which are used for shipping, recreation, and tourism.

Potential impacts for California's forests[15]

The California Regional Assessment notes that an increase in the number and extent of areas burned by wildfires in recent years, and modeling results under changing climate conditions suggest that fires may be hotter, move faster, and be more difficult to contain under future climate conditions. The factors which contribute to the risk of catastrophic fires (fuel loads, high temperatures, dry conditions, and wind) are typically present already in summer and fall seasons in California, but can exist at other times of the year, especially in drought conditions. Public safety is an issue as more home and tourism developments on coastal hills and mountains and the foothills and higher elevations in the Sierra Nevada are highly susceptible to catastrophic wild fires.

Other climate impacts affecting forestry are: higher CO2 concentrations which may increase growth, drought which can kill forests, changes in mineral nutrients, and pest population dynamics. However, more research is needed to understand whether total plant material is

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[13] Ibid.

[14] Ibid.

[15] Ibid.

expected to increase or decrease in California due to climate changes. Today's models of the Sierra Nevada and North Western California provide contradictory results on this subject.

Potential impacts for air pollution in California[16]

Projected climate changes will impact the quality of California's air, public health, and environment. Higher temperatures increase the formation of ground level ozone and particulate matter, making it more difficult to meet the health-base air quality standards for these pollutants. Ground-level ozone has been shown to aggravate existing respiratory illnesses such as asthma, reduce lung function, and induce respiratory inflammation. Ambient ozone also reduces agricultural crop yields and impairs ecosystem health.

The particulate matter of most concern - PM10 - has been implicated in exacerbation of cardiovascular disease, asthma, other respiratory diseases, and associated with increased mortality. Air pollution is also made worse by increases in natural hydrocarbon emissions and evaporative emissions of fuels and solvents which lead to higher levels of ozone and PM10 during hot weather. Warmer temperatures that cause increased use of air conditioners can cause increased air pollutants from power plants and from vehicle operation. In addition, warming, drying, and increased winds could mean hotter, harder-to-control wildfires. These wildfires could result in increased levels of fine particulate matter that could also exceed State and federal standards and harm public health.

Potential impacts for California's energy supply[17]

California's electricity generation is currently relatively efficient when it comes to emissions of greenhouse gases. The national average for the electricity generation share of total greenhouse gas emissions is approximately 40%, while California electricity accounts for only 16% of statewide emissions. This is in part due to California's significant amount of imported electricity, mild climate, and lack of energy-intensive industry. Over the past two decades, California has developed one of the largest and most diverse renewable electricity generation industries in the world. However, changes in climate of the magnitude predicted by the IPCC would substantially affect electricity generation throughout California and the entire Western States grid, particularly for hydroelectric facilities.

Less snowpack would result in lower levels of hydro generation in the summer and fall seasons due to reduced runoff in those seasons. Additional hydropower may be available during the winter and the spring. However, on balance hydropower is more useful and valuable within the grid mix of generation sources when it is available throughout the peak summer and fall

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[16] Ibid.

[17] Ibid.

seasons. The Natural gas distribution system may also be damaged because of landslides and fires. Flooding could also impact pipelines, wells and related petroleum extraction equipment. Warmer weather would result in an increased demand for electricity for cooling appliances in homes, and businesses.

Potential impacts for California's ecosystems[18]

The current distribution, abundance, and vitality of species and habitats are strongly dependent on climatic (and microclimatic) conditions. Climate change is expected to result in warmer temperatures year-round, accompanied by substantially wetter winters. Rising sea level will significantly affect coastal wetlands because they are mostly within a few feet of sea level. As the sea rises, these wetlands will move inland. The overall acreage of wetlands will be reduced due to constraints by existing urban development and steeper slopes immediately inland of existing wetlands. Tidal rivers, estuaries, and relatively flat shoreline habitats will be more subject to damage by flooding and erosion. More severe storm surges from the ocean, due to higher sea levels, combined with higher river runoff could significantly increase flood levels by more than the rise in sea level alone. Erosion of beaches would decrease habitat for beach-dependent species, such as seals, shorebirds, and endangered species (for example, snowy plover and least tern). Aquatic habitats are also likely to be significantly affected by climatic changes. Most fish have limits to how hot or cold the water can be before they must either find more hospitable temperatures or die. As temperatures warm, many fish will have to retreat to cooler waters.

Changes in temperature and precipitation patterns would also shift California's current climate zones, and thus habitats associated with these zones, northward by approximately 100 - 400 miles, as well as upwards in elevation by 500-1500 feet. Global climate change would alter the composition, structure and arrangement of the vegetation cover of the state (forest and wildland). Species distribution would move geographically as the climate changes, with forest stands, woodlands and grassland species predicted to move northward and higher in elevation. The entire vegetative community may be affected if non-native invasive species occupy sites and replace native plants. Outbreaks of insects and diseases could compromise forest health and the capability of the forest stands reproduce and to store carbon on a landscape basis. Forest fires are likely to become more frequent and severe if soils become drier. Changes in pest populations could further increase the stress on forests.

Climate change has and will continue to impact the environment in a variety of ways, and will cause economic and social effects. Potential climate change impacts directly affecting San Luis Obispo County include the following: sea level rise and increased flooding, water supply issues,

[18] Ibid.

wildfire risk, public health concerns, air quality threats, more intense storm events, changes in migration and habitat needs of native wildlife, and impacts to energy demand and supply.

REGULATORY FRAMEWORK

State Regulations and Policies[19]

State regulations at the time of this Conservation Element that specifically address greenhouse gas emissions and climate change are outlined below. At this time, there are no regulations setting ambient air quality emissions standards for greenhouse gases. California is highly ranked in the world for the amount of GHG emissions emitted in the state, but has taken the lead in creating stringent GHG emissions reduction policies.

Assembly Bill 1493

In 2002, then-Governor Davis signed Assembly Bill (AB) 1493. AB 1493 requires that the California Air Resources Board (ARB) develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

Executive Order S-3-05

Executive Order S-3-05 proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra’s snowpack, further exacerbate California’s air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order establishes total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California’s resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Action Team (CAT) made up of members from various state agencies and commissions. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

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[19] State regulations and policies that are directly related to energy, including those that facilitate greenhouse gas emissions reductions from the energy sector, are detailed in the Energy Appendix.

Assembly Bill 32, The California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. The State legislature recognized the importance of the issue of climate change, as AB 32 states: “Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California.” It establishes the first-in-the-world comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases (GHG). The Act continues the existing Climate Action Team to coordinate statewide efforts, and makes the California Air Resources Board (ARB) responsible for monitoring and reducing GHG emissions. The Act authorizes the Governor to invoke a safety valve in the event of extraordinary circumstances, catastrophic events, or the threat of significant economic harm, for up to 12 months at a time. The state's GHG reduction strategies focus on some specific areas to reach the 2020 emissions level goal of 427 million metric tons of CO2: transportation reductions, electricity and natural gas reductions, forestry conservation, urban forestry and additional measures.

Since adoption, ARB staff has laid out the strategy to meet the program's goals in the form of the draft scoping plan, and have developed numerous specific regulations targeted at reducing greenhouse gas emissions from a variety of sources throughout the state. ARB has also released greenhouse gas emissions accounting and reporting protocol for specific sectors and local government operations. The local government operations protocol provides a consistent methodology to develop greenhouse gas emission inventories for California's local governments, including cities and towns. The protocol lays out specific guidelines in how local governments can assess emissions from buildings and facilities; streetlights and traffic signals; water delivery and wastewater treatment facilities; ports and airports; vehicle and transit fleets; power generation facilities; solid waste facilities; and other process and fugitive emissions.

Senate Bill 375

SB 375 builds on the existing regional transportation planning process (which is overseen by local elected officials with land use responsibilities) to connect the reduction of greenhouse gas (GHG) emissions from cars and light trucks to land use and transportation policy. In order to reach the greenhouse gas reduction goals set out in AB 32, the Global Warming Solutions Act of 2006, SB 375 provides emissions-reduction goals around which regions can plan - integrating transportation, housing, and land use planning activities and providing incentives for local governments and developers to adopt smart growth.

SB 375 enhances the Air Resources Board's (ARB) ability to reach AB 32 goals by directing ARB to develop regional greenhouse gas emission reduction targets from the automobile and light truck sectors for 2020 and 2035. ARB will also work with California's 18 metropolitan planning organizations (MPOs) to align their regional transportation, housing and land-use plans and prepare a "sustainable communities strategy" (SCS) to reduce the amount of vehicle miles traveled (VMT) in their respective regions and demonstrate the region's ability to attain its greenhouse gas reduction targets.

Additionally, SB 375 provides incentives for creating attractive, walkable and sustainable communities and revitalizing existing communities. The bill also allows home builders to get relief from certain environmental reviews under the California Environmental Quality Act if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options, which will promote healthy lifestyles and reduce traffic congestion.

Senate Bill 732

SB 732 will provide a comprehensive statutory framework to implement new programs under Proposition 84, the $5.4 billion initiative voters passed in 2006 for safe drinking water, water quality and supply, flood control, natural resource protection and park improvements. The bill also establishes the Strategic Growth Council and will appropriate $500,000 from Prop 84 to the Resources Agency to support the Council and its activities. The bill requires the Council to take certain actions with regard to coordinating programs of various state agencies to improve air and water quality, improve natural resource protection, increase the availability of affordable housing, improve transportation, meet the goals of AB 32, encourage sustainable land use planning and revitalize urban community centers in a sustainable manner. The Council will also manage and award grants and loans to support the planning and development of sustainable communities.

State Attorney General

As the chief law enforcement officer of California, the Attorney General has committed to doing everything in his power to ensure that California meets its greenhouse gas reduction targets. At the 113th annual meeting of the California State Association of Counties in November 2007, Attorney General Edmund G. Brown Jr. challenged supervisors representing the 58 counties of California to “combat global warming through green buildings, alternative energy and wise land use rules.” During the meeting, Attorney General Brown challenged the counties to immediately lead the charge against climate disruption and combat global warming through green buildings, alternative energy and wise land-use rules.

The Attorney General’s office has suggested that by law, a General Plan must discuss climate change, and include meaningful, tangible, enforceable, and funded policies, implementation mechanisms and timelines. Local government agencies are responsible, under the California Environmental Quality Act, to address the potential impacts of global warming. In comments to local jurisdictions, on projects with potentially large amounts of greenhouse gas emissions, Attorney General Brown has outlined feasible mitigations which include: green building, alternative energy and land use mitigations. The Attorney General has reached landmark agreements with San Bernardino County, ConcoPhillips, and the City of Stockton that will reduce the greenhouse gas emissions attributable to these major projects and General Plan implementation.

LOCAL RESPONSE TO CLIMATE CHANGE

The San Luis Obispo County Air Pollution Control District (APCD) Board, at its November 16, 2005 meeting approved APCD staff's proposal to take actions locally to address climate change. Staff recommendation and proposed actions are outlined in a report entitled *Options for Addressing Climate Change in San Luis Obispo County.*

Many of the air pollution programs already in place throughout the county reduce ozone forming pollutants and toxic emission, but they also have ancillary benefits and reduce greenhouse gas emissions. These programs include existing rules and regulations, clean fuels programs, CEQA mitigations measures, grants, Transportation Choices Program, pollution prevention activities, and general public outreach.

The climate change action plan identifies the following seven actions that could be implemented to specifically address greenhouse gases (GHG) at the local level:

1) Prepare a countywide inventory of greenhouse gas emissions.
2) Target a percentage of mitigation grant funds for greenhouse gas emission reductions.
3) Evaluate and quantify the GHG reduction benefits from existing district programs.
4) Develop public education and outreach campaigns on climate change.
5) Encourage and provide support for local governments to join Cities for Climate Protection program.
6) Develop partnership with Cal Poly for addressing climate change.
7) Join the California Climate Registry and encourage local industry participation.

As of November 2008, the APCD has initiated all of the implementation actions to address climate change and reduction of greenhouse gas emissions in the county. The APCD joined the California Climate Registry and conducted its greenhouse gas emissions inventory in the fall of 2008. The APCD facilitates regular meetings of Climate Change Stakeholders, a local group of city and county representatives that shares resources to address climate change. To encourage and support local greenhouse gas emissions inventories, the APCD secured consultant services to assist or perform GHG emissions for all of the incorporated cities in the county. The GHG inventories are in progress and a complete countywide GHG emissions inventory is expected at the time of adoption of this Element.

This Conservation and Open Space Element acknowledges the potential impacts of climate change in the county and includes specific policies and implementation strategies that will reduce greenhouse gas emissions and allow the county to adapt to climate change. In addition, the county has conducted a Greenhouse Gas Emissions Baseline Inventory for county operations and communitywide emissions in the calendar year of 2006. The findings of the report are attached as a separate appendix.

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County of San Luis Obispo General Plan

Community-Wide and County Government Operations Baseline Greenhouse Gas Emissions Inventory

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Appendices

Executive Summary

Climate change is quickly becoming a high priority among policy makers and residents alike. In July 2008, the County Board of Supervisors made a commitment to calculating San Luis Obispo's contribution to global climate change through the development of a Community-Wide and County Government Operations Baseline Greenhouse Gas Emissions (GHG) Inventory (Inventory). This Inventory identifies the major sources of greenhouse gas emissions within the county[1] and provides a baseline against which future progress can be measured. This Inventory includes two components: a community-wide analysis and a County government operations analysis. It is important to note that the County government operations inventory is a subset of the community inventory, meaning that all County government operations emissions are included in the commercial/industrial, transportation, waste, or 'other' categories of the community-wide inventory. The County government operations inventory should not be added to the community analysis; rather it should be looked at as a slice of the complete picture. Specifically, this Inventory does the following:

What are Greenhouse Gas Emissions (GHGs)?

Gases that trap heat in the Earth's atmosphere are called greenhouse gases, or GHGs. Greenhouse gases include carbon dioxide, methane, nitrous oxide, and fluorinated gases. While many of these gases occur naturally in the atmosphere, modern human activity has led to a steep increase in the amount of GHGs released into the atmosphere over the last 100 years. Collectively, these gases intensify the natural greenhouse effect, thus causing global average surface temperatures to rise, which in turn affects global climate patterns. GHGs are often quantified in terms of CO_2 equivalent, or CO_2e, a unit of measurement that equalizes the potency of GHGs.

Source: Intergovernmental Panel on Climate Change (IPCC), 2007

- Calculates GHGs from community-wide[2] activities, including County government operations, within County's jurisdictional boundary in calendar year 2006;
- Identifies the major sources of greenhouse gas emissions from community-wide sources and County government operations;
- Provides County decision-makers and the community with adequate information to inform policy decisions; and,
- Forecasts how emissions will grow in the community if no behavioral changes are made.

The 2006 community-wide and County government operations baseline GHG Inventory represents a key step in San Luis Obispo County's efforts to improve air quality, enhance environmental sustainability, and ensure the safety and comfort of its residents for generations

[1] In this report, the term 'county' refers to the area inside the jurisdictional boundary of San Luis Obispo County, whereas 'County' refers to those activities which are under the operational control of County agencies.

[2] 'Community-wide' or 'community' refers to all activities within the county (as defined above), including those from businesses, industrial processes, residents, vehicles, and municipal operations.

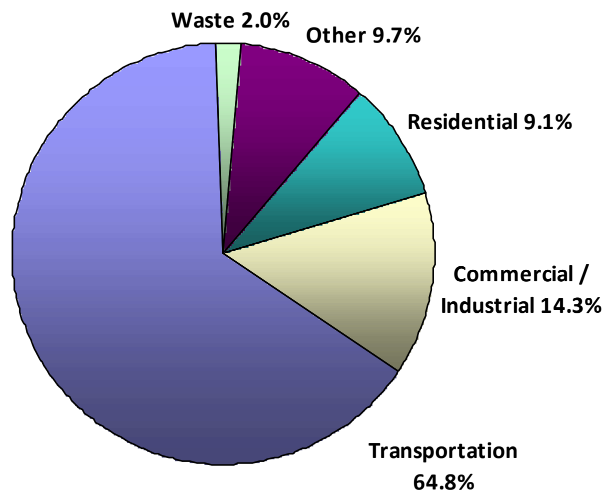
to come. In addition, this Inventory allows the County to quantitatively track and take credit for its numerous efforts related to energy efficiency and the mitigation of global climate change.

COMMUNITY-WIDE GHG INVENTORY RESULTS

The GHG Inventory identifies that the community of San Luis Obispo County emitted approximately 1,506,163 metric tons of CO_2e in the baseline year 2006. As shown in **Figure A2-ES1**, the transportation sector was by far the largest contributor to emissions (64.8%), producing approximately 976,585 metric tons of CO_2e in 2006. Emissions from the residential, commercial, and industrial sectors accounted for a combined 23.4% of the total, while emissions from the waste sector accounted for 2.0% of emissions and other sources, including livestock and agricultural equipment, comprised 9.7% of the total.

The majority of emissions from the transportation sector were the result of gasoline consumption in private vehicles traveling on local roads, US 101, and state highways. GHG figures from the waste sector are the estimated future emissions that will result from the decomposition of waste generated by county residents and businesses in the base year 2006, with a weighted average methane capture factor of 58%.

FIGURE A2-ES1
COMMUNITY GHG EMISSIONS BY SECTOR



COUNTY GOVERNMENT OPERATIONS GHG INVENTORY RESULTS

County operations and facilities produced approximately 34,335 metric tons of CO_2e from inventoried greenhouse gas emission sources in 2006. As displayed in **Figure A2-ES2**, this represents approximately 2.2% of total community-wide emissions in the county. County emissions are comprised of employee commute trips, waste, streetlight electricity, energy consumption from water and sewage facilities, building energy, vehicle fleet fuel consumption, and miscellaneous equipment. Employee commute was by far the largest contributor to the County's emissions (73.6%) producing 25,257 metric tons of carbon dioxide equivalent. (Refer to **Figure A2-ES3**) The second largest contributor (14.5%) was from energy consumption in County-owned and -operated facilities.

FIGURE A2-ES2
COUNTY GOVERNMENT OPERATIONS PORTION OF COMMUNITY-WIDE GHG EMISSIONS, 2006

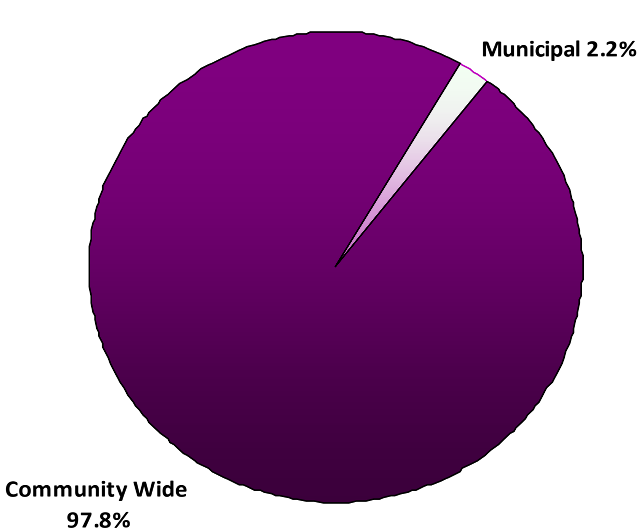
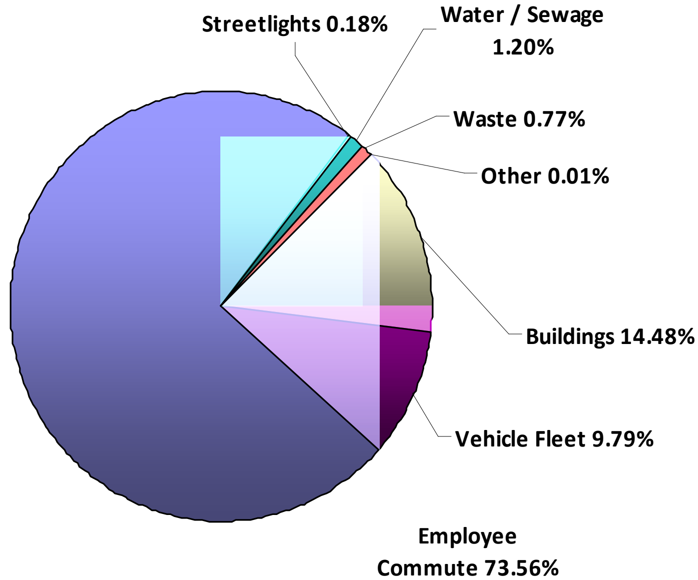


FIGURE A2-ES3
COUNTY GOVERNMENT OPERATIONS GHG EMISSIONS BY SECTOR, 2006



County government operations emissions are a subset of the total community-wide emissions as outlined above. However, similar to how businesses and factories perform their own facility-scale GHG Inventories this Inventory analyzes County emissions separately to identify cost-saving and emissions-reducing strategies in the future. The methodology for estimating emissions from local government operations is guided specifically by the Local Government Greenhouse Gas Inventory Protocol developed by the California Air Resources Board, ICLEI – Local Governments for Sustainability, and the California Climate Registry.

DATA LIMITATIONS

This County government operations and community-wide Inventory captures the major sources of greenhouse gases caused by activities within the County per standard practice. However, it is important to note that some likely emission sources were not included in the Inventory either because of privacy laws, lack of data, or a lack of reasonable methodology for calculating emissions. It is estimated that these sources not included in the inventory comprise less than 5% of total emissions in the county. It is likely that as greenhouse gas inventories become more common, methodology and accessibility to data will improve.

The sources that could not be included due to privacy laws, lack of data availability, and/or a reasonable methodology include the following:

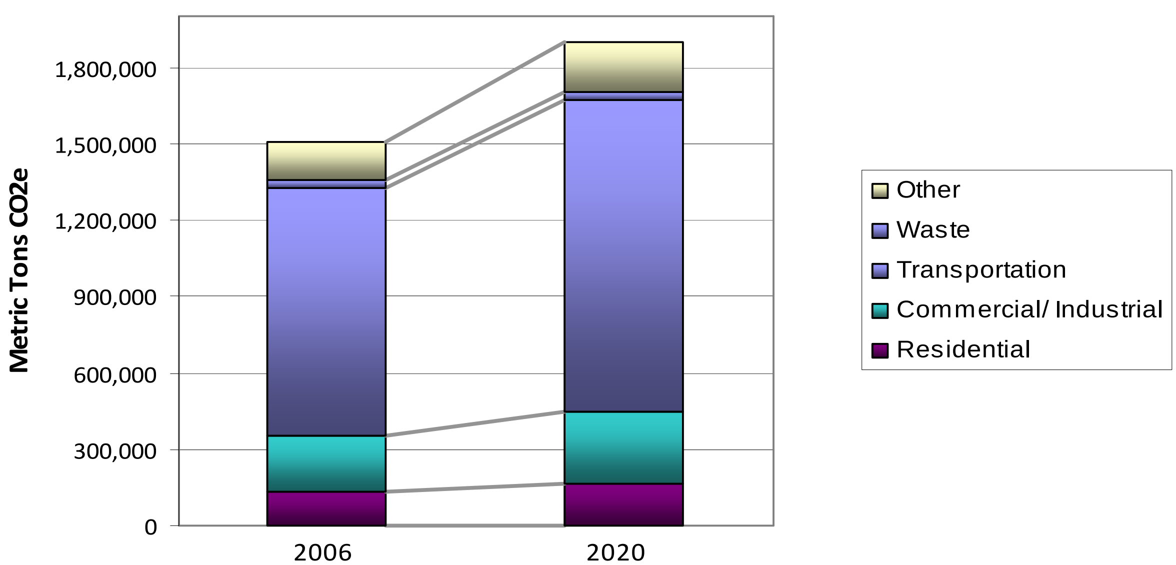
- Aircraft activities
- Military base activities
- Port and harbor activities
- Refrigerants from County government operations facilities and vehicles
- Freight and passenger trains
- Sewage and water treatment for the community-at-large
- Propane use for the community-at-large

These limitations are explained further in this document.

FORECAST AND NEXT STEPS

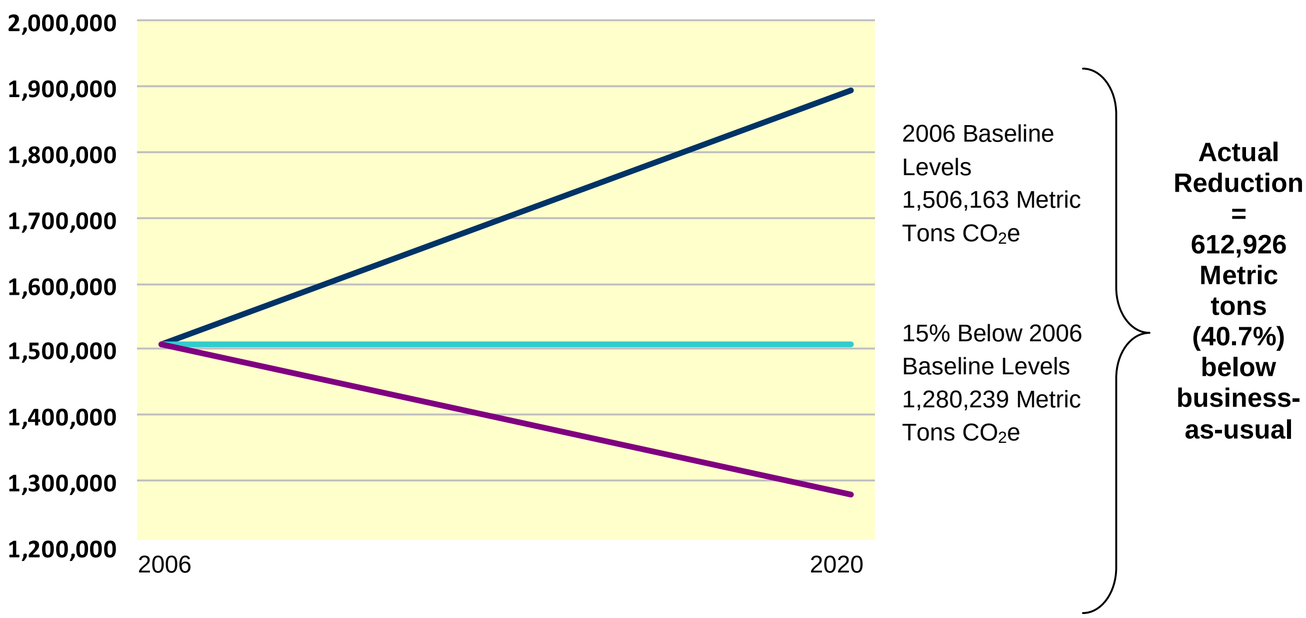
If consumption trends continue the pattern observed in 2006 emissions will reach 1,893,164 metric tons of CO_2e by 2020, or a 25.7% increase over 2006 baseline levels. This growth, shown in **Figure A2-ES4**, is due to projected increases in households, population, and jobs within the County.

FIGURE A2-ES4 2020 SAN LUIS OBISPO COUNTY BUSINESS-AS-USUAL GHG EMISSIONS FORECAST



With this information the County can make an informed determination of a reduction target. Conformance with the State of California's recommended reduction of 15% below present levels by 2020 would result in a 32.4% reduction below the county's business-as-usual emissions (**Figure A2-ES5**).[3]

FIGURE A2-ES5 2020 BUSINESS-AS-USUAL FORECAST IN RELATION TO 15% STATE-RECOMMENDED REDUCTION TARGET



It is likely that the county's emissions are already below the business-as-usual forecast due to sustainability efforts initiated by the County since 2006. As directed by the Conservation and Open Space Element (April 2009 Public Hearing Draft), this baseline Inventory will be updated on a regular basis, most likely 3-7 years, in order to track the County's progress and reassess reduction targets.

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[3] AB 32 Scoping Plan, page 27 states that ARB encourages local governments to "move toward establishing similar goals for community emissions that parallel the State commitment to reduce greenhouse gas emissions by approximately 15 percent from current levels by 2020." http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

1. Introduction

In July 2008, the County Board of Supervisors adopted a resolution to join ICLEI-Local Governments for Sustainability (ICLEI) and to authorize the preparation of a greenhouse gas emissions (GHG) baseline inventory as part of the Conservation and Open Space Element (COSE) update. In committing to the project, the County of San Luis Obispo embarked on an ongoing, coordinated effort to reduce the GHG emissions that cause global warming, improve air quality, reduce waste, cut energy use, and save money.

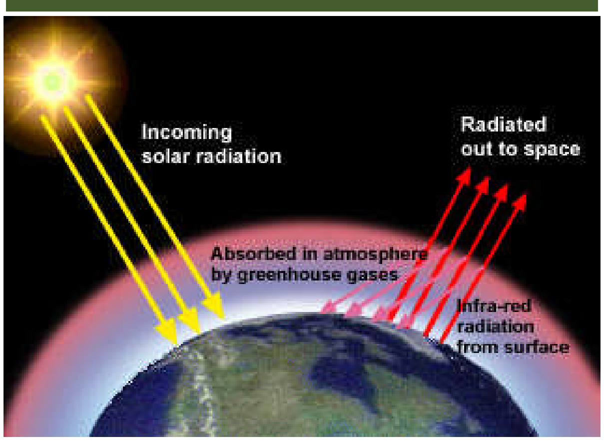
This section introduces the Inventory, defines key terms used throughout the Inventory, and provides an overview of climate change science and regulation in California.

ICLEI, formerly the Intergovernmental Council of Local Environmental Initiatives, is now named ICLEI - Local Governments for Sustainability. The non-profit organization provides technical assistance to more than 1,000 local governments worldwide on quantifying and reducing greenhouse gas emissions.

1.1 PURPOSE OF A GHG INVENTORY

This Inventory represents completion of the first step in the County's climate protection process. As advised by ICLEI, quantifying recent-year emissions is essential to establish: 1) a baseline against which to measure future emission levels, and 2) an understanding of where the highest percentages of emissions are coming from, and, therefore, the greatest opportunities for emissions reductions. This Inventory presents estimates of greenhouse gas emissions in 2006 resulting from the community as a whole.

**FIGURE A2.1-1
THE GREENHOUSE GAS EFFECT**



Source: Tufts University

Climate Change – Scientific Background

Since the early 1990's scientific consensus holds that the world's population is releasing greenhouse gases faster than the earth's natural systems can absorb them. These gases are released as by-products of fossil fuel combustion, waste disposal, energy use, land-use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), creates a blanket around the earth that allows light to pass through but traps heat at the surface preventing its escape into space (**Figure A2.1-1**). Known as the greenhouse effect, models show that this phenomenon will lead to a 2^oF to 10^oF temperature increase over the next 100 years. The Intergovernmental Panel on Climate Change warns that most of the warming observed over the last 50 years is attributable to human activities.[4]

Although used interchangeably, there is a difference between the terms “climate change” and “global warming.” According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period. It can be caused by natural factors and human activities alike. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased greenhouse gas emissions from human activities. The use of the term ‘climate change’ is becoming more prevalent because it encompasses all changes to the climate, not just temperature. Additionally, the term ‘climate change’ conveys temporality, implying that climate change can be slowed with the efforts of local, regional, state, national, and world entities.

Changes in the earth’s temperature will have impacts for residents and businesses of San Luis Obispo County. Some of the major impacts expected to occur before 2099 include the following, separated by sector:[5]

- Coastline: The San Luis Obispo coastline could face inundation as a result of sea level rise and global warming. As temperatures rise, the ocean waters rise as well due to thermal expansion and the melting of glaciers and snowpack. New reports commissioned by the California Climate Action Team and performed by the Pacific Institute suggest that sea levels will rise by at least 55 inches by 2099.[6]
- Agriculture: County agriculture will be greatly affected by climate change. Rising sea levels will cause greater soil salinity, increased temperatures will cause longer and more severe periods of drought and wildfire.
- Public Health: Heat waves are expected to have a major impact on public health, as will decreasing air quality and an increase in mosquito-breeding and mosquito-borne diseases. The elderly, young and other vulnerable populations will need assistance as they will not have the resources to deal with the costs and adapt to the expected changes.

Although one county cannot resolve the issue of climate change, local governments can make a positive impact through cumulative local action. Cities and counties have the ability to reduce

[4] Intergovernmental Panel on Climate Change. Fourth Assessment Report, Working Group I. 2007. Climate Change 2007: The Physical Science Basis, Summary for Policy Makers.

[5] Our Changing Climate: Assessing the Risks to California (2006), www.climatechange.ca.gov

[6] California Climate Change Center, The Impacts of Sea-Level Rise on the California Coast, March 2009. http://www.pacinst.org/reports/sea_level_rise/index.htm

greenhouse gas emissions through effective land use and transportation planning, wise waste management, and the efficient use of energy. The County can achieve multiple benefits including lower energy bills, improved air quality, economic development, reduced emissions, and better quality of life through:

- Energy efficiency in county facilities and vehicle fleet;
- Sustainable purchasing and waste reduction efforts;
- Land use and transportation planning; and
- Preparing for sea level rise.

This Inventory serves as a baseline measurement for implementing and tracking the effectiveness of these efforts.

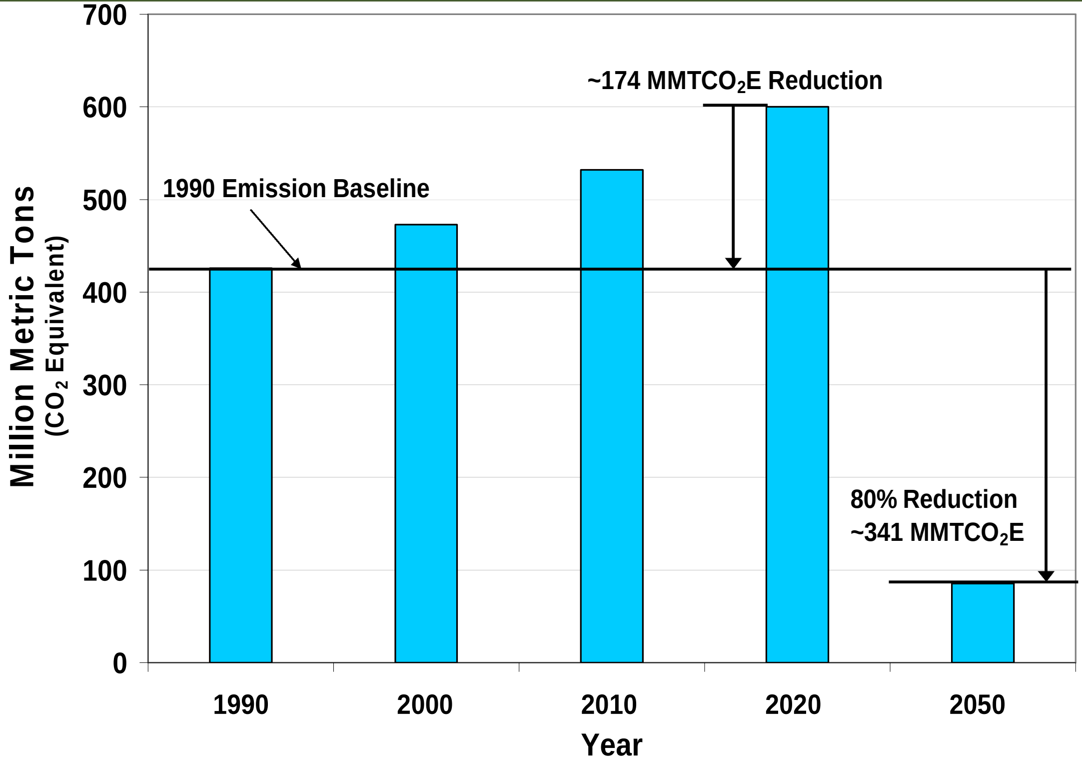
1.2 CLIMATE CHANGE – LEGISLATIVE BACKGROUND

California continues to be a leader in addressing climate change in the United States and in the world. In June of 2005, Governor Schwarzenegger issued a landmark Executive Order establishing progressive greenhouse gas emissions targets for the entire state. **Executive Order S-3-05** makes the following goals:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020 reduce greenhouse gas emissions to 1990 levels;
- By 2050, reduce greenhouse gas emissions to 80% below 1990 levels.

To support these reduction targets, the California legislature adopted the **California Global Warming Solutions Act of 2006, also known as AB 32**. The law requires the California Air Resources Board (CARB) to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020 as shown in **Figure A2.1-2** below. CARB approved a scoping plan in January 2009 outlining preliminary mechanisms for emissions reductions, including a cap-and-trade program and regional reduction targets.

FIGURE A2.1-2
CALIFORNIA CLIMATE CHANGE EMISSIONS AND TARGETS



Source: California Air Resources Board

AB 32 has caused a ripple effect among cities, counties, and environment groups throughout the state. In *State of California Attorney General v. San Bernardino County* in 2007, the California Attorney General's office argued that the Environmental Impact Report for San Bernardino's General Plan update did not conform to the overall goals of AB 32 because it did not adequately analyze or mitigate the effects of development on global warming. The County settled with the State by agreeing to produce a greenhouse gas emissions reduction plan much like this report and, at the same time, furthering California's commitment to addressing climate change.

The San Bernardino Settlement Agreement led senators to write SB 97 in August 2007. This law formally acknowledges that climate change is an important environmental issue that requires analysis under the California Environmental Quality Act (CEQA). The Governor's Office of Planning and Research (OPR) is responsible for developing guidelines for addressing climate change in CEQA documents by 2009. The guidelines will be adopted by the State Resources Agency in 2010.

In September 2008, the Attorney General reached another settlement agreement concerning climate change, this time with the City of Stockton. According to the Attorney General's office and the Sierra Club, the City of Stockton did not adequately address climate change in its 2035 General Plan update and corresponding Environmental Impact Report. The City of Stockton settled with the Attorney General by agreeing to adopt a climate action plan designed to reduce sprawl, increase infill development, promote public transit, and encourage more energy-efficient buildings.

Although EO S-3-05, AB 32, SB 97, and the Attorney General's actions have made California a national leader in climate change policy, there is much more to come. The California Legislature passed numerous bills in recent years concerning energy use, land use, transportation, and other climate change topics. These bills will result in the guidance and funding necessary for local governments to move forward with climate action efforts. At the same time, the State is working to form regional approaches to reducing greenhouse gas emissions in response to the passage of Senate Bill 375 (SB 375). SB 375 (Steinberg) aims to reduce greenhouse gas emissions by linking transportation funding to land use planning. It also requires Metropolitan Planning Organizations, including the San Luis Obispo Council of Governments, to include a Sustainable Communities Strategy (SCS) in their Regional Transportation Plans (RTPs) for reducing suburban sprawl. It also creates incentives for implementation of the sustainable communities strategies and sustainable transportation plans. Additional efforts are underway to affect the overall transportation sector by mandating fewer emissions from vehicles, including Assembly Bill 1493 (Pavley), signed into law in 2002, which will require carmakers to reduce emissions from new passenger cars and light trucks beginning in 2009.

The scale and pace at which the State of California is addressing this issue necessitates that San Luis Obispo County accelerate efforts to combat climate change.

1.3 THE CITIES FOR CLIMATE PROTECTION CAMPAIGN

By adopting a resolution to join ICLEI-Local Governments for Sustainability, San Luis Obispo County is now part of an international movement of local governments. More than 1,000 local governments, including over 500 in the United States, have joined ICLEI's Cities for Climate Protection (CCP) campaign.

The CCP campaign provides a framework for local communities to identify and reduce greenhouse gas emissions, organized along five milestones as represented in **Figure A2.1-3** below:

FIGURE A2.1-3 THE ICLEI FIVE MILESTONE PROCESS

This report represents the completion of the first CCP milestone, and provides a foundation for future work to reduce greenhouse gas emissions in San Luis Obispo County.

1.4 SUSTAINABILITY AND CLIMATE CHANGE MITIGATION ACTIVITIES IN THE COUNTY

Many of the air pollution programs already in place throughout the county reduce ozone forming pollutants and toxic emissions, but they also have ancillary benefits and reduce greenhouse gas emissions. The County, cities, and the Air Pollution Control District (APCD) implement rules and regulations, clean fuels programs, CEQA mitigations measures, grants, Transportation Choices Program, pollution prevention activities, energy efficiency and conservation measures, water conservation programs, partnerships, and general public outreach that directly or indirectly address climate change and reduce greenhouse gas emissions.

The APCD Board approved the first report or plan to address climate change in the county. The plan, *Options for Addressing Climate Change in San Luis Obispo County (2005)* identifies the following seven actions that could be implemented to specifically address greenhouse gases (GHG) at the local level:

1) Prepare a countywide inventory of greenhouse gas emissions.
2) Target a percentage of mitigation grant funds for greenhouse gas emission reductions.
3) Evaluate and quantify the GHG reduction benefits from existing district programs.
4) Develop public education and outreach campaigns on climate change.
5) Encourage and provide support for local governments to join Cities for Climate Protection program.
6) Develop partnership with Cal Poly for addressing climate change.
7) Join the California Climate Registry and encourage local industry participation.

As of November 2008, the APCD has initiated, promoted, or supported all of the implementation actions to address climate change and reduction of greenhouse gas emissions in the county. The APCD joined the California Climate Registry and conducted its greenhouse gas emissions inventory in the fall of 2008. The APCD facilitates regular meetings of Climate Change Stakeholders, a local group of city and county representatives that shares resources to address climate change. To encourage and support local greenhouse gas emissions inventories, the APCD is providing technical assistance to all of the incorporated cities to assist or perform GHG County government operations and community-wide emissions inventories, similar to this Inventory, for all of the incorporated cities in the county.

The APCD also coordinates the Central Coast Clean Cities Coalition (C5). C5 is a partnership of public/private entities whose goal is to promote the use of alternative fuels vehicles (AFV) on the Central Coast. By working with area fleet operators, C5 sponsors training seminars, public events and grant funding workshops related to use of alternative fuels.

In 2008, the APCD and the San Luis Obispo Council of Governments partnered to conduct a countywide survey regarding air quality, climate change, energy use and land use. The key findings follow.

Attitudes toward Air Quality and Climate Change

County residents are more concerned about local air quality than they are about climate change. Moreover, the percentage of people who said they have ‘no’ concern for climate change far exceeds those who said they have ‘no’ concern for protecting air quality. North County residents are less concerned about both air quality and climate change issues than are residents of other regions.

- About one fourth of residents say they are ‘very’ knowledgeable about ways to reduce their impact on air quality and climate change.

- Approximately 1/3 of all residents have made ‘a lot’ of lifestyle changes to reduce their impact on air quality and climate change. Another third have made some changes while the remaining third have made a few or no changes.
- Messages that encourage residents to ‘buy locally grown produce or manufactured items’ and/or to ‘combine errands into one trip’ are likely to influence the greatest number of people; least effective are statements about ‘reducing car use’.

Attitudes toward Alternative Sources of Energy

- 94% of respondents support the idea of government agencies working to provide more energy through renewable sources. Two-thirds of respondents would support such efforts even with a 5% increase over current costs.

Land Use Issues

- Respondents support development in urban areas more than they do in rural areas. 80% - 85% support development that provides single-family homes or condominiums in urban areas.
- 78% support the idea of planning communities that make it easier to get around by bus, biking or walking rather than planning communities that accommodate cars.
- Rural development is the planning issue with the least consensus among respondents.
- 54% indicated they would like planners to discourage rural development while 46% would like to allow such developments. North County respondents, followed by South County respondents, were generally more in support of rural development than were respondents the central and coastal regions.

Local and state-level conversations and regulatory actions regarding climate change have been evolving rapidly since the APCD and SLOCOG survey. The County and other municipal agencies will use the results of GHG baseline inventories and public outreach and engagement processes to develop a local response to climate change.

Many non-governmental organizations in the county have prioritized sustainability[7] and climate change. Consequently, these organizations partnered with government agencies and others to develop activities and programs to educate, engage, and assist government agencies, businesses, and residents understand and address sustainability and a local response to climate change.

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[7] The most widely quoted definition of ‘sustainability’ internationally is the "Brundtland definition" of the 1987 Report of the World Commission on Environment and Development – that sustainability means "**meeting the needs of the present without compromising the ability of future generations to meet their own needs.**" http://www.epa.gov/sustainability/basicinfo.htm#sustainability

2. Community and County government operations Inventory Methodology

The first step toward reducing greenhouse gas emissions is to identify baseline levels and sources of emissions in the county. This information can later inform the selection of a reduction target and possible reduction measures to be included in a climate action plan.

This section outlines the methodology used to calculate the community and County government operations[8] inventories, including the difference between the two inventories, and the data collection process, data sources, GHG emission scopes, data limitations, and means of calculation.

2.1 BASELINE AND FORECAST YEARS

The year 2006 was selected as the county's baseline year due to the availability of reliable data. The State of California uses 1990 as a reference year to remain consistent with the Kyoto Protocol, and also because it has well-kept records of transportation trends and energy consumption in that year. However, cities and counties throughout California typically elect to use 2005 or 2006 as a baseline year because of the more reliable recordkeeping from those years and because of the large amount of growth that has occurred since 1990.

This Inventory uses a forecast year of 2020 to be consistent with the State of California GHG Inventory[9] forecast year and AB 32 target, both of which reference 2020. In addition, it is likely that any forecast beyond 2020 would have a significant margin of error because of unknown population growth rates and new technology.

2.2 THE TWO INVENTORIES: COMMUNITY-WIDE AND COUNTY GOVERNMENT OPERATIONS

This inventory is separated into two sections, community-wide and County government operations. Per ICLEI protocol, the County has completed an assessment of activities throughout the community and a more detailed analysis of County government operations including streetlights, building energy use, fleet vehicles, and more. The County government operations inventory was conducted consistent with the Local Government Operations Protocol

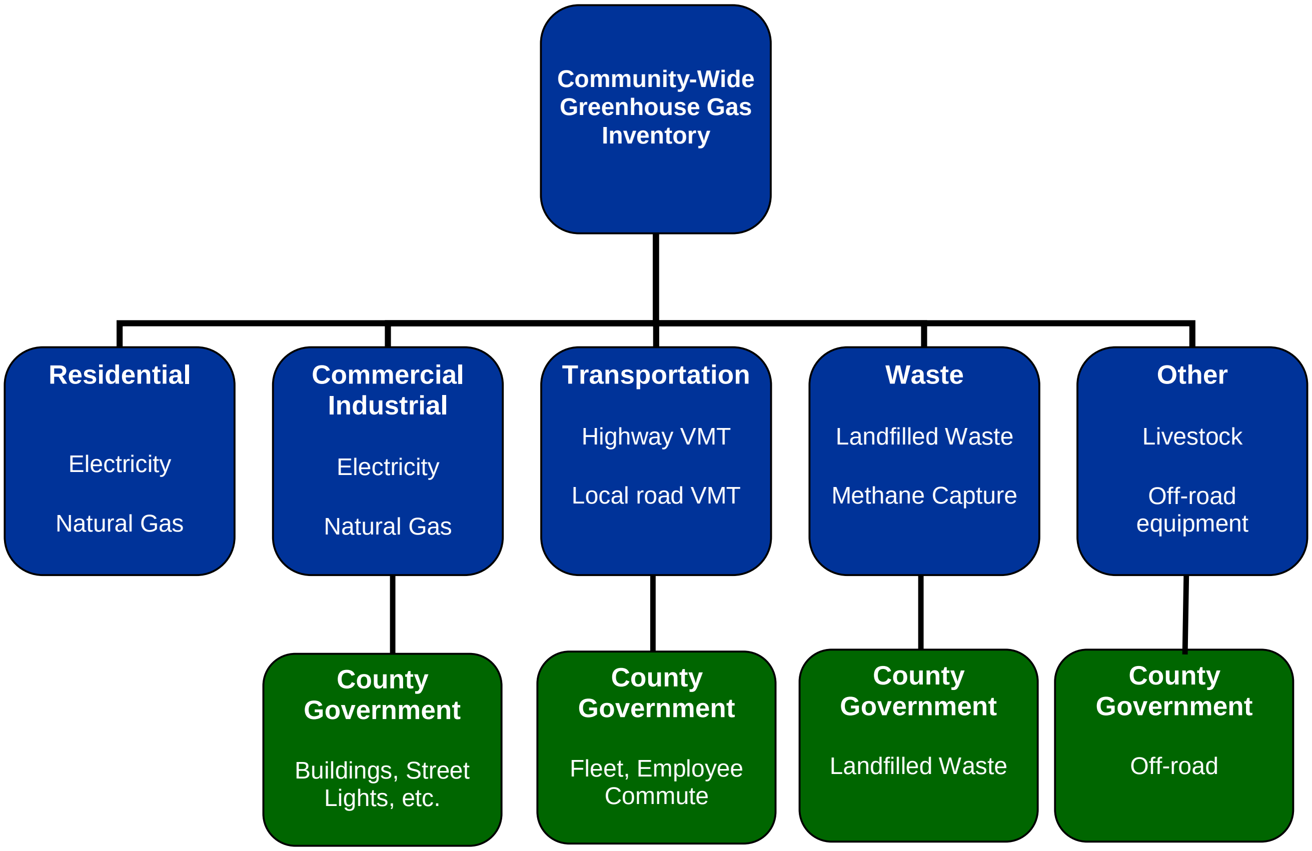
[8] In this report, the term 'county' refers to the unincorporated area (the jurisdictional boundary of the San Luis Obispo County), whereas 'County' refers to those activities that are under the operational control of County agencies. 'Community-wide' or 'community' refers to all activities within the unincorporated county (as defined above), including those from businesses, industrial processes, residents, vehicles, and municipal operations.

[9] California Greenhouse Gas Inventory, http://www.arb.ca.gov/cc/inventory/inventory.htm

developed by the California Air Resources Board (CARB), ICLEI, The Climate Registry, and the California Climate Action Registry (CCAR).

It is important to note that the County government operations inventory is a subset of the community inventory, meaning that all County government operations are included in the commercial/industrial, transportation, waste, or ‘other’ categories of the community-wide inventory. The County government operations inventory should not be added to the community analysis; rather it should be looked at as a slice of the complete picture as illustrated in **Figure A2.2-1**. Although a small contributor to the community's overall emissions levels, a County government operations audit allows the County to track its individual facilities and vehicles and to evaluate the effectiveness of its emissions reduction efforts at a more detailed level.

FIGURE A2-2-1 THE RELATIONSHIP BETWEEN COMMUNITY-WIDE AND GOVERNMENT OPERATIONS INVENTORIES



Once completed, these inventories provide the basis for policy development, the quantification of emissions reductions associated with proposed measures, the creation of an emissions forecast, and the establishment of an informed emissions reduction target.

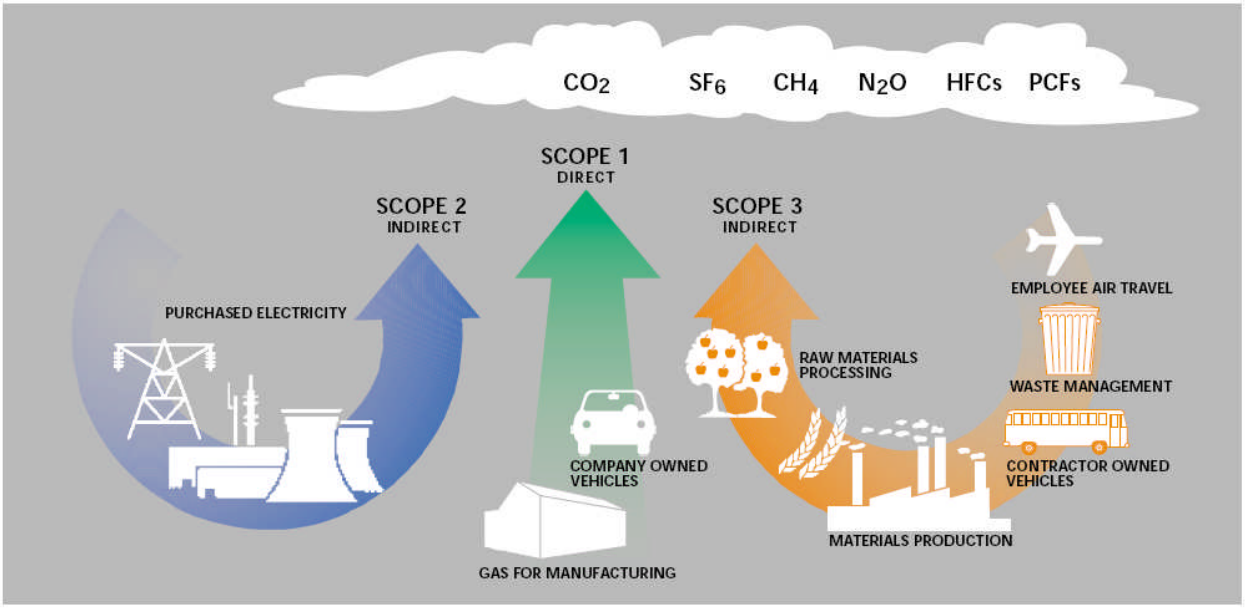
2.3 DATA COLLECTION AND METHODOLOGY

Creating the community and County government operations emissions inventories required the collection of information from a variety of sources. Sources for community data included the Pacific Gas and Electric Company (PG&E), the Southern California Gas Company, Caltrans, and the California Integrated Waste Management Board. County government operations data sources included PG&E, the Southern California Gas Company, and documentation from multiple County departments including sheriff, fire, general services, planning, public works, and more. Data from the year 2006 were used in both inventories, with the following exceptions: 1) A subset of waste data by type was not available for 2006, therefore this study utilizes a California statewide waste characterization study conducted in 2003-2004, 2) County employee commuting trips were calculated using an employee survey conducted in 2008, and 3) Aircraft operations data was not available for 2006, therefore this study utilizes a APCD report conducted in 2007.

For community activities and government operations, emissions sources are categorized by scope. Scopes help us identify where emissions originate from and what entity retains regulatory control and the ability to implement efficiency measures. The scopes are illustrated in **Figure A2.2-2** and defined as follows:

- **Scope 1.** Direct emissions sources located within the unincorporated areas of the county, mostly from the combustion of fuels. Examples of Scope 1 sources include use of fuels such as gasoline and natural gas.
- **Scope 2.** Indirect emissions that result because of activites within the unincorporated areas of the county, limited to electricity, district heating, steam and cooling consumption. Examples of Scope 2 sources include purchased electricity used within the unincorporated areas and associated with the generation of greenhouse gases at the power plant. These emissions should be included in the community-scale analysis, as they are the result of the community's electricity consumption.
- **Scope 3.** All other indirect emissions that occur as a result of activity within the unincorporated areas. Examples of Scope 3 emissions include methane emissions from solid waste generated within the community which decomposes at landfills either inside or outside of the unincorporated areas of the county.

FIGURE A2.2-2 GHG EMISSION SCOPES



Source: NZBCSD (2002), The Challenge of GHG Emissions: the "why" and "how" of accounting and reporting for GHG emissions: An Industry Guide, New Zealand Business Council for Sustainable Development, Auckland

Appendices 1A and 1B of this report separate the community and County government operations emissions by scope. Each sector is labeled with a 1, 2, or 3 that corresponds to the scopes above.

2.4 DATA SOURCES

The data used to complete this Inventory came from multiple sources, as summarized in **Tables A2.2-1 and A2.2-2**. Utility providers supplied electricity and natural gas consumption data associated with commercial, industrial, residential, and County government buildings in 2006. Vehicle miles traveled (VMT) was obtained from the 2006 Highway Performance Maintenance System (HPMS) developed by Caltrans and refined with County Geographic Information System (GIS) data. These data sources are further explained in the sector-specific discussions of this document.

TABLE A2.2-1 DATA SOURCES FOR COMMUNITY ANALYSIS, 2006

Sector	Information	Unit of Measurement	Data Source
Residential	Electricity Consumption	Therms	PG&E
	Natural Gas Consumption	kWh	PG&E Southern California Gas
Commercial / Industrial	Electricity Consumption	Therms	PG&E
	Natural Gas Consumption	kWh	PG&E Southern California Gas
Transportation	Local road VMT for unincorporated areas	Annual average VMT	Caltrans HPMS data
	Highway and Interstate VMT for SLO County	Annual average VMT	Caltrans HPMS data
	Portion of highways and interstates within unincorporated areas	Highway miles	County GIS shape files
Solid Waste	Solid waste tonnage sent to landfill from activities in unincorporated SLO County	Short tons	San Luis Obispo Integrated Waste Management Board
Other - Aircraft	Emissions from aircraft take-offs and landings, calculated as part of a separate analysis	Tons CO, NOx, VOC	Engineering report by APCD (2007 data)
Other - Cattle and Sheep	Number of cattle and number of sheep in the unincorporated County	County 2006 Crop Report	Number of heads in the County
Other - Off-Road Agricultural Equipment	Emissions from off-road agricultural equipment	Tons/year of N_20, CO_2, and CH_4	California Air Resources Board OFFROAD2007 model
	Portion of land within unincorporated areas	Square feet	County GIS shape files

TABLE A2.2-2 DATA SOURCES FOR COUNTY GOVERNMENT OPERATIONS ANALYSIS, 2006

Sector	Information	Unit of Measurement	Data Source
Buildings	Electricity Consumption	Therms	Billing Records
	Natural Gas Consumption	kWh	Billing Records
Vehicle Fleet	Diesel Consumption and Corresponding Vehicle Type	Gallons	Billing Records
	Gasoline Consumption and Corresponding Vehicle Type	Gallons	Billing Records
Employee Commute	Sample of Employee Commuting Patterns	Annual VMT	Commuter Survey (September 2008)
Streetlights	Electricity Consumption	kWh	Billing Records
Water / Sewage	Electricity Consumption	kWh	Billing Records
Waste	Annual waste tonnage sent to landfill	Tons	Billing Records
Other – Misc. Equipment	Fuel consumption of various types of equipment	Gallons	County General Services

2.5 DATA LIMITATIONS

It is important to note that calculating community-wide greenhouse gas emissions with precision is a complicated task. The ICLEI model relies on numerous assumptions and is limited by the quantity and quality of available data. Because of these limitations it is useful to think of any specific number generated by the model as an approximation of reality, rather than an exact value.

Despite these limitations, the Clean Air and Climate Protection (CACP) software[10] and ICLEI methodology provide the best-available snapshot of the county's greenhouse gas emissions. Additionally, the CACP tool is utilized to promote consistency among municipalities throughout the country and the world. **Appendices 2A** and **2B** include the detailed CACP reports for the Community-wide and Government Operations inventories. Sector-specific data limitations or methodological issues are explained thoroughly in **Appendices 2C and 2D**. The following paragraphs highlight emissions that cannot be included in a GHG Inventory under current science and policy direction, or lack of reliable data.

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[10] The Clean Air and Climate Protection (CACP) software was developed by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (SAPPA/ALAPCO), the International Council for Local Environmental Issues (ICLEI), and Torrie Smith Associates.

This Inventory does not separately analyze site-level emissions from specific sources such as refineries, landfills, and large industrial emitters. The emissions from industrial energy consumption and related transportation are included under the commercial/industrial category, but will not be analyzed independently as part of this Inventory. This is for two reasons: 1) State privacy laws prevent us from obtaining site-level energy consumption data from utility providers, and 2) It is the responsibility of the emitter, whether it is a large refinery or household, to perform their own energy audit and subsequent reduction process. Efforts to require site-level energy audits and greenhouse gas emissions reporting are being continually expanded and required by the California Climate Action Registry, U.S. Environmental Protection Agency, and California Air Resources Board.

The county's actual 2006 greenhouse gas emissions are likely to be slightly greater than what are reported in this document due to three main factors: 1) data limitations, 2) privacy laws, and 3) a lack of a reasonable methodology to collect or model emissions data.

Lack of available data prevented the calculation of emissions from community-wide freight and passenger trains, ports, off-road vehicles and equipment, propane use and County government operations refrigerants. For rail, port and other off-road vehicles and equipment emissions, the California Air Resources Board OFFROAD 2007 software provides emissions from rail and port activities; however these numbers are aggregated for the entire San Luis Obispo County area, including incorporated, unincorporated, and State or federally owned land. Without data specific to unincorporated areas and without a reasonable methodology for allocating the OFFROAD calculation, port and rail activity emissions were omitted. Lack of data availability also prevents the calculation of emissions from propane (liquefied petroleum gas, or LPG) created in the unincorporated county. Propane is basically an unregulated fuel in California (except for storage and safety issues which are regulated). Because it is an unregulated commodity, no data is collected by the state on propane sales or usage. Another sector that was excluded from the inventory is County government operations refrigerants. The County of San Luis Obispo made a best effort to gather data on the amount of refrigerants consumed by fleet vehicles, HVAC systems, and County government operations facilities; however County records were not suited to this

What's the difference between an emissions inventory and a carbon footprint?

An emissions inventory incorporates emissions directly caused by actions taken within the county that we know how to calculate. A carbon footprint, on the other hand, encompasses greenhouse gas emissions from the entire life cycle of a product or service. This could include the emissions from raising beef for sale at the supermarket or the fuel consumption associated with residents' flights out of SBP for vacation. At this time, it is difficult to accurately estimate the community's carbon footprint. However, individuals may reduce their carbon footprint by buying locally produced foods and goods, reducing packaging, and other behavioral changes.

purpose. It is recommended that the County consider changes to its record keeping to inventory amount of refrigerants purchased and consumed within a year.

Lack of data also prevents the calculation of emissions from wastewater (sewage) created in unincorporated county. Municipalities, special services districts, and private landowners that collect, treat, and dispose of wastewater differ with regard to treatment and disposal methods, water efficiency requirements, impervious surface allowances, landscape irrigation efficiency standards, type of building stock, and data collection and reporting. As a result, it is unclear what portion of the sewage treated at each facility originates from unincorporated county businesses and residents. For this reason, estimates associated with the County's share of sewage cannot be made at this time. Full accounting of emissions from wastewater collection, treatment, and disposal would require extensive coordination with special services districts, such as community services districts and sanitary districts, other municipalities, and private landowners. Opportunities for improvement in data collection and reporting could occur through the Resource Management System Annual Resource Summary Report.

Privacy laws restrict us from collecting data on the military bases and certain aviation activities within the county. Also, as stated previously, the California Public Utilities Commission 15/15 rule prevents us from analyzing industrial emissions separately from commercial emissions.

A lack of a reasonable methodology for calculating carbon dioxide, methane, and nitrous oxide from aircraft takeoffs and landings also prevent the inclusion of the majority of emissions from the San Luis Obispo County Regional Airport. This is despite the fact that, according to the United Nations Intergovernmental Panel on Climate Change (IPCC), aviation activities are currently thought to contribute about 2 to 3 percent to total global greenhouse gas emission inventories. Therefore, although an airport may make a considerable contribution to an inventory, it cannot be accurately estimated or included. However, as awareness of climate change increases and local governments improve data collection protocols it can be expected that a greater percentage of actual emissions will be captured through improved data management.

Similarly, protocol and methodological barriers prevent us from including all emissions from the treatment and movement of water consumed by the community. Water in the county largely comes from incorporated cities, community services districts or other special districts, mutual water companies, and private landowners (groundwater wells and onsite septic systems). The emissions from these treatment facilities are the responsibility of the jurisdiction in which these facilities are located. As a result, if the total emissions from all water consumed within the county were included in the inventory regardless of its source, emissions generated within other jurisdictions would be double-counted. As such, this Inventory only includes emissions from the electricity and natural gas consumed by water treatment facilities within the county's jurisdictional boundary. As a result, all emissions from water treatment facilities used to serve the county may not be included in the County government operations Inventory, whereas facilities that are located within unincorporated areas which serve incorporated cities will be included in the commercial/industrial sector of the Community-wide inventory.

Lastly, there is a lack of reasonable methodology for estimating lifecycle emissions for the community. Lifecycle emissions are emissions associated with the production and disposal of items consumed by a community. For instance, a lifecycle assessment would estimate the emissions associated with the planning, production, delivery, and disposal of each car currently in the county. In contrast, this analysis only captures how much that car drives within the county.

Given these limitations it is likely that the county's emissions are greater than presented in this Inventory. However, it is important to note that the emissions identified in this report are primarily greenhouse gases that the community has directly caused and has the ability to reduce through implementation of the Conservation and Open Space Element, a Climate Action Plan, and corresponding efforts.

2.6 CACP SOFTWARE

The County government operations and community-wide inventories use the Clean Air and Climate Protection (CACP) software package developed by ICLEI in partnership with the National Association of Clean Air Agencies (NACAA) and Torrie Smith Associates. This software calculates emissions resulting from energy consumption, vehicle miles traveled, and waste generation. The CACP software calculates emissions using specific factors (or coefficients) according to the type of fuel used.

CACP aggregates and reports the three main greenhouse gas emissions (CO_2, CH_4, and N_2O) and converts them to equivalent carbon dioxide units, or CO_2e. Equalizing the three main greenhouse gas emissions as CO_2e allows for the consideration of different greenhouse gases in comparable terms. For example, methane (CH_4) is twenty-one times more powerful than carbon dioxide on a per weight basis in its capacity to trap heat, so the CACP software converts one metric ton of methane emissions to 21 metric tons of carbon dioxide equivalents.[11]

The emissions coefficients and quantification method employed by the CACP software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) and the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form1605).

[11] The potency of a given gas in heating the atmosphere is defined as its Global Warming Potential, or GWP. For more information on GWP see: IPCC Fourth Assessment Report, Working Group I, Chapter 2, Section 2.10.

3. Community GHG Inventory Results

The community of San Luis Obispo County contains the unincorporated rural areas and communities of Avila Beach, Black Lake, Callender-Garrett, Cambria, Cayucos, California Valley, Creston, Garden Farms, Heritage Ranch, Los Berros, Los Osos, Los Ranchos-Edna, Nipomo, Oak Shores, Oceano, Palo Mesa, Pozo, San Miguel, San Simeon, Santa Margarita, Shandon, Templeton, Whitley Gardens and Woodlands. In the 2006 baseline year, there were approximately 101,786 people, 99,300 jobs, and 101,447 households in these unincorporated areas. The following section provides an overview of the emissions caused by activities within the jurisdictional boundary of the county and analyzes them in terms of scope, sector, source, and population.

3.1 COMMUNITY-WIDE EMISSIONS BY SCOPE

Although there are countless items that can be included in a community-scale emissions inventory, as discussed in Chapter 2, this Inventory includes Scope 1, Scope 2, and Scope 3 sources from the following sectors, consistent with ICLEI protocol:

- Residential
- Commercial / Industrial
- Transportation
- Waste
- Other – Livestock, Aircraft (calculated as part of a separate analysis), and Off-Road Agricultural Equipment Emissions

What are Scopes?

The key principles to remember are that Scope 1 emissions are caused by activities within the county and emitted within the county (fuel combustion), while Scope 2 emissions are caused by activities within the county, but most likely are emitted outside of the county (electricity). Scope 3 emissions are indirect emissions, such as methane released from cattle, sheep, and waste decomposition.

Table A2.3-1 summarizes the scopes of each sector in this analysis.

TABLE A2.3-1 EMISSION SOURCES INCLUDED IN 2006 COMMUNITY INVENTORY BY SCOPE AND SECTOR

Sector	Scope 1	Scope 2	Scope 3
Residential	Natural Gas	Electricity	---
Commercial / Industrial	Natural Gas	Electricity	---
Transportation	Gasoline & Diesel	---	---
Waste	---	---	Methane from Decomposition
Other	Aircraft Emissions, calculated as part of a separate analysis Off-Road Agricultural Equipment	---	Methane from Cattle and Sheep

Including all sectors and scopes, the community emitted approximately 1,506,163 metric tons of CO_2e in 2006. As shown in **Figure A2.3-1 and Table A2.3-2**, the majority of community GHG emissions were Scope 1 (83.5%), with Scope 2 (8.9%) and Scope 3 (7.6%) constituting the remainder.

The largest portion of Scope 1 emissions came from the transportation sector (refer to **Table A2.3-2 and Figure A2.3-2)**. These emissions qualify as Scope 1 because they involve the direct combustion of fuel within the jurisdictional boundary of the county. The second largest source of Scope 1 emissions was commercial and industrial natural gas use.

FIGURE A2.3-1 COMMUNITY GHG EMISSIONS BY SCOPE

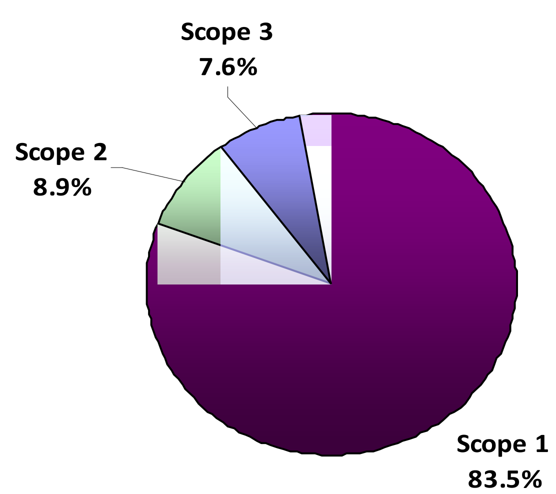


TABLE A2.3-2 COMMUNITY GHG EMISSIONS PER SECTOR PER SCOPE (METRIC TONS OF CO_2E)

Sector	Scope 1	Scope 2	Scope 3	TOTAL
Residential	70,853	65,514	---	136,367
Commercial / Industrial	147,493	68,483	---	215,976
Transportation	976,585	---	---	976,585
Waste	---	---	30,540	30,540
Other12	63,278	---	83,417	146,695
TOTAL	**1,258,209**	**133,997**	**113,957**	**1,506,163**
Percentage of Total CO2e	83.5%	8.9%	7.6%	100.0%

Commercial and industrial energy use generated the largest percentage of Scope 2 emissions; however, the difference between this sector and the residential sector is minimal. Methane emissions from livestock and sheep within the county account for all Scope 3 emissions, with landfilled waste operations adding incrementally to total emissions.

What is 1,506,163 Metric Tons of CO2e equivalent to?

1,506,163 Metric Tons of CO2e is equivalent to the air volume of about 308,612 hot air balloons under standard conditions of pressure and temperature. The same amount of emissions is also equivalent to one year of electricity used in 290,689 California residences!

Source: California Air Resources Board, "Conversion of 1 MMT CO2 to

3.2 ALL-SCOPE EMISSIONS BY SECTOR

As noted above, the community emitted approximately 1,506,163 metric tons of CO_2e in calendar year 2006. In addition to analyzing the data by scope, it can also be aggregated by sector. As depicted in **Figure A2.3-2** and **Table A2.3-3** below, the transportation sector was by far, the largest emitter (64.8%) in 2006. Emissions from commercial and industrial energy use accounted for a combined 14.3%, while residential energy use produced 9.1% of emissions. The remaining 11.7% is attributed to emissions from waste (2.0%) and livestock and agricultural equipment (9.7%).

[12] The "other" category includes emissions from livestock (sheep and cattle), aircraft takeoffs and landings, and off-road agricultural equipment. These sources are categorized as 'other' to correspond with the ICLEI CACP software.

FIGURE A2.3-2
COMMUNITY GHG EMISSIONS BY SECTOR

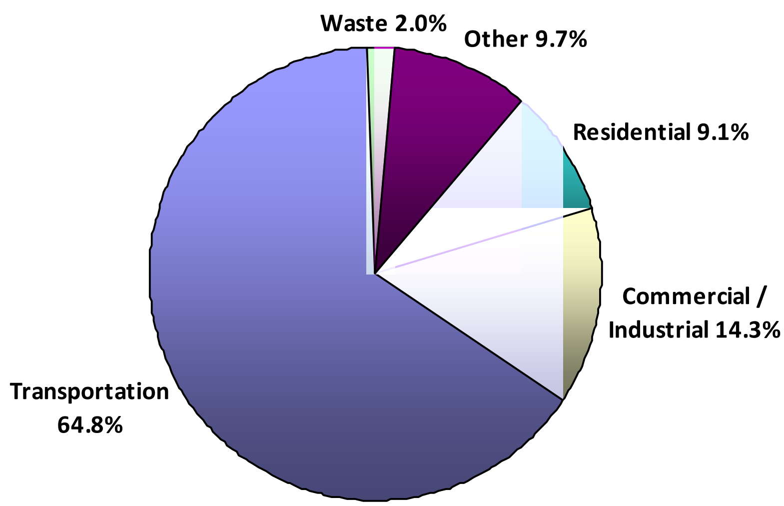


TABLE A2.3-3 COMMUNITY GHG EMISSIONS BY SECTOR (METRIC TONS CO_2E)

2006 Community Emissions by Sector	Residential	Commercial / Industrial	Transportation	Waste	Other[13]	TOTAL
CO_2e (metric tons)	136,367	215,976	976,585	30,540	146,695	1,506,163
Percentage of Total CO_2e	9.1%	14.3%	64.8%	2.0%	9.7%	100.0%
Energy Use (MMBtu)	2,321,301	3,736,644	13,557,909	---	---	19,615,854

3.3 TRANSPORTATION

As with the majority of California municipalities,[14] travel by on-road motorized vehicle constitutes the greatest percentage of greenhouse gas emissions in the county (64.8%). The Inventory

[13] The "other" category includes emissions from livestock (sheep and cattle), aircraft takeoffs and landings, and off-road agricultural equipment. These sources are categorized as 'other' to correspond with the ICLEI CACP software.

does not include trains, boats or off-road recreational vehicles as there is no feasible methodology for calculating emissions from these sources. Less than one-fourth, or 21.2% of the emissions in the transportation sector came from travel on local roads in the unincorporated areas (**Table A2.3-4**). Approximately 78.8% of the greenhouse gas emissions in the transportation sector resulted from highway travel. Of the total emissions in the transportation sector, an estimated 89% was due to gasoline consumption, with the remaining 11% coming from diesel use (see **Figure A2.3-3** and **Table A2.3-5**).

FIGURE A2.3-3 COMMUNITY GHG EMISSIONS BY FUEL

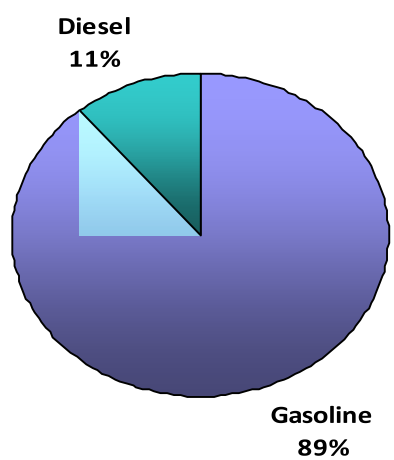


TABLE A2.3-4 TRANSPORTATION GHG EMISSIONS BY ROAD TYPE			
Transportation Road Type Emissions Sources 2006	**Local Roads**	**State Highways**	**TOTAL**
CO_2e (metric tons)	207,356	769,230	976,586
Percentage of Total CO_2e	21.2%	78.8%	100%
Energy Use (MMBtu)	2,878,714	10,679,195	13,557,909

[14] For a list of California cities and counties that have developed GHG Inventories, see the California Office of Planning and Research document here: http://www.opr.ca.gov/ceqa/pdfs/City_and_County_Plans_Addressing_Climate_Change.pdf

TABLE A2.3-5 TRANSPORTATION GHG EMISSIONS BY FUEL SOURCE

Transportation Fuel Emissions Sources 2006	Gasoline	Diesel	TOTAL
CO_2e (metric tons)	868,985	107,601	976,586
Percentage of Total CO_2e	89.0%	11.0%	100%
Energy Use (MMBtu)	12,274,606	1,283,303	13,557,909

These emissions result from the gasoline and diesel consumption of vehicles traveling within the unincorporated areas of the county, including those that are just passing through. As a result, it is likely that the County does not have jurisdictional control to reduce the transportation emissions from the majority of this sector. However ICLEI and State protocol require that these emissions be included in a local inventory in order to capture all emissions within the area and calculate their effect on the local community.

This analysis of highway transportation emissions assumes constant levels of travel along all highways in the county. The Caltrans data includes aggregated vehicle miles traveled (VMT) along highways for the whole county, including incorporated areas. This data was allocated to municipal jurisdictions using the proportion of highway miles in unincorporated areas versus incorporated; traffic counts were not used to measure actual traffic levels at specific locations. This could mean that the community-wide transportation emissions are slightly inflated; however, there is currently no feasible methodology to calculate emissions for individual jurisdictions with traffic data levels. Further discussion of the transportation sector methodology is included in **Appendix 2C**.

Emissions that resulted from the air, rail, and boat travel of county residents were not included in the transportation sector analysis. As science and data collection methodology develop it is likely that the greenhouse gas emissions from air, rail and boat travel could be estimated as a Scope 3 items. Partial emissions from county airport takeoffs and landings are discussed in the 'other' section; however, these are not quantifiable as CO_2-equivalent. Please see **Appendix 2C** for more detail on methods and emissions factors used in calculating emissions from the transportation sector.

3.4 THE BUILT ENVIRONMENT (RESIDENTIAL, COMMERCIAL, INDUSTRIAL)

With all scopes aggregated, 23.4% of total community-wide emissions in the year 2006 came from the "built environment." The built environment is comprised of the residential, commercial, and industrial natural gas and electricity consumption. This analysis does not include emissions from other types of energy such as propane, solar, and wind due to lack of reliable sales, construction, or consumption data. It also does not include emissions from harbors and ports as they are largely outside of County jurisdiction. The commercial and industrial sectors are combined in this Inventory due to a mandatory aggregating of commercial and industrial data by PG&E[15].

In 2006, emissions from the built environment were split roughly 60-40 between the commercial/industrial sector and the residential sector (see **Figure A2.3-4**). All of the emissions calculated from the built environment were the result of local natural gas consumption (Scope 1) and local consumption of electricity generated outside of the county (Scope 2). Overall, natural gas consumption caused the majority of emissions from the built environment in 2006, as shown in **Figure A2.3-5**.

FIGURE A2.3-4 BUILT ENVIRONMENT EMISSIONS BY SECTOR

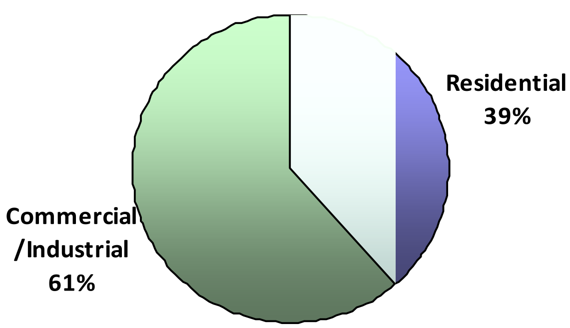
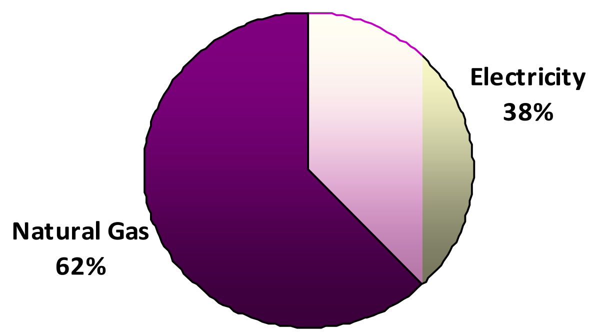


FIGURE A2.3-5 BUILT ENVIRONMENT EMISSIONS BY SOURCE



A little over 50% of emissions in the residential sector resulted from the combustion of natural gas for heating and cooking (see **Figure A2.3-6** and **Table A2.3-6**), while about 68% of emissions in the commercial/industrial sector came from natural gas usage (see **Figure A2.3-7** and **Table A2.3-7**).

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[15] Commercial and Industrial Electricity and Natural Gas were combined into one section due to the California 15/15 rule. The 15/15 rule was adopted by the California Public Utilities Commission in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. Corie Cheeseman, Program Manager with Pacific Gas and Electric Company - Customer Energy Efficiency, provided this information.

FIGURE A2.3-6 COMMERCIAL / INDUSTRIAL EMISSIONS BY SOURCE

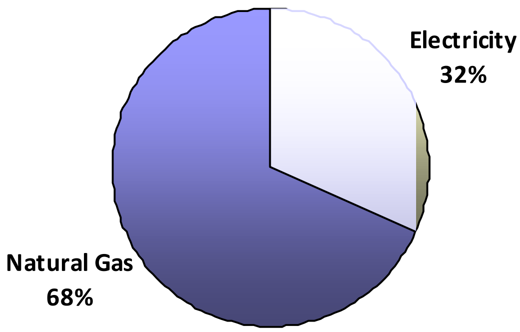
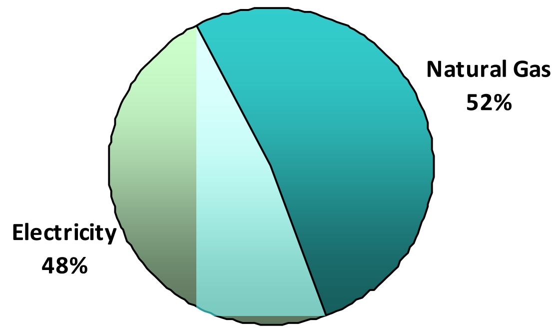


FIGURE A2.3-7 RESIDENTIAL EMISSIONS BY SOURCE



It is useful to consider the causes behind significant variations in data when developing policies and programs to reduce emissions from each sector. For example, the policies that would aim to reduce emissions from the commercial/ industrial sector may differ from those aiming to reduce emissions from the residential sector based upon the information above (and in the figures and tables below). In this regard, the emissions inventory provides valuable insight into policy development strategies.

TABLE A2.3-6 RESIDENTIAL GHG EMISSIONS SOURCES

Residential Emission Sources 2005	Electricity	Natural Gas	TOTAL
CO_2e (metric tons)	65,514	70,853	136,367
Percentage of Total CO_2e	48.0%	52.0%	100%
Energy Use (MMBtu)	1,056,643	1,264,658	2,321,301

TABLE A2.3-7 COMMERCIAL / INDUSTRIAL GHG EMISSIONS SOURCES

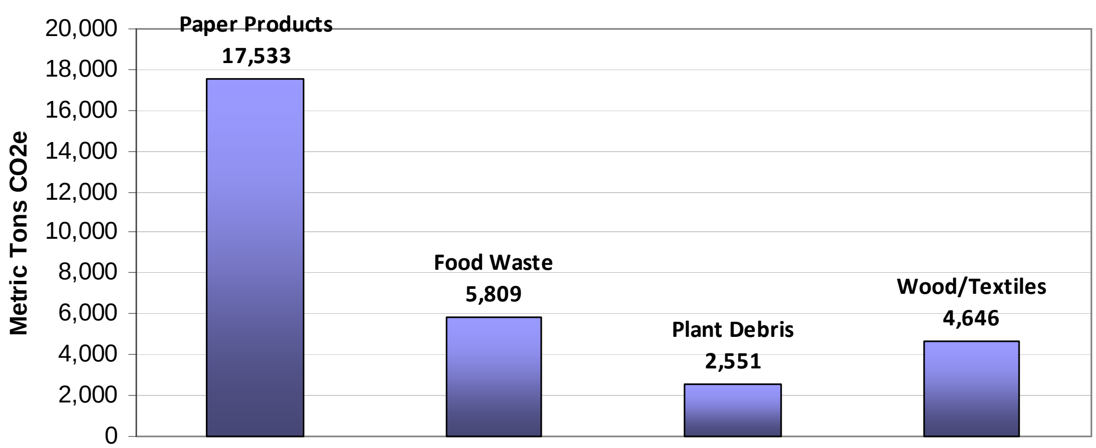
Commercial / Industrial Emission Sources 2005	Electricity	Natural Gas	TOTAL
CO_2e (metric tons)	68,483	147,493	215,976
Percentage of Total CO_2e	31.7%	68.3%	100%
Energy Use (MMBtu)	1,104,531	2,632,113	3,736,644

3.5 WASTE

Solid waste disposed of at managed landfills was responsible for 2.0% of total emissions for the community. The CACP software calculates methane generation from waste sent to landfill in 2006, and accounts for the confirmed methane recovery factors among the three active landfills (Cold Canyon, Paso Robles, and Chicago Grade), which have a 57% weighted average. The methane recovery factors of all three landfills are well documented and verified. For more information, please see detailed methodology in **Appendix 2C**.

Waste emissions are considered Scope 3 emissions because they are not generated in the base year, but will result from the decomposition of waste generated in 2006 over the full 100-year+ cycle of its decomposition. In 2006, the community sent approximately 106,000 tons of waste to landfill. The 2004 California Statewide Waste Characterization Study provides standard waste composition for the State of California.[16] Identifying the different types of waste in the general mix is necessary, because decomposition of some materials generate methane within the anaerobic environment of landfills whereas others do not. Carbonaceous materials such as paper and wood actually sequester the methane released in managed landfills, therefore offsetting some or all of the emissions from food and plant waste. **Figure A2.3-8** and **Table A2.3-8** show the estimated percentage of emissions coming from the various types of organic, methanogenic waste.

FIGURE A2.3-8 WASTE GHG EMISSIONS BY TYPE



[16] http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

TABLE A2.3-8 WASTE GHG EMISSIONS BY WASTE TYPE

Waste Emissions Sources 2006	Paper Products	Food Waste	Plant Debris	Wood / Textiles	TOTAL
CO_2e (metric tons)	17,533	5,809	2,551	4,646	30,539
Percentage of Total CO_2e	57.4%	19.0%	8.4%	15.2%	100%
Energy Use (MMBtu)	0	0	0	0	0

3.6 OTHER – EMISSIONS FROM LIVESTOCK

Waste emissions from cattle and sheep in San Luis Obispo County accounted for 5.5% of greenhouse gas emissions within the county, or 83,417 metric tons CO_2e in 2006. Cattle caused the majority of emissions (99%), with sheep only accounting for 1% of the sector, as shown in **Figure A2.3-9** and **Table A2.3-9** below. Ruminant animals, such as cattle and sheep, as well as buffalo and goats, which are not present in the county in significant numbers, release large amounts of methane, a highly potent greenhouse gas. Their special digestive systems have the ability to convert otherwise unusable plant materials into nutritious food and fiber, however this same helpful digestive system produces methane.

FIGURE A2.3-9 GHG EMISSIONS FROM LIVESTOCK, 2006

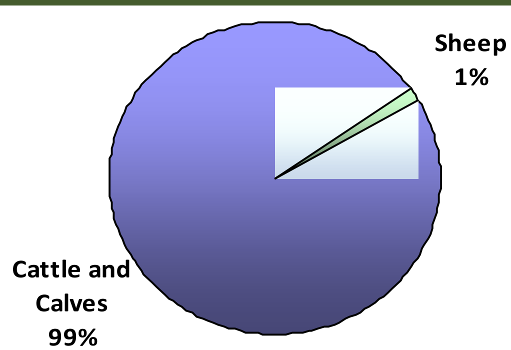


TABLE A2.3-9 GHG EMISSION FROM LIVESTOCK, 2006

Cattle and Sheep Emissions Sources 2006	Cattle	Sheep	TOTAL
CO_2e (metric tons)	82,293	1,124	83,417
Percentage of Total CO_2e	99%	1%	100%
Energy Use (MMBtu)	0	0	0

3.7 OTHER – EMISSIONS FROM AIRCRAFT TAKEOFFS AND LANDINGS

This emissions sector accounts for all aircraft exhaust emissions associated with airports located within San Luis Obispo County (excluding agricultural crop dusting). This information was taken from an engineering report prepared by the Air Pollution Control Board (APCD) in August 2008 (**Appendix 2E**). The report estimated the tons of exhaust emissions per year from operations below 3,000 feet in altitude. The report was a special project analyzing 2007, and provided the most complete data set available. No significant change in airport activity or aircraft type distribution occurred during this time interval.

The number of landing and takeoff operations (LTO) was obtained from the major airports in San Luis Obispo County, including San Luis County Airport, and Oceano Municipal Airport. Aircraft emissions are computed using FAA Emissions & Dispersion Modeling System (EDMS 5.0.2). EDMS 5.0.2 provided emission factors for the majority of aircrafts with the following results.

TABLE A2.3-10 AIRCRAFT EMISSIONS (TONS PER YEAR) FOR THE COUNTY OF SAN LUIS OBISPO

Description	CO	HC	VOC	NOx	SOx	PM10	PM2.5
Commercial-Jet (47555)	64.715	13.848	12.852	16.787	3.461	0.735	0.735
Civil-Jet (47589)	155.349	19.175	17.222	1.759	0.746	0.261	0.261
Civil-Piston (57331)	184.949	28.766	23.957	0.516	0.333	0	0
Military-Jet (47571)	0	3.452	3.322	0.364	0.144	0.075	0.075
Military-Piston (57323)	0.18	0.053	0.049	0.007	0.003	0.001	0.001
Totals	**384.733**	**65.255**	**57.401**	**19.432**	**4.686**	**1.068**	**1.068**

The report's findings were entered into the CACP software by aggregated tons per emission gas type as shown in **Table A2.3-10** above. However, since the gases above are not included in the CACP or EPA calculations of CO_2e, the emissions from aircrafts are not reflected in the total greenhouse gas inventory for San Luis Obispo County. It is likely that aircrafts are a significant source of greenhouse gas emissions within the community, but until it is technically and politically feasible to obtain emissions coefficients and data for carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NOx), and fluorocarbons to be included as carbon dioxide equivalents, these gases should not be compared or aggregated with other county emissions.

3.8 OTHER - OFF-ROAD AGRICULTURAL EQUIPMENT

Off-road agricultural equipment including tractors, mowers, balers, combines, tillers, and other equipment produced approximately 4.2% of emissions in 2006, or 63,278 metric tons CO_2e. This calculation was performed using the California Air Resources Board OFFROAD2007 model and inputted into the ‘other’ category in CACP. The OFFROAD model generates emission inventories by equipment type, accounting for age within a given year (2006).

The OFFROAD software has the ability to calculate emissions from other types of off-road vehicles such as recreational vehicles, motor boats, and more. However, since data is aggregated by county, this information is only usable if it can be divided by jurisdiction within the county in a reasonable manner. As a reminder, this emissions inventory is a snapshot of emissions caused by activities within the unincorporated areas of the county in the year 2006. Therefore, absent a methodology for estimating the portion of off-road vehicles driven or used within various jurisdictions, OFFROAD data cannot be allocated to different jurisdictions. As current practice and methodology stands, population data is not an acceptable measure of emissions per jurisdiction.

To complete the analysis of impacts associated with agriculture activities, the Inventory allocated total agricultural emissions by the percentage of agricultural and open space land contained in each jurisdiction. For consistency, County agriculture and crop GIS data from 2007 was utilized to determine acreage within each jurisdiction. The unincorporated county held the vast majority of agricultural land (98%) and therefore the majority of off-road agricultural equipment emissions.

Why Can't We Calculate All Off-Road Emissions in San Luis Obispo County?

According to a report by the Center for Biological Diversity, off-road vehicle use in California releases as much GHG as burning 500,000 barrels of oil each year, which is equivalent to more than 1.5 million car trips from San Francisco to Los Angeles. Despite this fact, there is no current methodology to calculate GHGs from off-road vehicles at the local level. The California Air Resources Board OFFROAD2007 model produces countywide figures for San Luis Obispo which cannot be separated by jurisdiction. This is for two main reasons: 1) Many off-road vehicles, such as motor boats and recreational vehicles, are operated outside of County jurisdiction in State-owned parks or waters, and 2) There are wide degrees of variability in off-road vehicle use and fuel consumption. For instance, if we allocated the emissions from off-road agricultural equipment by population and not by portion of agricultural land, cities that have minimal agricultural lands, would receive an equal portion of agricultural emissions per person as the county, which has 98% of agricultural land in the county. This approach would misrepresent emissions.

Source: Center for Biological Diversity, http://www.biologicaldiversity.org/programs/public_lands/off-road_vehicles/pdfs/Fuel_to_Burn_Exec_Summary.pdf

3.8 COMMUNITY EMISSIONS BY SOURCE

In addition to viewing emissions by sector and by scope, it can be useful for building policy and programs to analyze emissions according to their raw fuel or waste source. **Figure A2.3-10** and **Table A2.3-11** below demonstrates that more than 57% of all community emissions come from the consumption of gasoline on local roads and highways. Natural gas (14.5%) and electricity (8.9%) consumption from the built environment are the next most significant figures, with the remainder coming from various waste products.

FIGURE A2.3-10 COMMUNITY GHG EMISSIONS BY SOURCE

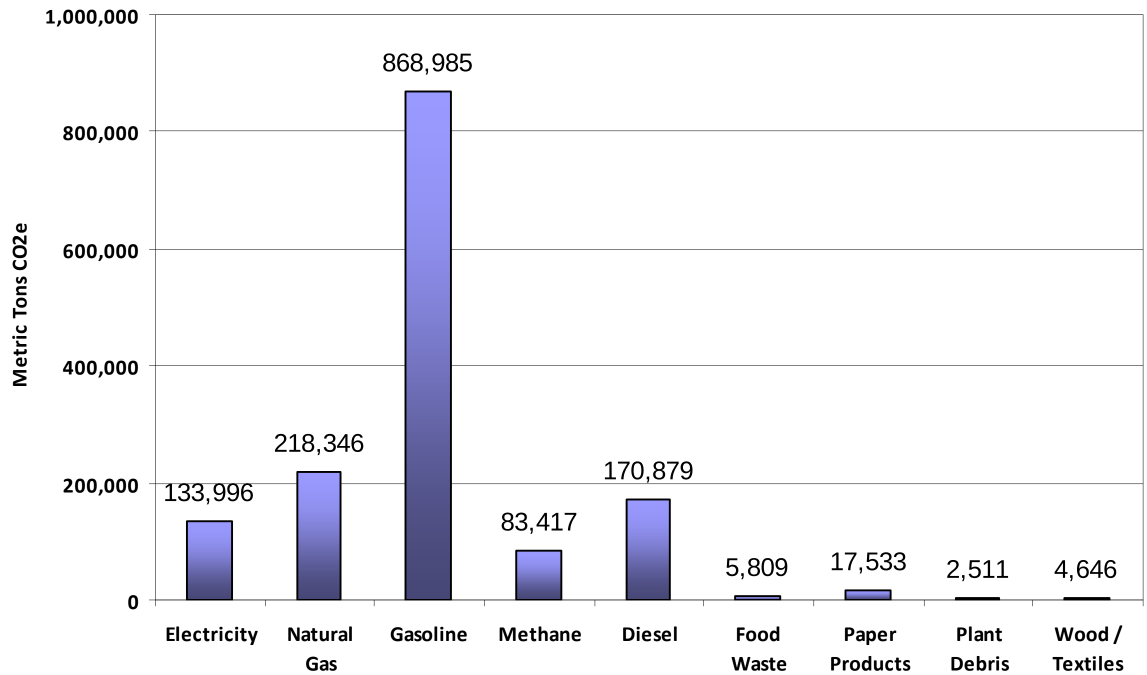


TABLE A2.3-11 COMMUNITY GHG EMISSIONS BY SOURCE

Community Emissions 2006 by Source	CO_2e (metric tons)	CO_2e (percent of total)
Electricity	133,996	8.9%
Natural Gas	218,346	14.5%
Gasoline	868,985	57.7%
Methane	83,417	5.5%
Diesel	170,879	11.3%
Food Waste	5,809	0.4%
Paper Products	17,533	1.2%
Plant Debris	2,511	0.2%
Wood / Textiles	4,646	0.3%
TOTAL	**1,464,131**	**100.0%**

3.9 PER CAPITA EMISSIONS

Per capita emissions can be a useful metric for measuring progress in reducing greenhouse gases and for comparing one community's emissions with neighboring cities and against regional and national averages. Currently it is difficult to make meaningful comparisons between local inventories because of variations in the scope of inventories conducted. For instance, this Inventory takes in to account emissions from off-road vehicles, which many inventories like the Sonoma County GHG Inventory do not. Only when ICLEI, the California Air Resources Board, and other organizations adopt universal reporting standards will local inventories be prepared in a consistent manner and therefore be comparable.

Simply dividing total community greenhouse gas emissions by unincorporated county population in 2006 (101,786) yields a result of 14.80 metric tons CO_2e per capita.[17] It is important to understand that this number is not the same as the carbon footprint of the average individual living in San Luis Obispo County. It is also important to note that the per capita emissions number for the county is not directly comparable to every per capita number produced by other emissions studies because of differences in emission inventory methods.

[17] Population in 2006 derived from US Census data for the County

4. County Government Operations GHG Emissions Inventory Results

The San Luis Obispo County government is comprised of over 40 different agencies located throughout the county, including General Services, Sheriff, Fire, Public Works, Planning and Building, the Air Pollution Control District, Library Services, and more. This Inventory accounts for the over 2,567 people employed by the County and the over 130 County-owned and/or –operated buildings.

This chapter reviews the results of the County government operations inventory by scope, sector, and source, including employee commuting emissions.

4.1 COUNTY GOVERNMENT OPERATIONS EMISSIONS BY SCOPE

This Inventory includes Scope 1, Scope 2, and Scope 3 sources of emissions sources within the operational control of the County from the following sectors, consistent with ICLEI protocol:

- Buildings
- Vehicle Fleet
- Water/Sewage Facilities
- Streetlights
- Waste
- Other Equipment
- Employee Commute

Table 4-1 summarizes the scopes of each sector in this analysis.

TABLE A2.4-1 EMISSION SOURCES INCLUDED IN 2006 GOVERNMENT OPERATIONS INVENTORY BY SCOPE AND SECTOR

Sector	Scope 1	Scope 2	Scope 3
Buildings	Natural Gas	Electricity	---
Vehicle Fleet	Gasoline & Diesel	---	---
Water/Sewage Facilities	---	Electricity	---
Streetlights	---	Electricity	---
Waste	---	---	Methane from Decomposition
Miscellaneous Equipment	Gasoline & Diesel	---	---
Employee Commute	---	---	Gasoline & Diesel

4.2 COUNTY GOVERNMENT OPERATIONS INVENTORY RESULTS

Including all scopes and sectors, County operations and facilities produced approximately 34,335 metric tons of greenhouse gas emissions in 2006. As displayed in **Figure A2.4-1**, this is approximately 2.2% of total community-wide emissions. County emissions are comprised of employee commute trips, waste, streetlight and signal electricity, energy consumption from water and sewage facilities, building energy, vehicle fleet fuel consumption, and miscellaneous equipment. Employee commute was by far the largest contributor to the County's emissions (73.6%) with 25,257 metric tons of carbon dioxide equivalent. The second largest contributor (14.5%) was from energy consumption in County-owned and -operated facilities. (Refer to **Figure A2.4-2** and **Table A2.4-2** below.)

FIGURE A2.4-1 COUNTY GOVERNMENT OPERATIONS CONTRIBUTION TO COMMUNITY-

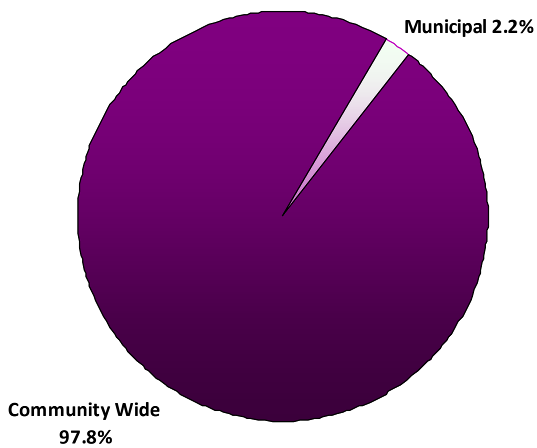
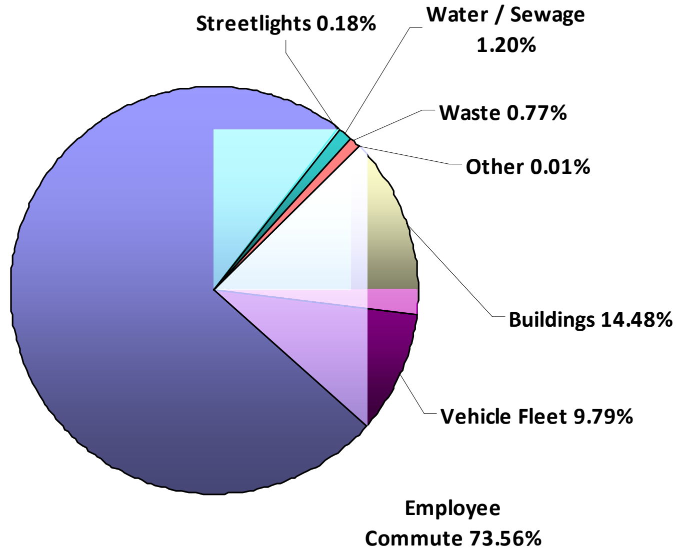


FIGURE A2.4-2 COUNTY GOVERNMENT OPERATIONS GHG EMISSIONS BY SECTOR



As mentioned in the Introduction, these emissions are a subset of the community emissions inventory discussed in **Chapter 3.** The County's operations emissions are separately analyzed in this section in a manner that is similar to how an industry or business would produce a facility-scale greenhouse gas audit. The Local Government Greenhouse Gas Inventory Protocol developed by the California Air Resources Board, The Climate Registry, the California Climate Action Registry, and ICLEI guides the methodology for estimating emissions from local government operations. Local government emissions reporting is deemed significant in order to establish local governments as climate leaders in the community so that they can lead by example and pave the way for energy efficiency improvements.

TABLE A2.4-2 2006 COUNTY GOVERNMENT OPERATIONS EMISSIONS BY SECTOR

2006 Emissions by Sector	Buildings	Vehicle Fleet	Employee Commute	Street lights	Water / Sewage	Waste	Other	TOTAL
CO2e (metric tons)	4,972	3,363	25,257	63	413	265	2	34,335
Percentage of Total CO2e	14.5%	9.8%	73.6%	0.2%	1.2%	0.8%	0.0%	100.0%
Energy Use (MMBtu)	83,606	43,325	362,292	1,017	6,659	n/a	n/a	496,899

4.3 BUILDING SECTOR

The building sector calculates greenhouse gas emissions from energy consumption in facilities owned and operated by a municipality. This inventory calculates electricity, natural gas, and propane consumption in County-owned and -operated facilities. The facilities included in this analysis include fire stations, child care facilities, sheriff stations, the courthouse, government centers, libraries, and numerous other facilities. As depicted in **Figure A2.4-3** at right and **Table A2.4-3** below, the majority of emissions resulted from electricity consumption (60%), which is consistent with the community at large.

FIGURE A2.4-3
BUILDING EMISSIONS BY SECTOR

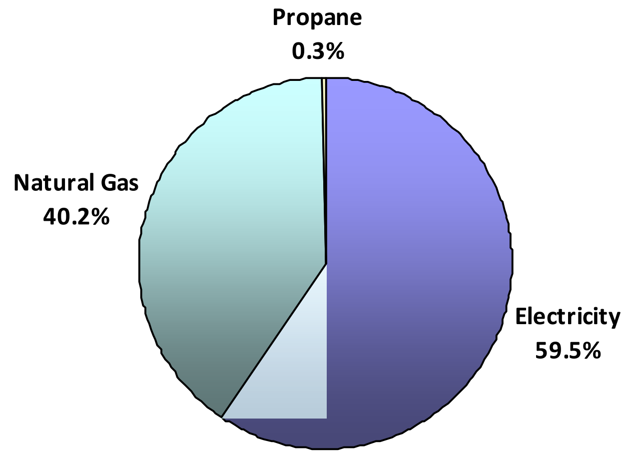


TABLE 4-3 BUILDING SECTOR EMISSIONS BY SOURCE, 2006

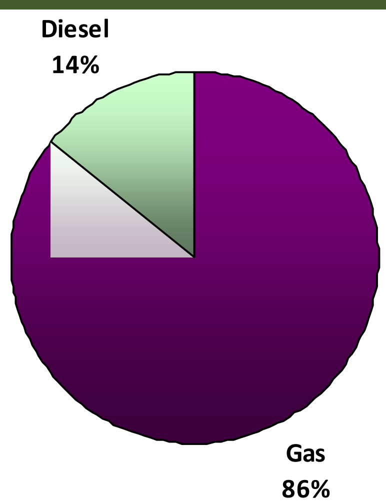
2006 Community Emissions by Sector	Electricity	Natural Gas	Propane	Total
CO_2e (metric tons)	2,950	2,005	17	4,972
Percentage of Total CO_2e	59.5%	40.2%	0.3%	100.0%
Energy Use (MMBtu)	55,262	35,758	262	91,282

These emissions and associated consumption data will be useful in determining significant sources of energy consumption from County facilities. This will allow for the County to designate priority facilities for energy efficiency retrofits and conservation outreach.

4.4 VEHICLE FLEET

County-owned and –operated vehicles emitted approximately 3,363 metric tons of CO_2e in 2006, or 9.8% of total County government emissions. This sector includes gasoline and diesel consumption from billing records of all departments in the County operating vehicles, including the Fire Department, Air Pollution Control District, Public Works, General Services, and the County libraries.

FIGURE A2.4-4 VEHICLE FLEET FUEL CONSUMPTION PER YEAR BY TYPE



The majority of fuel used by the County is gasoline (86%), with the rest diesel (14%) (see **Figure A2.4-4)**. When compared to the total emissions per fuel type, diesel emissions actually produce less CO_2e for the vehicle types used by the County. However, there are other, non-CO_2e emissions from diesel-like particulate matter that make such a comparison misleading to the reader. The trend for diesel to emit less CO_2e in this case does not necessarily mean that the County should aim to convert more vehicles to conventional diesel. There are multiple clean and alternative fuel options available, including biodiesel conversion, electric vehicles, hybrid vehicles, smaller vehicles, and shared vehicles.

4.5 EMPLOYEE COMMUTE

This sector estimates greenhouse gas emissions from County employees traveling to and from work in 2006. The estimate is based on a September 2008 online survey conducted by the County, a blank version of which is included as **Appendix 2F**. Approximately 1,300 employees responded to the survey with usable information, meaning that all essential questions were answered. This results in approximately a 50% response rate, the results of which were applied to the County employment total for 2006.

The online survey found that most County employees travel by car. Employees were asked how many days of the week they travel by each commute mode, including driving alone (which includes motorcycles), carpooling, vanpooling, public transit, bicycling, walking, telecommuting, and other. The results show that employees get to and from 70% of their workdays by personal vehicle. The second most popular mode of transportation was carpooling (14%) and the third public transit (5.7%).

TABLE 4-4 DAYS OF COUNTY EMPLOYEE TRAVEL BY COMMUTE MODE

	Days traveled by Commute mode	% of Total
Drive Alone	4,556	71.11%
Carpool	904	14.11%
Vanpool	84	1.31%
Public transit	368	5.74%
Bicycle	269	4.20%
Walk	141	2.20%
Telecommute	27	0.42%
Other	58	0.91%
Total	**6,407**	**100.00%**

These figures for commute mode were combined with each respondent's travel distance to work, car model (if any), and fuel type (if any). The results show vehicle miles traveled (VMT) annually per vehicle type and fuel type (see **Table A2.4-5**). These VMT numbers were then adjusted for the total employee population in 2006 and entered into the CACP software to obtain CO_2e.

Driving patterns were assumed to be constant for the purposes of this study; therefore, the 2008 sample was applied directly to the 2006 employee population. Only one modification to the sample data was made in order to account for the large increase in hybrid car sales between 2006 and 2008. The proportion of hybrid to traditional vehicles was roughly two-thirds less in 2006 than in 2008, according to State sales data.[18]

[18] www.hybridcars.com

TABLE A2.4.5-EMPLOYEE COMMUTE VMT BY VEHICLE & FUEL TYPE

Vehicle Group	2008 Survey results		Adjusted for 2006	
	Annual VMT	Fuel Type	Annual VMT	Fuel Type
Light Truck/SUV/Pickup	3,086,462.65	Gasoline	6,288,055.26	Gasoline
	110,621.60	Diesel	225,369.56	Diesel
Motorcycle	127,517.48	Gasoline	259,791.57	Gasoline
Passenger Vehicle	25,226,718.43	Gasoline	51,766,151.53	Gasoline
	80.00	Diesel	162.98	Diesel
	273,684.10	Hybrid	185,859.02	Hybrid
Total	**28,825,084.26**		**58,725,389.93**	

The 2008 survey results, adjusted for 2006 employee totals, resulted in an estimate of 25,257 metric tons CO_2e in 2006 from commuter travel to and from work. This figure comprises approximately 74% of total greenhouse gas emissions released from County operations. The calculation does not include employee business travel or travel during lunchtime hours.

Employee business travel is usually included in a government agency operations (or municipal) GHG Inventory per protocol, however we could not include it in this baseline analysis due to data limitations. The County maintains financial records of when employees travel by air or vehicle to conferences and other events; however, it does not keep records of business travel destinations. As such, this Inventory could not accurately account for GHG emissions from employee business travel. A minor adjustment to County recordkeeping would allow the data to be included in the next County government operations GHG inventory.

4.6 STREETLIGHTS

The electricity consumed by County streetlights and traffic signals in calendar year 2006 resulted in approximately 63 metric tons of CO2e, or approximately 0.2% of total County emissions.

4.7 WATER AND SEWAGE

In 2006, electricity consumption from water and wastewater facilities in the County emitted approximately 413 metric tons of CO_2e, or 1.2% of total County emissions. These facilities provide for a small part of the collection, treatment, disposal, and movement of water and wastewater within the county and other areas. This number does not represent the total emissions from water and wastewater treatment, largely because the County is not in the business of managing water and wastewater facilities. Water and wastewater services are provided by incorporated cities, community services districts or other special districts, mutual water companies, and private landowners (groundwater wells and onsite septic systems).[19] As a result, this number should be looked upon as a small fraction of the energy emissions from community water and sewage. However, to avoid double-counting with water and sewage facilities in other jurisdictions, the total water and sewage emissions from the community are not included in the community analysis.

4.8 WASTE

Similar to the Community-Wide analysis, waste produced by County facilities was calculated using the methane commitment. The CACP calculates the methane expected to be released from this landfilled waste over the course of its lifetime. In 2006, County facilities sent a total of 912 tons of waste to landfill, producing 265 metric tons of CO_2e, or 0.8% of total emissions.

4.9 OTHER – MISCELLANEOUS EQUIPMENT

The 'other' category encompasses emissions from miscellaneous equipment such as golf course facilities, general service equipment, and park facilities equipment. Equipment analyzed included leaf blowers, chainsaws, golf carts, drills, tractors, and more. This equipment resulted in 2 metric tons of carbon dioxide, or less than 1% of total emissions.

Emissions from miscellaneous County equipment were analyzed outside of the CACP software using California Air Resources Board protocol for inventorying local GHGs. They were then put into the CACP software in the 'other' category, which allows for direct inputs when CACP automation is not feasible. Since the emissions from miscellaneous equipment are insignificant or *de minimis*, it is not necessary or required by protocol to include them; however, we did so in the event that these emissions grow to a more significant level in the future.

4.10 COUNTY EMISSIONS BY SOURCE

It can also be helpful to view overall County emissions by source. As shown in **Table A2.4-6** and **Figure A2.4-5**, the vast majority (82.3%) of emissions are from gasoline consumption in fleet and employee vehicles. The remainder of emissions is primarily from electricity and natural gas consumption in County buildings, streetlights, and water/sewage facilities. Propane, diesel, and waste products contribute minimally to the overall County greenhouse gas inventory.

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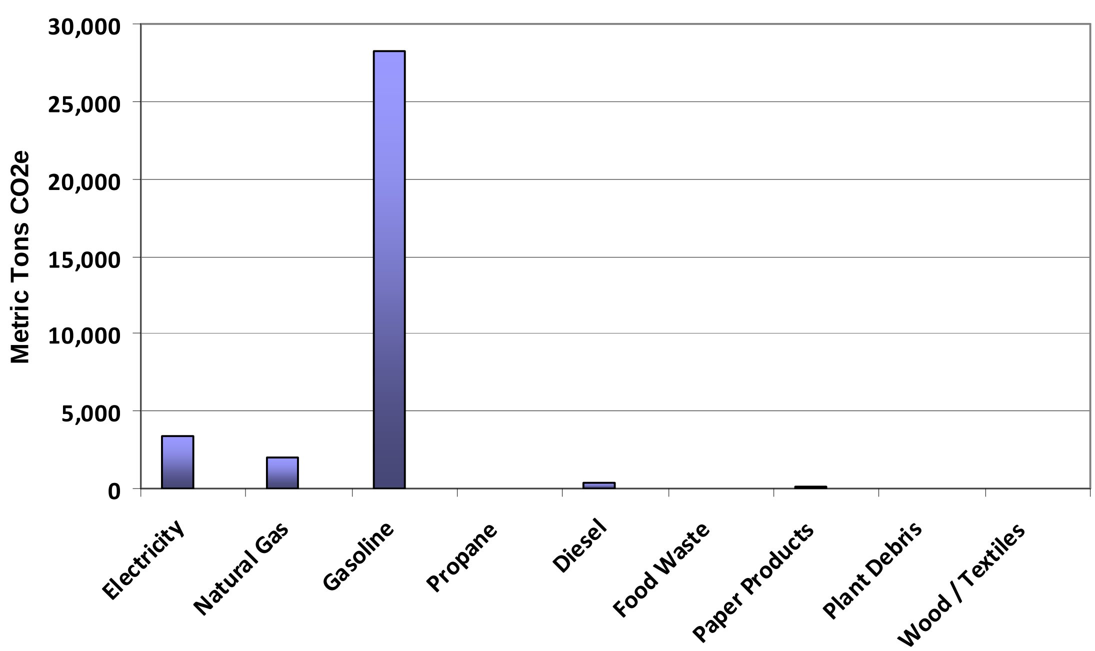
[19] Individual Community Service Districts and other Special Districts are outside of the jurisdiction of the County and will be responsible for developing their own Emissions Inventories in the future. The County does not currently track the number of active septic systems or their capacity.

TABLE A2.4-6 COUNTY EMISSIONS BY SOURCE

Emission Source	CO_2e (metric tons)	CO_2e (percent of total)
Electricity	3,426	10.0%
Natural Gas	2,005	5.8%
Gasoline	28,244	82.3%
Propane	17	0.05%
Diesel	376	1.1%
Food Waste	50	0.1%
Paper Products	152	0.4%
Plant Debris	22	0.1%
Wood / Textiles	40	0.1%
TOTAL	**34,332**	**100.0%**

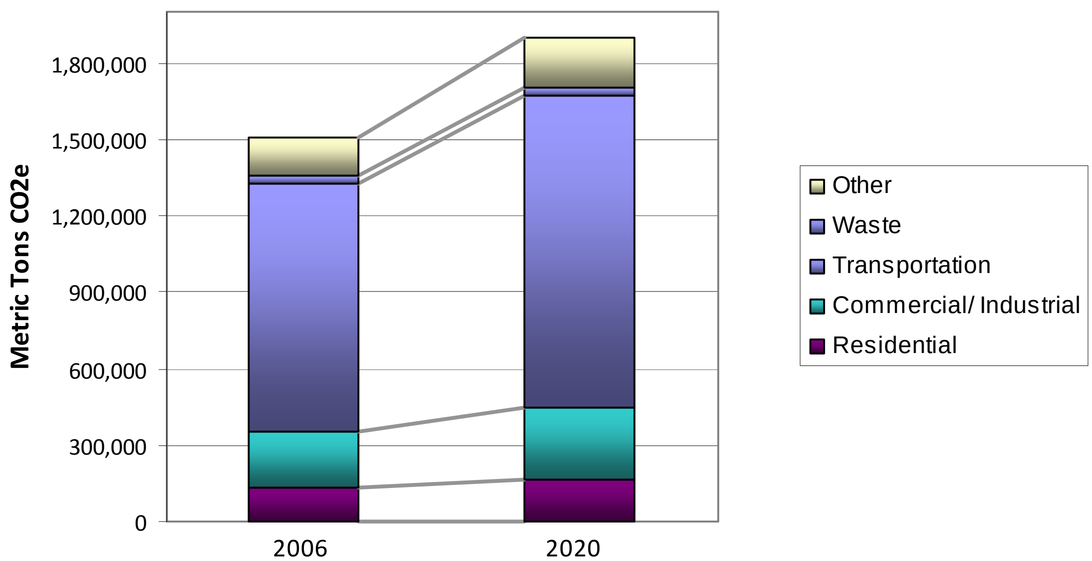
FIGURE A2.4-5 COUNTY EMISSIONS BY SOURCE



5. Forecast

The emissions forecast for San Luis Obispo County represents a business-as-usual prediction of how community GHG levels will change over time if consumption trends and behavior continue as they did in 2006. These predictions are based on the community inventory results included in this report and statistics on job, household, and population growth from the County. The analysis (**Figure A2.5-1** below) shows that if behavior and consumption trends continue as business-as-usual, emissions will reach 1,896,164 metric tons of CO_2e by 2020, or a 25.7% increase over 2006 baseline levels.

FIGURE A2.5-1 BUSINESS-AS-USUAL PROJECTED GROWTH IN COMMUNITY-WIDE EMISSIONS, 2006-2020



The forecast does not quantify emissions reductions from State or federal activities including AB 32, the renewable portfolio standard, and SB 375. Additionally, it does not take into account reduction activities already underway or completed since 2006, the results of which likely put the community's emissions on a track well below the business-as-usual linear projection.

Forecasts were performed by applying household, job, and population growth rates to 2006 community-wide greenhouse gas emissions levels. Estimates were obtained from a long-range projections report developed by the San Luis Obispo Council of Governments in 2006. The "mid-range" cases for population, job, and household growth were used in this forecast estimation.

County government operations emissions are not separately analyzed as part of this forecast due to a lack of reasonable growth indicators for the County government sector. However, an increase in emissions is not expected for existing facilities and operations in the County government operations sector. If anything, the County expects that emissions within the scope of the 2006 County government operations inventory will decrease because of improved commuter programs, energy efficiency improvements, and fleet upgrades. At the same time, it is likely the County will have to expand services and infrastructure to accommodate the expected growth in the region, which could add new sources of emissions to the County government operations inventory that did not exist in 2006.

6. Conclusion and Next Steps

The County of San Luis Obispo has made a formal commitment to reduce its greenhouse gas emissions. This report lays the groundwork for those efforts by estimating baseline emission levels against which future progress can be demonstrated.

This analysis found that the community was responsible for emitting 1,506,163 metric tons of CO_2e in the base year 2006, with the transportation sector contributing the most (64.8%) to this total. As a component of the community-wide analysis, county government operations produced 34,335 metric tons of CO_2e, or a little over 2% of total. In addition to establishing the baseline for tracking progress over time, this report serves to identify the major sources of county emissions, and therefore the greatest opportunities for emission reductions. In this regard, the emissions inventory ought to inform the focus of the County Climate Action Plan. If no action is taken, this report found that business-as-usual emissions will likely rise by 25.7%.

It is important to note that in order to remain consistent with greenhouse gas reduction methodology, all future quantifications of reduction activities must be subtracted from this 'business-as-usual' line. Not doing so would be assuming that emissions remain at constant 2006 levels while reduction activities are underway. In reality, the County's climate action efforts will be working against a rising emissions level due to job, population, and household growth. **Figure A2.6-1** below shows the business-as-usual emissions forecast in relation to 2006 baseline levels and the 15% reduction below 2006 levels recommended by the State Attorney General and Air Resources Board.

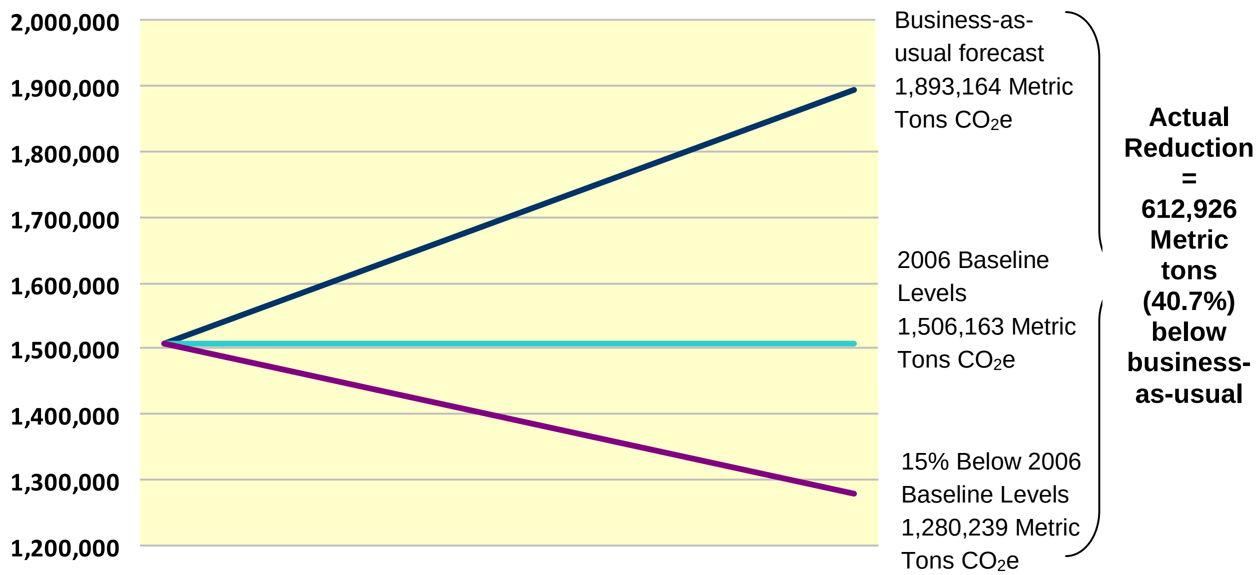
The difference between the business-as-usual forecast and the 15% reduction target is actually 4%, which makes the State's recommended reduction goal challenging, but still feasible. As noted in the Forecast section, it is likely that the County's sustainability efforts have already caused emissions to fall below the business-as-usual linear projection line, thus making the 40.7% reduction (612,926 metric tons of CO2e) by 2020 achievable.

If the community reduced GHG emissions by 612,926 metric tons of CO2e, what would that be equivalent to?

- **132,392 passenger cars not driven for one year**
- **1.4 million barrels of oil saved**
- **15,936,076 tree seedlings grown over 10 years**
- **7,968,036 compact fluorescent bulbs used instead of standard light bulbs for one year**

Source: California Air Resources Board, "Conversion of 1 MMT CO2 to Familiar Equivalents," Oct. 2007.

FIGURE A2.6-1 GHG FORECAST IN RELATION TO 15% REDUCTION TARGET, 2006 - 2020



As the County moves forward to the next milestones in the process, including designation of emission reduction targets and development of a Climate Action Plan, the County should identify and quantify the emission reduction benefits of projects that have already been implemented since 2006, as well as the emissions reduction benefits of proposed Conservation and Open Space Element policies and climate protection measures. The benefits of both existing and proposed strategies can be tallied against the baseline established in this report to determine the appropriate set of strategies that will deliver the County to its chosen emissions reduction goal.

APPENDICES

APPENDIX 2A: CACP DETAILED REPORT FOR COMMUNITY-WIDE EMISSIONS, 2006

Community Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)

Residential

San Luis Obispo County, CA

1 PG&E Residential Natural Gas

Natural Gas	798	0.1	14,993
Subtotal 1 PG&E Residential Natural Gas	798	0.1	14,993

Source(s):
- All PG&E Data was received from Jeremy Howard, Account Executive with PG&E (805.595-6430 Email: J2H6@pge.com)
- Data file: "PG&E_2006_UNINC.xls"

Notes:
- The "California Coefficients for Natural Gas" coefficient set is based on a PG&E eCO2 emissions factor of 53.05 kg/MMBtu of delivered natural gas, certified by the California Climate Action Registry and the CEC, and was reported to ICLEI in Dec 2007 by Jasmin Ansar. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

1 SoCal Gas Co. Residential Natural Gas

Natural Gas	70,055	4.7	1,249,665
Subtotal 1 SoCal Gas Co. Residential Natural Gas	55	4.7	1,249,665

Source(s):
- Southern California Gas Co Data was provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com
- Data file: "Gas Usage by Market (MCF).xls"

Notes:
- Conversion of 1 MCF=10 therms was used.
- Default Fuel CO2 Set
- CEC Emission Factor for Natural Gas - RCI Average Set

2 PG&E Residential Electricity

Electricity	65,514	4.3	1,056,643
Subtotal 2 PG&E Residential Electricity	65,514	4.3	1,056,643

Source(s):
- All PG&E Data was received from Jeremy Howard, Account Executive with PG&E (805.595-6430 Email: J2H6@pge.com)
- Data file: "PG&E_2006_UNINC.xls"

Notes:
- The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.492859 lbs/kWh of delivered elctricity. This emissions factor is certified by the California Climate Action Registry and was reported to ICLEI in January 2007 by Greg San Martin. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13 - Western Systems Coordinating Council/CNV Average Grid Electricity Set.

Community Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Subtotal Residential	136,367	9.1	2,321,301

Commercial

San Luis Obispo County, CA

1 PG&E Commercial + Industrial Natural Gas

Natural Gas	1,144	0.1	21,506
Subtotal 1 PG&E Commercial + Industrial Natural Gas		0.1	21,506

Source(s):
- All PG&E Data was received from Jeremy Howard, Account Executive with PG&E (805.595-6430 Email: J2H6@pge.com);
- Data file: "PG&E_2006_UNINC.xls"

Notes:
- PG&E supplies natural gas to Shandon and portions of Creston, while SoCal Gas serves the rest of SLOCo. Conversion of 1 MCF=10 therms was used.
- PG&E data for commercial and industrial was combined and included under commercial, due to 15/15 Rule
- Notation: The "California Coefficients for Natural Gas" coefficient set is based on a PG&E eCO2 emissions factor of 53.05 kg/MMBtu of delivered natural gas, certified by the California Climate Action Registry and the CEC, and was reported to ICLEI in Dec 2007 by Jasmin Ansar. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

1 SoCal Gas Co. Commercial Natural Gas

Natural Gas	72,214	4.8	1,288,177
Subtotal 1 SoCal Gas Co. Commercial Natural Gas	4	4.8	1,288,177

Source(s):
- Southern California Gas Co Data was provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com
- Data file: "Gas Usage by Market (MCF).xls"

Notes:
- Conversion of 1 MCF=10 therms was used.
- CEC Emission Factor for Natural Gas - RCI Average Set
- Default Fuel CO2 Set

1 SoCal Gas Co. Industrial Natural Gas

Natural Gas	74,135	4.9	1,322,431
Subtotal 1 SoCal Gas Co. Industrial Natural Gas	,135	4.9	1,322,431

Source(s):
- Southern California Gas Co Data was provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com
- Data file: "Gas Usage by Market (MCF).xls"

Notes:
- Conversion of 1 MCF=10 therms was used.
- Default Fuel CO2 Set
- CEC Emission Factor for Natural Gas - RCI Average Set

Community Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
2 PG&E Commercial + Industrial Electricity			
Electricity	68,483	4.5	1,104,531
Subtotal 2 PG&E Commercial + Industrial Electricity	3	4.5	1,104,531

Source(s):
- All PG&E Data was received from Jeremy Howard, Account Executive with PG&E (805.595-6430 Email: J2H6@pge.com);
- Data file: "PG&E_2006_UNINC.xls"

Notes:
- PG&E data for commercial and industrial was combined and included under commercial, due to 15/15 Rule adopted by the CPUC to protect customer confidentiality. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers. A single customer's load must be less than 15 percent of an assigned category. If the number of customers in the complied data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released. The Rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened already using the 15/15 Rule, the customer must be dropped from the information provided.
This information was provided by Corie Cheeseman, Program Manager with Pacific Gas and Electric Company - Customer Energy Efficiency C3CL@pge.com or 415-973-4999.

Subtotal Commercial	215,976	14.3	3,736,644

Transportation

San Luis Obispo County, CA

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
1 Community On-Road VMT - Unincorp SLOco			
Gasoline	184,509	12.3	2,606,234
Diesel	22,847	1.5	272,480
Subtotal 1 Community On-Road VMT - Unincorp SLOco		13.8	2,878,714

Source(s):
- Community On-road VMT in unincorporated areas provided by Caltrans Highway Performance Maintenance data (HPMS) 2006, http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2006PRD.pdf

Notes:
- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, Tscheffe@arb.ca.gov. Manipulated by Jillian Rich, PMC, jrich@PMCworld.com to convert EMFAC vehicle classes to those used in CACP

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
1 State Highway VMT - Unincorp. SLOco			
Gasoline	684,476	45.4	9,668,372
Diesel	84,754	5.6	1,010,823
Subtotal 1 State Highway VMT - Unincorp. SLOco	30	51.1	10,679,195

Source(s):
- Highway road segments derived from San Luis Obispo County GIS shapefiles for roads and political boundaries, provided by Bobby Jo Close, Mapping Systems Specialist at the County of San Luis Obispo. Manipulated by John DeMartino, PMC, jdemartino@pmcworld.com.
- Total State highway VMT data provided by Caltrans Highway Performance Maintenance data (HPMS) 2006,

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)

http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2006PRD.pdf

Notes:
- The unincorporated highway VMT was calculated by using GIS to find the portion of highway road segments in unincorporated County land and multiplying it by total County highway VMT
- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, Tscheffe@arb.ca.gov. Manipulated by Jillian Rich, PMC, jrich@PMCworld.com to convert EMFAC vehicle classes to those used in CACP.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Subtotal Transportation	976,585	64.8	13,557,909

Waste

Chicago Grade

3 Unincorp. SLOco Solid Waste - Chicago Grade — *Disposal Method - Managed Landfill*

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Paper Products	4,401	0.3	
Food Waste	1,458	0.1	
Plant Debris	640	0.0	
Wood/Textiles	1,166	0.1	
Subtotal 3 Unincorp. SLOco Solid Waste - Chicago Grade		0.5	

Sources:
- Total waste tonnage for unincorporated SLO County in 2006 provided by the 2006 Disposal Report prepared by San Luis Obispo Couny Integrated Waste Management Authority on 3/6/07, provided by Tom Martin, tmartim@wasteconnections.com.
- Percentages of waste share by type for landfill tonaage provided by CIWMB 2004 Statewide Waste Characterization Study, http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097.
- Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 170.21 mmcf/yr. Total gas transferred = 102.13 mmcg/yr.

Notes:
- Waste Type data not collected by landfill. State average waste characterization data is used for residential, commerical, and self haul waste.
- A weighted average methane recovery factor of 58% is used for this calculation to account for the different recovery factor of Paso Robles.

Cold Canyon

3 Unincorp. SLOco Solid Waste - Cold Canyon — *Disposal Method - Managed Landfill*

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Paper Products	10,712	0.7	
Food Waste	3,549	0.2	
Plant Debris	1,559	0.1	
Wood/Textiles	2,839	0.2	
Subtotal 3 Unincorp. SLOco Solid Waste - Cold Canyon		1.2	

Sources:
- Total waste tonnage for unincorporated SLO County in 2006 provided by the 2006 Disposal Report prepared by San Luis Obispo Couny Integrated Waste Management Authority on 3/6/07, provided by Tom Martin, tmartim@wasteconnections.com.
- Percentages of waste share by type for landfill tonage provided by CIWMB 2004 Statewide Waste Characterization Study, http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097.
- Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 763.1 mmcf/yr. Total gas transferred = 457.84

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)

mmcg/yr.

Notes:
- Waste Type data not collected by landfill. State average waste characterization data is used for residential, commerical, and self haul waste.
- A weighted average methane recovery factor of 58% is used for this calculation to account for the different recovery factor of Paso Robles.

Paso Robles

3 Unincorp. SLOco Solid Waste - Paso Robles — *Disposal Method - Managed Landfill*

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Paper Products	2,420	0.2	
Food Waste	802	0.1	
Plant Debris	352	0.0	
Wood/Textiles	641	0.0	
Subtotal 3 Unincorp. SLOco Solid Waste - Paso Robles		0.3	

Sources:
- Total waste tonnage for unincorporated SLO County in 2006 provided by the 2006 Disposal Report prepared by San Luis Obispo Couny Integrated Waste Management Authority on 3/6/07, provided by Tom Martin, tmartim@wasteconnections.com.
- Percentages of waste share by type for landfill tonaage provided by CIWMB 2004 Statewide Waste Characterization Study, http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097.
- Paso Robles landfill reports a methane recovery factor of 50%. Paso Robles total gas generated = 144.48 mmcf/yr. Total gas transferred = 72.24 mmcg/yr.

Notes:
- Waste Type data not collected by landfill. State average waste characterization data is used for residential, commerical, and self haul waste.
- A weighted average methane recovery factor of 58% is used for this calculation to account for the different recovery factor of Paso Robles.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Subtotal Waste	30,540	2.0	

Other

San Luis Obispo County, CA

1 Off-Road Agricultural Equipment

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Carbon Dioxide	62,784	4.2	
Nitrous Oxide	236	0.0	
Methane	258	0.0	
Subtotal 1 Off-Road Agricultural Equipment	63,278	4.2	

Source(s):
- CO2, CH4, and N20 emissions calculated using the California Air Resources Board OFFROAD2007 modeling tool.
- The portion of agricultural land per jurisdiction in SLO County calculated by John Demartino, PMC, jdemartino@pmcworld.com using County GIS shape files.

Notes:
- OFFROAD aggregates off-road agricultural equipment emissions for the entire county. Emissions were separted by jurisdiction based on the proportion of agricultural land per jurisdiction. This analysis was completed using GIS shapefiles of land use patterns in the county.
- OFFROAD includes the following agricultural equipment: 2-wheel tractors, agricultural mowers, agricultural tractors, balers, combines, hydro power units, other agricultural equipment, sprayers, swathers, tilers.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
3 Heads of Cattle and Sheep			
Methane	83,417	5.5	
Subtotal 3 Heads of Cattle and Sheep	83,417	5.5	

Sources:
- Livestock data obtained from the Department of Agriculture and reported in 'Farming Operations" engineering report by Courtney Ward, July 22, 2008. Cattle heads estimated to be 95,000
- Methane emissions from enteric fermentation and manure were calculated using Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines for National Greenhouse Gas Inventories. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_Ch10_Livestock.pdf

Notes:
- CH4 is attributed to the 95,000 cattle and 6,210 sheep in SLOCo (2006). Since half of the sheep and half of the cattle are in-county year round and half are here only half of the year. Therefore, we will model (95,000 * 75%) = 71,250 cattle and (6,210 * 75%) = 6,457.5 sheep
- All cows were assumed to be in the Other/Meat category of IPCC cattle categories as SLO county does not raise cattle or calves for dairy uses. The only dairy is on the Cal Poly campus, which is not included in this Inventory. Assumption confirmed by Robert Lilley (rlilley@co.slo.ca.us), Agricultural Commissioner for the County on 3/2/09.
- Tier 1 Enteric fermentation methane emissions factor (kg CH4 per head per year) for Other cattle = 53. For Sheep = 8.
- Tier 1 Manure management methane emission factor (kg per head per year) for Other cattle = 2. For sheep in temperate average temperatures (15-25 Degrees C) = 0.28
- CATTLE: (71,250 heads * 53 kg/head) + (71,250 * 2 kg/head) = 3776250 + 142500 = 3,918,750 kg/year
- SHEEP: (6457.5 * 8) + (6457.5 * .28) = 51660 + 1801.1 = 53,468.1 kg/year
- TOTAL= 3,918,750 + 53,468.1= 3,972,248.1 kg/year

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Subtotal Other	146,695	9.7	
Total	1,506,163	100.0	19,615,854

APPENDIX 2B: CACP DETAILED REPORT FOR COUNTY GOVERNMENT OPERATIONS EMISSIONS, 2006

Government Greenhouse Gas Emissions in 2006
Detailed Report

Buildings

San Luis Obispo County, CA

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 Cal Fire South/North County Training				
Natural Gas	1	0.0	16	0
Subtotal 1 Cal Fire South/North County Training	1	0.0	16	0

Source(s):
- Data provided by Eric Cleveland Battalion Chief of Support Services, County Cal Fire.
Contact info: 805-543-4244- eric.cleveland@fire.ca.gov
- Natural Gas comes from the Gas Co.

Notes:
- Propane comes from Delta Liquid Energy- 764.41 units (do not know units)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 Child Support Services- County				
Natural Gas	11	0.0	189	0
Subtotal 1 Child Support Services- County	11	0.0	189	0

Source(s):
- Contact- Jacquiline Barthelow- Administration- 805-781-5730

Notes:
- Jacquiline signed data request letters to PG&E and the Gas Co.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 County Building- PPD01 Oceano Airport				
Natural Gas	8	0.0	144	1,992
Subtotal 1 County Building- PPD01 Oceano Airport	8	0.0	144	1,992

Source(s):
- Reported by Department of General Services.

Notes:
Building Info: 20,060

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 County Building- PT-39 1103 Toro St. HEALTH				
Natural Gas	3	0.0	62	823
Subtotal 1 County Building- PT-39 1103 Toro St. HEALTH		0.0	62	823

Source(s):
- Reported by Department of General Services.

Notes:
- Electric under RKE (dave clew). County pays utilities based on sq. ft.
- Bldg info:

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2619 sq. ft.				
1&2 APCD Roberto Court (4 meters)				
Electricity	4	0.0	72	3,494
Natural Gas	4	0.0	72	900
Subtotal 1&2 APCD Roberto Court (4 meters)	8	0.0	144	4,394

Source(s):
- APCD data collected using electricity (PG&E) & gas (Gas Co.) paper bills at APCD Roberto Court. Contact- Melisa Guise

Notes:
- For the month of March the bills were missing the kwh page. Asssumed that the kwh was 0 because the bill was approx. $10. For other months that had 0 kwh, the bill was between $8-$12.
- No gas data for Dec. 2006 (missing). Nov. 2006 had 35 therms. Jan. 2006 had 143 therms. Can maybe take the average between those months.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 Cal Fire Sta 21 Airport				
Electricity	6	0.0	102	0
Natural Gas	7	0.0	118	0
Subtotal 1&2 Cal Fire Sta 21 Airport	13	0.0	221	0

Source(s):
- Reported by Eric Cleveland, Battalion Chief, County Cal Fire.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 Cal Fire Sta. 62 Avila Valley				
Electricity	3	0.0	42	0
Natural Gas	5	0.0	82	0
Subtotal 1&2 Cal Fire Sta. 62 Avila Valley	7	0.0	124	0

Source(s):
- contact- Eric Cleveland

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building DSS PA-35 Grand Ave, Arroyo Grande				
Electricity	34	0.1	549	27,859
Natural Gas	12	0.0	209	2,317
Subtotal 1&2 County Building DSS PA-35 Grand Ave, Arroyo Grande		0.1	757	30,176

Source(s):
- Reported by General Services.

Notes:
- Bldg info:
2600 operating hours
19,728 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building PIC20 Mail Jail & Femail Jail				
Electricity	349	1.0	5,629	204,980
Natural Gas	492	1.4	8,775	81,279
Subtotal 1&2 County Building PIC20 Mail Jail & Femail Jail		2.5	14,404	286,259

Source(s):
- Data from General Services
Contact- David Clew, Utility Coordinator, Department of General Services, 805-781-5221- dclew@co.slo.ca.us

Notes:
- Bldg info:
8760 operating hours
46925 sq. ft. floor area

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- Cogeneration Plant				
Electricity	130	0.4	2,090	0
Natural Gas	411	1.2	7,324	57,389
Subtotal 1&2 County Building- Cogeneration Plant	540	1.6	9,414	57,389

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
Located in basement of PTB00- Old Courthouse
3,120 operating hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- DSS PB-08_9415 El Camino Atascadero				
Electricity	11	0.0	177	9,331
Natural Gas	7	0.0	118	1,521
Subtotal 1&2 County Building- DSS PB-08_9415 El Camino Atascadero		0.1	295	10,852

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
4,901 sq. ft.

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- DSS PR15_ 530 12th St. Paso Robles				
Electricity	18	0.1	290	13,747
Natural Gas	2	0.0	35	533
Subtotal 1&2 County Building- DSS PR15_ 530 12th St. Paso Robles		0.1	325	14,280

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
6,485 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- DSS PT86 2975 McMillan #160 AB				
Electricity	9	0.0	151	8,209
Natural Gas	4	0.0	69	1,025
Subtotal 1&2 County Building- DSS PT86 2975 McMillan #160 AB		0.0	220	9,234

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
4533 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PA-28 1106 E. Grand Ave AG HEALTH				
Electricity	11	0.0	178	8,493
Natural Gas	4	0.0	72	951
Subtotal 1&2 County Building- PA-28 1106 E. Grand Ave AG HEALTH		0.0	250	9,444

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
2242 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PA-34 1092 E. Grand Ave. AG HEALTH				
Electricity	2	0.0	38	2,041
Natural Gas	1	0.0	20	546
Subtotal 1&2 County Building- PA-34 1092 E. Grand Ave. AG HEALTH		0.0	59	2,587

Source(s):

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
2249 sq. ft.

1&2 County Building- PAC01 South County Regional Ctr

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	6	0.0	97	3,957
Natural Gas	1	0.0	17	207
Subtotal 1&2 County Building- PAC01 South County Regional Ctr		0.0	113	4,164

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
3744 operating hours
10,677 sq. ft.

1&2 County Building- PAC05 Ag ommissioner Arroyo Grande

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	5	0.0	75	3,529
Natural Gas	4	0.0	67	902
Subtotal 1&2 County Building- PAC05 Ag ommissioner Arroyo Grande		0.0	142	4,431

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
2,880 sq. ft.

1&2 County Building- PB-16 3518-3556 El Camino Real HEALTH

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	7	0.0	107	5,455
Natural Gas	5	0.0	87	1,326
Subtotal 1&2 County Building- PB-16 3518-3556 El Camino Real HEALTH		0.0	193	6,781

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
600 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PB-18 DSS 9485 El Camino, Atascadero				
Electricity	2	0.0	34	1,682
Natural Gas	1	0.0	21	446
Subtotal 1&2 County Building- PB-18 DSS 9485 El Camino, Atascadero		0.0	55	2,128

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
931 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PB-19 Assessor/Clerk/Planning				
Electricity	7	0.0	107	5,459
Natural Gas	6	0.0	110	1,794
Subtotal 1&2 County Building- PB-19 Assessor/Clerk/Planning		0.0	216	7,253

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
4,650 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PB-20 3520 El Camino Real AT HEALTH				
Electricity	7	0.0	107	5,417
Natural Gas	5	0.0	88	1,350
Subtotal 1&2 County Building- PB-20 3520 El Camino Real AT HEALTH		0.0	194	6,767

Source(s):
- Reported by Department of General Services.
Combined with 3556 El Camino

Notes:
- Bldg info:
600 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PB-21 Probation Atascadero				
Electricity	3	0.0	52	2,470

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Natural Gas	6	0.0	102	1,350
Subtotal 1&2 County Building- PB-21 Probation Atascadero		0.0	155	3,820

Source(s):
- Reported by General Services.
Contact- David Clew
Probation pays electricity as it is grant funded (dave clew).

Notes:
- Bldg info:
2600 operating hours
1550 sq. ft.

1&2 County Building- PBG01 Atascadero Hospital

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	2	0.0	30	1,421
Natural Gas	18	0.1	316	3,838
Subtotal 1&2 County Building- PBG01 Atascadero Hospital		0.1	346	5,259

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
8,734 sq. ft.

1&2 County Building- PEN15 Sheriff Substation Los Osos

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	6	0.0	97	4,476
Natural Gas	5	0.0	92	1,216
Subtotal 1&2 County Building- PEN15 Sheriff Substation Los Osos		0.0	189	5,692

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
8760 operating hours
3,200 sq. ft.

1&2 County Building- PIC 23 Info Services Comm Shop

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	5	0.0	75	3,535
Natural Gas	3	0.0	53	773
Subtotal 1&2 County Building- PIC 23 Info Services Comm Shop		0.0	128	4,308

Source(s):
- Reported by Department of General Services.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Notes:
- Bldg info:
2600 operating hours
2214 sq. ft.

1&2 County Building- PIC02 Maintenance Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	6	0.0	99	4,658
Natural Gas	6	0.0	105	1,354
Subtotal 1&2 County Building- PIC02 Maintenance Building		0.0	204	6,012

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 operating hours
50,121 sq. ft.

1&2 County Building- PIC05 Detectives Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	24	0.1	388	17,107
Natural Gas	8	0.0	148	1,950
Subtotal 1&2 County Building- PIC05 Detectives Building		0.1	535	19,057

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8,760 operating hours
9,450 sq. ft.

1&2 County Building- PIC07 Sheriff Storage Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	4	0.0	56	2,618
Natural Gas	2	0.0	37	542
Subtotal 1&2 County Building- PIC07 Sheriff Storage Building		0.0	93	3,160

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8760 operating hours
7136 sq. ft.

Government Greenhouse Gas Emissions in 2006
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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PIC17 Garage				
Electricity	5	0.0	77	3,588
Natural Gas	6	0.0	112	1,528
Subtotal 1&2 County Building- PIC17 Garage	11	0.0	189	5,116

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 operating hours
14,277 sq. ft. (additional planned on GAR 700)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PIC30 Animal Services				
Electricity	23	0.1	371	15,116
Natural Gas	89	0.3	1,589	16,371
Subtotal 1&2 County Building- PIC30 Animal Services		0.3	1,960	31,487

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8,760 operating hours
13,499 sq. ft. floor area

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PIC31 Sheriff Honor Farm				
Electricity	103	0.3	1,669	62,299
Natural Gas	255	0.7	4,542	43,448
Subtotal 1&2 County Building- PIC31 Sheriff Honor Farm		1.1	6,211	105,747

Source(s):
- Reported by General Services
Contact- David Clew

Notes:
Bldg info:
8,760 operating hours
34,807 sq. ft. floor area

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PIC35 Juvenile Services				
Electricity	72	0.2	1,156	43,868

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Natural Gas	84	0.2	1,495	15,356
Subtotal 1&2 County Building- PIC35 Juvenile Services		0.5	2,651	59,224

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8,760 operating hours
22,783 sq. ft. floor area

1&2 County Building- PLC03 Municipal Court Grover Beach

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	4	0.0	70	3,396
Natural Gas	3	0.0	60	824
Subtotal 1&2 County Building- PLC03 Municipal Court Grover Beach		0.0	130	4,220

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
2600 operating hours
3,412 sq. ft.

1&2 County Building- PLC05 Public Health Grover Beach

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	3	0.0	50	2,520
Natural Gas	3	0.0	58	773
Subtotal 1&2 County Building- PLC05 Public Health Grover Beach		0.0	107	3,293

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
4843 sq. ft.

1&2 County Building- PMA09 Park Ranger Residence

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	0	-377
Propane	0	0.0	6	1,172
Subtotal 1&2 County Building- PMA09 Park Ranger Residence		0.0	6	795

Source(s):
- Reported by Department of General Services.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Notes:
- CLOSED on 9/21/2006.
- Electricity account closed so monies refunded showing a credit (dave clew).
- Bldg info:
8760 operating hours
1344 sq. ft.

1&2 County Building- PNL02 Morro Bay Clinic

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	2	0.0	35	1,712
Natural Gas	4	0.0	64	896
Subtotal 1&2 County Building- PNL02 Morro Bay Clinic		0.0	99	2,608

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 operating hours
2803 sq. ft.

1&2 County Building- PPD02 Oceano Airport Residnece

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	10	281
Natural Gas	5	0.0	96	1,165
Subtotal 1&2 County Building- PPD02 Oceano Airport Residnece		0.0	106	1,446

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8,760 operating hours
1140 sq. ft.

1&2 County Building- PPD12 Coastal Dunes

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	29	0.1	472	20,020
Natural Gas	17	0.0	300	2,819
Subtotal 1&2 County Building- PPD12 Coastal Dunes		0.1	772	22,839

Source(s):
- Reported by Department of General Services.

Notes:
info:
Opened on 10/01/2006-- so data only from October of 2006.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

8,760 operating hours

1&2 County Building- PR-04 1030 Vine PR HEALTH

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	7	0.0	118	5,658
Natural Gas	2	0.0	42	603
Subtotal 1&2 County Building- PR-04 1030 Vine PR HEALTH		0.0	160	6,261

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
2720 sq. ft.

1&2 County Building- PRE31/32 Paso Robles Courts Modulars

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	14	0.0	225	8,978
Natural Gas	3	0.0	57	808
Subtotal 1&2 County Building- PRE31/32 Paso Robles Courts Modulars		0.1	282	9,786

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
4969 sq. ft.

1&2 County Building- PRE33 Public Health Paso Robles

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	11	0.0	174	8,365
Natural Gas	6	0.0	112	1,482
Subtotal 1&2 County Building- PRE33 Public Health Paso Robles		0.1	287	9,847

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
4391 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PT-111 1011 Pacific St. HEALTH				
Electricity	10	0.0	158	7,549
Natural Gas	1	0.0	24	393
Subtotal 1&2 County Building- PT-111 1011 Pacific St. HEALTH		0.0	181	7,942

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
4860 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PT-20 Superior Court				
Electricity	10	0.0	158	8,540
Natural Gas	2	0.0	38	696
Subtotal 1&2 County Building- PT-20 Superior Court	2	0.0	196	9,236

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 operating hours
6427 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PT-65 Family Court Services				
Electricity	1	0.0	23	1,042
Natural Gas	3	0.0	49	711
Subtotal 1&2 County Building- PT-65 Family Court Services		0.0	73	1,753

Source(s):
- Reported by Department of General Services.

Notes:
- Building CLOSED on 6/20/2006 (dave clew)
- Bldg info:
2600 operating hours
4279 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PT066 2191 Johnson Ave HEALTH				
Electricity	49	0.1	789	35,613

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Natural Gas	41	0.1	726	7,643
Subtotal 1&2 County Building- PT066 2191 Johnson Ave HEALTH		0.3	1,514	43,256

Source(s):
- Reported by Department of General Services.

Notes:
Building info:
Lab HVAC operates 8,760 hours
Offices operate 2600 hrs/yr
11,806 sq. ft.

1&2 County Building- PT067 Heath/Ag Depts.- 2156 Sierra Way

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	33	0.1	530	25,950
Natural Gas	9	0.0	165	2,131
Subtotal 1&2 County Building- PT067 Heath/Ag Depts.- 2156 Sierra Way		0.1	695	28,081

Source(s):
- Reported by Department of General Services.

Notes:
Building Info:
2600 operating hours
21,037 sq. ft.

1&2 County Building- PTA86 Veterans Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	17	0.0	266	12,387
Natural Gas	14	0.0	258	2,961
Subtotal 1&2 County Building- PTA86 Veterans Building		0.1	524	15,348

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2,600 operating hours
28,124 sq. ft.

1&2 County Building- PTB00 Government Center

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	702	2.1	11,325	430,446
Natural Gas	100	0.3	1,775	17,587
Subtotal 1&2 County Building- PTB00 Government Center		2.4	13,100	448,033

Source(s):

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

- Reported by Department of General Services.
Contact- David Clew

Notes:
Bldg info:
8760 operating hours
351,653 sq. ft. floor area

1&2 County Building- PTB07 General Services

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	15	0.0	236	11,537
Natural Gas	1	0.0	18	341
Subtotal 1&2 County Building- PTB07 General Services		0.0	254	11,878

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 Operating hours
9,010 sq. ft.

1&2 County Building- PTB10 Kimball Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	17	0.0	266	13,172
Natural Gas	14	0.0	243	2,898
Subtotal 1&2 County Building- PTB10 Kimball Building		0.1	510	16,070

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
17,167 sq. ft.

1&2 County Building- PTC91 Courts Attorneys

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	5	0.0	84	3,993
Natural Gas	2	0.0	36	542
Subtotal 1&2 County Building- PTC91 Courts Attorneys		0.0	119	4,535

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1800 sq. ft.				
1&2 County Building- PTD92 Grand Jury				
Electricity	2	0.0	26	1,557
Natural Gas	2	0.0	43	622
Subtotal 1&2 County Building- PTD92 Grand Jury	4	0.0	69	2,179

Source(s):
- Reported by Department of General Services.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PTF53 Probation SLO				
Electricity	25	0.1	409	19,470
Natural Gas	12	0.0	207	2,587
Subtotal 1&2 County Building- PTF53 Probation SLO		0.1	616	22,057

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3120 operating hours
14,402 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PTF66 Health Campus				
Electricity	106	0.3	1,715	79,296
Natural Gas	87	0.3	1,556	15,404
Subtotal 1&2 County Building- PTF66 Health Campus		0.6	3,272	94,700

Source(s):
- Reported by General Services
Contact- David Clew

Notes:
Bldg info:
116,337 sq. ft. floor area

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PTN11 Airport Terminal				
Electricity	81	0.2	1,305	51,779
Natural Gas	12	0.0	213	2,769
Subtotal 1&2 County Building- PTN11 Airport Terminal		0.3	1,518	54,548

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
7,300 operating hours
22,332 sq. ft. floor area

1&2 County Building- PTR01 DSS 3433 Higuera St.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	146	0.4	2,348	106,245
Natural Gas	78	0.2	1,386	14,634
Subtotal 1&2 County Building- PTR01 DSS 3433 Higuera St.		0.7	3,734	120,879

Source(s):
- Reported by Department of General Services.
Data provided by DSS to General Services
Contact- David Clew

Bldg info:
3,120 operating hours
57,498 sq. ft. floor area

1&2 County Building- PWA06 Sheriff Templeton

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	15	0.0	236	10,882
Natural Gas	5	0.0	90	1,268
Subtotal 1&2 County Building- PWA06 Sheriff Templeton		0.1	325	12,150

Source(s):
- Reported by Department of General Services.

Bldg info:
8760 operating hours
6385 sq. ft.

1&2 County Building- PWA07 Ag Commissioner Templeton

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	4	0.0	69	3,285
Natural Gas	18	0.1	323	3,751
Subtotal 1&2 County Building- PWA07 Ag Commissioner Templeton		0.1	392	7,036

Source(s):
- Reported by Department of General Services.

Bldg info:
2600 operating hours
2935 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- PYA09 El Chorro Maintenance				
Electricity	4	0.0	61	2,844
Natural Gas	2	0.0	41	646
Subtotal 1&2 County Building- PYA09 El Chorro Maintenance		0.0	102	3,490

Source(s):
- Reported by Department of General Services.
Initial electric service initiated 2/08/2006.

Bldg info:
4368 operating hours
1857 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Building- South County Sheriff Sub Station- 1681 Front St., Oceano				
Electricity	11	0.0	178	8,463
Natural Gas	14	0.0	255	2,945
Subtotal 1&2 County Building- South County Sheriff Sub Station- 1681 Front St., Oceano			433	11,408

Source(s):
- Data requested by Mike Matus of Fiscal Services 805-781-4555_ mmatus@co.slo.ca.us
- Data came from PG&E and the Gas Co. from data request letters that PMC created.
- So. County Sheriff's sub station is one of two County buildings whose bills are not paid by General Services.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PGF01 Swimming Pool Windsor Blvd.				
Electricity	3	0.0	41	1,853
Natural Gas	5	0.0	81	886
Subtotal 1&2 County Facility- PGF01 Swimming Pool Windsor Blvd.		0.0	122	2,739

Source(s):
- Reported by Department of General Services.

Facility info:
745 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PKC03 Hardie Park Pool				
Electricity	9	0.0	149	6,611
Natural Gas	24	0.1	432	4,705
Subtotal 1&2 County Facility- PKC03 Hardie Park Pool		0.1	582	11,316

Source(s):
- Reported by Department of General Services.

Facility info:
1,227 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PM-01 Santa Margarita RA				
Electricity	29	0.1	468	18,171
Propane	2	0.0	25	6,896
Subtotal 1&2 County Facility- PM-01 Santa Margarita RA		0.1	493	25,067

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours
1,898 acres (82,676,880 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PMA01 Lopez Park				
Electricity	64	0.2	1,038	39,934
Propane	8	0.0	126	2,204
Subtotal 1&2 County Facility- PMA01 Lopez Park	73	0.2	1,164	42,138

Source(s):
- Reported by Department of General Services.

Site info:
8,760 operating hours
33,802,560 sq. ft floor area (776 acres)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PN-19 Morro Bay Golf Course				
Electricity	42	0.1	680	24,015
Propane	1	0.0	15	1,251
Subtotal 1&2 County Facility- PN-19 Morro Bay Golf Course		0.1	695	25,266

Source(s):
- Reported by Department of General Services.

Facility info:
2,600 operating hours
125 acres (5,445,000 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PWB09 Templeton Park				
Electricity	12	0.0	201	8,114
Natural Gas	0	0.0	6	206
Subtotal 1&2 County Facility- PWB09 Templeton Park		0.0	207	8,320

Source(s):
- Reported by Department of General Services.

Facility info:

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4 acres (174,240 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PYA04 El Chorro Park				
Electricity	24	0.1	389	17,773
Natural Gas	5	0.0	98	1,320
Propane	6	0.0	90	1,514
Subtotal 1&2 County Facility- PYA04 El Chorro Park	[illegible]	0.1	577	20,607

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours
290 acres (12,623,400 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Facility- PYA11 Dairy Creek Golf Course				
Electricity	54	0.2	873	33,588
Natural Gas	3	0.0	45	713
Subtotal 1&2 County Facility- PYA11 Dairy Creek Golf Course		0.2	918	34,301

Source(s):
- Reported by Department of General Services.

Notes:
- Data includes maintenance, pumping, and on course use. Does not include clubhouse/restaurant, cart barn, or parking lot lights which are under private control. (Dave Clew)

Site info:
2,600 operating hours
224 acres (9,757,440 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Arroyo Grande				
Electricity	28	0.1	448	15,848
Natural Gas	7	0.0	129	1,648
Subtotal 1&2 County Library- Arroyo Grande	35	0.1	577	17,496

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
1976 operating hours
12,000 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Atascadero				
Electricity	19	0.1	310	14,177
Natural Gas	12	0.0	216	2,563
Subtotal 1&2 County Library- Atascadero	31	0.1	526	16,740

Source(s):
- Data collected and received from Melody Mullis mmullis@co.slo.ca.us

Bldg info:
1976 operating hours
7000 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Cambria				
Electricity	4	0.0	61	2,664
Natural Gas	2	0.0	40	600
Subtotal 1&2 County Library- Cambria	6	0.0	101	3,264

Source(s):
- Data collected and received by melody Mullis mmullis@co.slo.ca.us

Bldg info:
1456 operating hours
2331 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Cayucos				
Electricity	1	0.0	14	697
Natural Gas	4	0.0	63	835
Subtotal 1&2 County Library- Cayucos	4	0.0	77	1,532

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
780 operating hours
1700 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Los Osos				
Electricity	6	0.0	97	3,384
Natural Gas	2	0.0	28	441
Subtotal 1&2 County Library- Los Osos	8	0.0	125	3,825

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Bldg info:
1664 operating hours
3976 sq. ft.

1&2 County Library- Morro Bay

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	9	0.0	147	6,085
Natural Gas	3	0.0	46	646
Subtotal 1&2 County Library- Morro Bay	12	0.0	193	6,731

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
1664 operating hours
6578 sq. ft.

1&2 County Library- Nipomo

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	11	0.0	183	7,868
Natural Gas	2	0.0	29	468
Subtotal 1&2 County Library- Nipomo	13	0.0	211	8,336

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
1612 operating hours
5487 sq. ft.

1&2 County Library- San Miguel

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	11	396
Natural Gas	0	0.0	5	168
Subtotal 1&2 County Library- San Miguel	1	0.0	16	564

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
780 operating hours
775 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1&2 County Library- Santa margarita				
Electricity	2	0.0	32	1,530
Natural Gas	1	0.0	23	388
Subtotal 1&2 County Library- Santa margarita	3	0.0	55	1,918

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
936 operating hours
900 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 APCD Atascadero				
Electricity	3	0.0	51	2,412
Subtotal 2 APCD Atascadero	3	0.0	51	2,412

Source(s):
- Data collected at APCD same time as Roberto Court.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 APCD Grover Beach				
Electricity	0	0.0	1	149
Subtotal 2 APCD Grover Beach	0	0.0	1	149

Source(s):
- Data gathered at APCD same time as Roberto Court.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 APCD Morro Bay				
Electricity	3	0.0	43	2,048
Subtotal 2 APCD Morro Bay	3	0.0	43	2,048

Source(s):
- Data collected at APCD same time as Roberto Court.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 APCD Nipomo				
Electricity	2	0.0	33	1,705
Subtotal 2 APCD Nipomo	2	0.0	33	1,705

Source(s):
- Data collected at APCD same time as Roberto Court.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 APCD Shandon/Redhills				
Electricity	1	0.0	23	1,125
Subtotal 2 APCD Shandon/Redhills	1	0.0	23	1,125

Source(s):
- Data collected at APCD same time as Roberto Court.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Cal Fire Sta. 14 Morro Toro				
Electricity	1	0.0	13	0
Subtotal 2 Cal Fire Sta. 14 Morro Toro	1	0.0	13	0

Source(s):
- Reported by Eric Cleveland, Battalion chief, County Cal Fire.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Cal Fire Sta. 22 Nipomo Mesa				
Electricity	4	0.0	58	0
Subtotal 2 Cal Fire Sta. 22 Nipomo Mesa	4	0.0	58	0

Source(s):
- Reported by Eric Cleveland, Battalion Chief, County Cal Fire.

Notes:
- Propane provided by Delta Liquid Energy- 721.4 units (unknown)
- No energy data for station # 36 Meridian.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Cal Fire Sta. 33 Heritage Ranch				
Electricity	5	0.0	73	0
Subtotal 2 Cal Fire Sta. 33 Heritage Ranch	5	0.0	73	0

Source(s):
- Reported by Eric Cleveland, Battalion Chief, County Cal Fire.

Notes:
- Propane from Delta liquid Energy- 865.6 units (unknown)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Cal Fire Sta. 43 Creston				
Electricity	5	0.0	76	0
Subtotal 2 Cal Fire Sta. 43 Creston	5	0.0	76	0

Source(s):
- Reported by Eric Cleveland, Battalion Chief, County Cal Fire.

Notes:

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

- Propane provided by Delta Liquid Energy- 220.7 units (unknown)

2 County Building- DSS PT-91 836 Via Estaban

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	34	0.1	549	27,859
Subtotal 2 County Building- DSS PT-91 836 Via Estaban		0.1	549	27,859

Source(s):
- Reported by Department of General Services.
Data provided by DSS to General Services.

Notes:
- Bldg info:
2600 operating hours
1634 sq. ft.

2 County Building- PBG04 Public Health Atascadero

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	24	0.1	384	18,098
Subtotal 2 County Building- PBG04 Public Health Atascadero		0.1	384	18,098

Source(s):
- Reported by Department of General Services.

Notes:
- Bldg info:
8,760 operating hours
11,320 sq. ft.

2 County Building- PIC36 Sheriff EOC Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	27	0.1	429	16,486
Subtotal 2 County Building- PIC36 Sheriff EOC Building		0.1	429	16,486

Source(s):
- Reported by Department of General Services.

Notes:
- No gas accounts found (Dave Clew)
- Bldg info:
8760 operating hours
14,160 sq. ft.

2 County Building- PLC02 Grover Courts Modular

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	6	0.0	105	4,848
Subtotal 2 County Building- PLC02 Grover Courts Modular		0.0	105	4,848

Source(s):
- Reported by Department of General Services.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Notes:
Bldg info:
2600 operating hours
2052 sq. ft.

2 County Building- POB24 Nipomo Park Host

Electricity	3	0.0	55	4,126
Subtotal 2 County Building- POB24 Nipomo Park Host		0.0	55	4,126

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8760 operating hours

2 County Building- PPD01 Oceano Airport Hangars

Electricity	5	0.0	86	2,498
Subtotal 2 County Building- PPD01 Oceano Airport Hangars		0.0	86	2,498

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
20,076 sq. ft.

2 County Building- PT-101 2995 McMilan Ave HEALTH

Electricity	3	0.0	43	2,245
Subtotal 2 County Building- PT-101 2995 McMilan Ave HEALTH		0.0	43	2,245

Source(s):
- Reported by Department of General Services.

Notes:
- No gas usage.
- Bldg info:
2496 sq. ft.

2 County Building- PT-102 2945 McMillan Ave HEALTH

Electricity	19	0.1	300	14,097
Subtotal 2 County Building- PT-102 2945 McMillan Ave HEALTH		0.1	300	14,097

Source(s):

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

- Reported by Department of General Services.

Notes:
Bldg info:
15,236 sq. ft.

2 County Building- PT-110 3183 Duncan Ave HEALTH

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	7	0.0	111	5,354
Subtotal 2 County Building- PT-110 3183 Duncan Ave HEALTH		0.0	111	5,354

Source(s):
- Reported by Department of General Services.

Notes:
- Building CLOSED on 2/25/2008 (Dave Clew).
- Gas paid by landlord.
- Bldg info:
1960 sq. ft.

2 County Building- PT-20 Info Tech Ahern Building

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	3	0.0	50	1,971
Subtotal 2 County Building- PT-20 Info Tech Ahern Building		0.0	50	1,971

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
6427 sq. ft.

2 County Building- PT-40 2925 McMilan Ave HEALTH

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	2	117
Subtotal 2 County Building- PT-40 2925 McMilan Ave HEALTH		0.0	2	117

Source(s):
- Reported by Department of General Services.

Notes:
- Building OPENED on 10/02/2006
- Bldg info:
10,608 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PT-48 Public Health Lab Bishop				
Electricity	0	0.0	4	179
Subtotal 2 County Building- PT-48 Public Health Lab Bishop		0.0	4	179

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
2761 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PT-68 District Attorney				
Electricity	0	0.0	7	363
Natural Gas	0	0.0	0	137
Subtotal 2 County Building- PT-68 District Attorney	0	0.0	7	500

Source(s):
- Reported by Department of General Services.

Notes:
- Gas usage was zero, meter charge only. Closed on 8/03/2006 (Dave Clew).

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTB11 Kimball Building East Lot				
Electricity	6	0.0	99	4,589
Subtotal 2 County Building- PTB11 Kimball Building East Lot		0.0	99	4,589

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
4004 operating hours
23644 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTN10 Airport Hangars				
Electricity	3	0.0	52	2,576
Subtotal 2 County Building- PTN10 Airport Hangars	3	0.0	52	2,576

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
3640 operating hours
21,615 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTN10 Airport Large Hangar				
Electricity	0	0.0	2	210
Subtotal 2 County Building- PTN10 Airport Large Hangar		0.0	2	210

Source(s):
- Reported by Department of General Services.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTN10 Airport Maintenance Building				
Electricity	0	0.0	0	50
Subtotal 2 County Building- PTN10 Airport Maintenance Building		0.0	0	50

Source(s):
- Reported by Department of General Services.

Notes:
- OPENED on 10/09/2006 (Dave Clew)
- Bldg info:
3200 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTN10 Airport Multi Hangar				
Electricity	4	0.0	61	3,091
Subtotal 2 County Building- PTN10 Airport Multi Hangar		0.0	61	3,091

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
8760 opearting hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PTN10 Airport- Maintenance Bldg				
Electricity	7	0.0	120	5,633
Subtotal 2 County Building- PTN10 Airport- Maintenance Bldg		0.0	120	5,633

Source(s):
- Reported by Department of General Services.

Notes:
Bldg info:
2600 operating hours
4000 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PUG24 Rio Caledonia Adobe				
Electricity	8	0.0	123	3,982
Subtotal 2 County Building- PUG24 Rio Caledonia Adobe		0.0	123	3,982

Source(s):
- Reported by Department of General Services.

Bldg info:
2600 operating hours
5880 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- PY03 Rocky Butte				
Electricity	8	0.0	136	6,310
Subtotal 2 County Building- PY03 Rocky Butte	8	0.0	136	6,310

Source(s):
- Reported by Department of General Services.

Bldg info:
8,760 operating hours
360 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Building- RKE 1170 Marsh St.				
Electricity	1	0.0	18	909
Subtotal 2 County Building- RKE 1170 Marsh St.	1	0.0	18	909

Source(s):
- Reported by Department of General Services.

Notes:
- Electricity includes 1103 Toro St. usage.

Bldg info:
2600 operating hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PBF01 Heilmann Regional Park				
Electricity	3	0.0	44	2,396
Subtotal 2 County Facility- PBF01 Heilmann Regional Park		0.0	44	2,396

Source(s):
- Reported by Department of General Services.

Bldg info:
102 acres (4,443,120)

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PDA01 Bob Jones Bike Trail				
Electricity	0	0.0	1	64
Subtotal 2 County Facility- PDA01 Bob Jones Bike Trail		0.0	1	64

Source(s):
- Reported by Department of General Services.

Notes:
- OPENED 09/07/2006

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PDA07 Avila Beach Park				
Electricity	1	0.0	19	951
Subtotal 2 County Facility- PDA07 Avila Beach Park	1	0.0	19	951

Source(s):
- Reported by Department of General Services.

Park info:
4004 operating hours
3 acres (130,680 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PEN02 Los Osos Park				
Electricity	5	0.0	81	3,041
Subtotal 2 County Facility- PEN02 Los Osos Park	5	0.0	81	3,041

Source(s):
- Reported by Department of General Services.

Facility info:
4756 operating hours
606 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PGC01 Shamel Park				
Electricity	1	0.0	11	705
Subtotal 2 County Facility- PGC01 Shamel Park	1	0.0	11	705

Source(s):
- Reported by Department of General Services.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PJB02 Paul Andrews Park				
Electricity	0	0.0	0	96
Subtotal 2 County Facility- PJB02 Paul Andrews Park		0.0	0	96

Source(s):
- Reported by Department of General Services.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Notes:
- No electricity usage since 2004. Meter bill.

Facility info:
1 acre (43,560 sq. ft.)

2 County Facility- PJB04 Cayucos Pier

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	19	1,372
Subtotal 2 County Facility- PJB04 Cayucos Pier	1	0.0	19	1,372

Source(s):
- Reported by Department of General Services.

Facility info:
4004 operating hours
19,924 sq. ft.

2 County Facility- PKC01 Hardie Park

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	11	680
Subtotal 2 County Facility- PKC01 Hardie Park	1	0.0	11	680

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours

2 County Facility- POB20 Nipomo Park

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	9	0.0	146	7,024
Subtotal 2 County Facility- POB20 Nipomo Park	9	0.0	146	7,024

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours
144 acres (6,272,640 sq. ft.)

2 County Facility- PPB28 Campground Oceano

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	14	0.0	231	6,435
Subtotal 2 County Facility- PPB28 Campground Oceano		0.0	231	6,435

Source(s):
- Reported by Department of General Services.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PPB29 Park Oceano				
Electricity	1	0.0	21	721
Subtotal 2 County Facility- PPB29 Park Oceano	1	0.0	21	721

Source(s):
- Reported by Department of General Services.

Park info:
8760 operating hours
12 acres (522,720 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PPD01 Oceano Airport Runway Lights				
Electricity	6	0.0	95	3,130
Subtotal 2 County Facility- PPD01 Oceano Airport Runway Lights		0.0	95	3,130

Source(s):
- Reported by Department of General Services.

Facility info:
4004 operating hours
1728 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTJ00 Cuesta Park				
Electricity	0	0.0	2	193
Subtotal 2 County Facility- PTJ00 Cuesta Park	0	0.0	2	193

Source(s):
- Reported by Department of General Services.

Facility info:
5 acres (217800 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport				
Electricity	17	0.0	272	8,616
Subtotal 2 County Facility- PTN10 Airport	17	0.0	272	8,616

Source(s):
- Reported by Department of General Services.

Bldg info:
8760 operating hours
57,507 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport Restaurants/Lights				
Electricity	2	0.0	32	1,421
Subtotal 2 County Facility- PTN10 Airport Restaurants/Lights		0.0	32	1,421

Source(s):
- Reported by Department of General Services.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport Runway Lights				
Electricity	49	0.1	795	27,045
Subtotal 2 County Facility- PTN10 Airport Runway Lights		0.1	795	27,045

Source(s):
- Reported by Department of General Services.

Site info:
4004 operating hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport Sign				
Electricity	0	0.0	5	315
Subtotal 2 County Facility- PTN10 Airport Sign	0	0.0	5	315

Source(s):
- Reported by Department of General Services.

Notes:
- 79-792 Unmetered agreement (Dave Clew).

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport Streetlights				
Electricity	4	0.0	61	3,867
Subtotal 2 County Facility- PTN10 Airport Streetlights		0.0	61	3,867

Source(s):
- Reported by Department of General Services.

Bldg info:
4004 operating hours

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PTN10 Airport Wind Cone				
Electricity	1	0.0	15	872
Subtotal 2 County Facility- PTN10 Airport Wind Cone		0.0	15	872

Source(s):
- Reported by Department of General Services.

Facility info:
4004 operating hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PUD15 Swimming Pool K St.				
Electricity	11	0.0	171	6,642
Subtotal 2 County Facility- PUD15 Swimming Pool K St.		0.0	171	6,642

Source(s):
- Reported by Department of General Services.

Facility info:
1,164 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PUE13 San Miguel Park				
Electricity	0	0.0	5	336
Subtotal 2 County Facility- PUE13 San Miguel Park	0	0.0	5	336

Source(s):
- Reported by Department of General Services.

Park info:
8760 operating hours
948 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PVA04 Park H St.				
Electricity	0	0.0	3	217
Subtotal 2 County Facility- PVA04 Park H St.	0	0.0	3	217

Source(s):
- Reported by Department of General Services.

Facility info:
4004 operating hours
2 acres (87120 sq. ft.)

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PY-02 Black Mountain				
Electricity	6	0.0	94	4,349
Subtotal 2 County Facility- PY-02 Black Mountain	6	0.0	94	4,349

Source(s):
- Reported by Department of General Services.

Bldg info:
8,760 operating hours
360 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PY01 Cuesta Peak				
Electricity	5	0.0	88	4,144
Subtotal 2 County Facility- PY01 Cuesta Peak	5	0.0	88	4,144

Source(s):
- Reported by Department of General Services.

Bldg info:
8760 operating hours
396 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PY05 San Antonio/Casmalia Peak				
Electricity	5	0.0	76	3,564
Subtotal 2 County Facility- PY05 San Antonio/Casmalia Peak		0.0	76	3,564

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PY08 Tassajara Peak				
Electricity	12	0.0	201	9,450
Subtotal 2 County Facility- PY08 Tassajara Peak	12	0.0	201	9,450

Source(s):
- Reported by Department of General Services.

Facility info:
8,760 operating hours
950 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PYA01 Biddle Park				
Electricity	6	0.0	90	4,221
Subtotal 2 County Facility- PYA01 Biddle Park	6	0.0	90	4,221

Source(s):
- Reported by Department of General Services.

Facility info:
8760 operating hours
47 acres (2,047,320 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Facility- PZB06 Shandon Park				
Electricity	17	0.1	276	9,823
Subtotal 2 County Facility- PZB06 Shandon Park	17	0.1	276	9,823

Source(s):
- Reported by Department of General Services.

Facility info:
8760 operating hours
12 acres (522,720 sq. ft.)

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Library- Creston				
Electricity	1	0.0	23	706
Subtotal 2 County Library- Creston	1	0.0	23	706

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
780 operating hours
960 sq. ft.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Library- San Luis Obispo				
Electricity	31	0.1	506	12,755
Subtotal 2 County Library- San Luis Obispo	31	0.1	506	12,755

Source(s):
- Data collected and received by Melody Mullis mmullis@co.slo.ca.us

Bldg info:
1976 operating hours
22814 sq. ft.

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- 1015 Kansas Ave. SLO				
Electricity	0	0.0	0	0
Subtotal 2 Public Works- 1015 Kansas Ave. SLO	0	0.0	0	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. # 2254125769

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Arroyo Grande Rd. Yard				
Electricity	5	0.0	74	0
Subtotal 2 Public Works- Arroyo Grande Rd. Yard	5	0.0	74	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- House at Salinas Dam				
Electricity	3	0.0	43	0
Subtotal 2 Public Works- House at Salinas Dam	3	0.0	43	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #7032991513

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Op Center, SLO				
Electricity	16	0.0	259	0
Subtotal 2 Public Works- Op Center, SLO	16	0.0	259	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. # 2970528278

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Paso Robles Rd. Yard				
Electricity	8	0.0	123	0
Subtotal 2 Public Works- Paso Robles Rd. Yard	8	0.0	123	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Santa Margarita Maint. Yard				
Electricity	3	0.0	52	0
Subtotal 2 Public Works- Santa Margarita Maint. Yard		0.0	52	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. # 7032991513

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Section 3 Road Yard, SLO				
Electricity	7	0.0	115	0
Subtotal 2 Public Works- Section 3 Road Yard, SLO		0.0	115	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- South Bay Dial-a-Ride Office				
Electricity	1	0.0	21	0
Subtotal 2 Public Works- South Bay Dial-a-Ride Office		0.0	21	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Trailer Office, 2285 Turri Rd. Los Osos				
Electricity	0	0.0	0	0
Subtotal 2 Public Works- Trailer Office, 2285 Turri Rd. Los Osos		0.0	0	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 Public Works- Trailer, Carrisa Plains				
Electricity	0	0.0	7	0
Subtotal 2 Public Works- Trailer, Carrisa Plains	0	0.0	7	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. #2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Buildings	4,972	14.6	83,606	2,171,989

Vehicle Fleet

San Luis Obispo County, CA

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 APCD Fleet				
Gasoline	22	0.1	286	0
Subtotal 1 APCD Fleet	22	0.1	286	0

Source(s):
Fleet data collected at APCD looking through gas purchases from gas card bills and vehicle logs.
Contact- Melisa Guise, APCD Planner

Notes:
- Most gas is purchased from gas credit card at regular pump stations; occasionally fill up at County gas pump, but this is minimal.
- All gas purchased is unleaded

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 Cal Fire (County) Fleet				
Gasoline	18	0.1	230	0
Diesel	81	0.2	1,033	0
Subtotal 1 Cal Fire (County) Fleet	99	0.3	1,263	0

Source(s):
- Data provided by Eric Cleveland Battalion Chief of Support Services, County Cal Fire.
Contact info: 805-543-4244- eric.cleveland@fire.ca.gov

Notes:
- Diesel is used only for Fire Engines.
- Gasoline used for trucks.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 County Fleet (General Services)				
Gasoline	3,014	8.9	38,877	0
Diesel	148	0.4	1,874	0
Subtotal 1 County Fleet (General Services)	3,162	9.3	40,751	0

Source(s):
- Reported by General Services Transportation division.
- Contacts- Ken Tasseff, Deputy Director, 781-5207
Toni fisher, 781-5931- Collected data
Spence Grafft, 788-2459

Notes:
- Vehicles seperated into different vehicle types and fuel type.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
1 Library Fleet				
Gasoline	22	0.1	286	6,979
Diesel	58	0.2	739	6,379
Subtotal 1 Library Fleet	80	0.2	1,025	13,358

Source(s):
- Library fleet data received by Melody Mullis of SLO County Library.

Notes:
- Used data from 2007-08. Assumed similar usage in 2006, as the same vehicles were used in 2006 as they were in 07-08.
- The diesel "transit bus" is the book mobile.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Vehicle Fleet	3,363	9.9	43,325	13,358

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Employee Commute				
San Luis Obispo County, CA				
3 Employee Commute				
Gasoline	25,169	74.1	355,393	
Diesel	88	0.3	1,046	
Subtotal 3 Employee Commute	25,257	74.4	356,439	

Source(s):
- Employee commute survey, conducted in July 2008 and adjusted for 2006 employment figures. Survey data obtained from Gary Hicklin, PMP, Technology Supervisor, Ciounty of San Luis Obispo GSA - Information Technology, ghicklin@co.slo.ca.us.
- July 2006, 2007, and 2008 County employment figures obtained from James Caruso, Senior Planner, jcaruso@co.slo.ca.us on March 6, 2008.
- Hybrid fuel economy of a 2006 Toyota Prius, www.fueleconomy.gov

Notes:
- 1,260 County employees successfully responded to the online survey, meaning that all essential entries were given. This is approximately a 50% response rate.
- Survey responses were adjusted for the 2006 employee population, assuming constant distribution of gasoline/diesel consumption by vehicle type. The population of hybrid cars was decreased by 2/3, based on California sales records found at hybridcars.com.
- For more detailed information on the methodology used in this sector, please see the appendices.

Subtotal Employee Commute	25,257	74.4	356,439	
Streetlights				
San Luis Obispo County, CA				
2 County Streetlights				
Electricity	48	0.1	777	0
Subtotal 2 County Streetlights	48	0.1	777	0

Source(s):
- Reported by Public Works.
Contact- Mark Hutchinson, Environmental Programs Manage- mhutchinson@co.slo.ca.us
Annette Young- ayoung@co.slo.ca.us

Notes:
- KWH for 38 streetlights.

2 County Traffic Signals				
Electricity	15	0.0	240	0
Subtotal 2 County Traffic Signals	15	0.0	240	0

Source(s):
- Reported by Department of Public Works.

Notes:
- KWH for 20 Traffic Signals.

Government Greenhouse Gas Emissions in 2006
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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Streetlights	63	0.2	1,017	0

Water/Sewage

San Luis Obispo County, CA

2 County Water Facility- 1675 Cabrillo, Cayucos Water Trmt Plant

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	52	0.2	833	0
Subtotal 2 County Water Facility- 1675 Cabrillo, Cayucos Water Trmt Plant		0.2	833	0

Source(s):
- Reported by Public Works.

- System serves County of SLO
Acct.# 2970528278

2 County Water Facility- 2845 Lopez Dr.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	15	0
Subtotal 2 County Water Facility- 2845 Lopez Dr.	1	0.0	15	0

Source(s):
- Reported by Public Works.

- System serves Flood Control
Acct.# 2970528278

2 County Water Facility- 9825 Estrada Santa Marg.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	11	0.0	175	0
Subtotal 2 County Water Facility- 9825 Estrada Santa Marg.		0.0	175	0

Source(s):
- Reported by Public Works.

- System serves County of SLO
Acct.# 2970528278

2 County Water Facility- Frady Rd Rectifier

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	2	0
Subtotal 2 County Water Facility- Frady Rd Rectifier	0	0.0	2	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- G St., Santa Margarita Pump				
Electricity	10	0.0	164	0
Subtotal 2 County Water Facility- G St., Santa Margarita Pump		0.0	164	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Hwy 101 Pump				
Electricity	139	0.4	2,235	0
Subtotal 2 County Water Facility- Hwy 101 Pump	139	0.4	2,235	0

Source(s):
- Reported by Public Works.

System serves City of SLO
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Lopez Dam Intake Bldg				
Electricity	0	0.0	3	0
Subtotal 2 County Water Facility- Lopez Dam Intake Bldg		0.0	3	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Lopez Dam, 4304 Lopez Dr.				
Electricity	0	0.0	7	0
Subtotal 2 County Water Facility- Lopez Dam, 4304 Lopez Dr.		0.0	7	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Meter Station, Belllo				
Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- Meter Station, Belllo		0.0	0	0

Source(s):
- Reported by Public Works.

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

System serves Flood Control
Acct.# 2970528278

2 County Water Facility- Meter Station, Brisco Rd.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- Meter Station, Brisco Rd.		0.0	0	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

2 County Water Facility- Meter Station, Crown Hill & Huasna

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- Meter Station, Crown Hill & Huasna		0.0	0	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

2 County Water Facility- Meter Station, Oak Park Blvd

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	23	0
Subtotal 2 County Water Facility- Meter Station, Oak Park Blvd		0.0	23	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

2 County Water Facility- Meter Station, Vista Del Mar

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- Meter Station, Vista Del Mar		0.0	0	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Orcutt Rd North of Lopez Dr.				
Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- Orcutt Rd North of Lopez Dr.		0.0	0	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Pozo Rd Pump				
Electricity	6	0.0	99	0
Subtotal 2 County Water Facility- Pozo Rd Pump	6	0.0	99	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

System serves City of SLO
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Pump House, Cayucos				
Electricity	0	0.0	2	0
Subtotal 2 County Water Facility- Pump House, Cayucos		0.0	2	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County Water Facility- Pump Well, Center St., Shandon				
Electricity	9	0.0	140	0
Subtotal 2 County Water Facility- Pump Well, Center St., Shandon		0.0	140	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

2 County Water Facility- reservoir Panel, Park Ave., Cayucos

Electricity	0	0.0	0	0
Subtotal 2 County Water Facility- reservoir Panel, Park Ave., Cayucos		0.0	0	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

2 County Water Facility- Turri Rd Monitoring Equipment

Electricity	9	0.0	153	0
Subtotal 2 County Water Facility- Turri Rd Monitoring Equipment		0.0	153	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

2 County Water Facility- Water Tank Pipeline, Kings Ave., Morro Bay

Electricity	0	0.0	2	0
Subtotal 2 County Water Facility- Water Tank Pipeline, Kings Ave., Morro Bay			2	0

Source(s):
- Reported by Public Works.

System serves Flood Control
Acct.# 2970528278

2 County Water Facility- Water Well, Cabrillo Ave., Cayucos

Electricity	2	0.0	28	0
Subtotal 2 County Water Facility- Water Well, Cabrillo Ave., Cayucos		0.0	28	0

Source(s):
- Reported by Public Works.

System serves County of SLO
Acct.# 2970528278

2 County Water Facility- Well #3, Shandon

Electricity	10	0.0	167	0
Subtotal 2 County Water Facility- Well #3, Shandon	0	0.0	167	0

Source(s):
- Reported by Public Works.

Government Greenhouse Gas Emissions in 2006
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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

System serves County of SLO
Acct.# 6551914431

2 County WW Facility- 2167 Ridge Rider Rd. Treatment Ponds

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	22	0.1	354	0
Subtotal 2 County WW Facility- 2167 Ridge Rider Rd. Treatment Ponds		0.1	354	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

2 County WW Facility- 2176 Ridge Rider Rd. Treatment Plant

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	8	0.0	131	0
Subtotal 2 County WW Facility- 2176 Ridge Rider Rd. Treatment Plant		0.0	131	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

2 County WW Facility- Crestmont Lift Pump

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	1	0.0	16	0
Subtotal 2 County WW Facility- Crestmont Lift Pump		0.0	16	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

2 County WW Facility- Galaxy, Nipomo, Sewer Pump

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	4	0.0	69	0
Subtotal 2 County WW Facility- Galaxy, Nipomo, Sewer Pump		0.0	69	0

Source(s):
- Data reported by Mark Hutchinson, Environmental Programs Manager, Department of Public Works mhutchinson@co.slo.ca.us.
- Data collection assistance- Annette Young, Public Works, ayoung@co.slo.ca.us

Acct. # 2970528278

Government Greenhouse Gas Emissions in 2006
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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Greystone Sewer Treatment Plant				
Electricity	70	0.2	1,132	0
Subtotal 2 County WW Facility- Greystone Sewer Treatment Plant		0.2	1,132	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Kathy Lift Pump				
Electricity	3	0.0	42	0
Subtotal 2 County WW Facility- Kathy Lift Pump	3	0.0	42	0

Source(s):
- Reported by Public Works.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Lift Station #1, Oakshores				
Electricity	0	0.0	2	0
Subtotal 2 County WW Facility- Lift Station #1, Oakshores		0.0	2	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Lift Station #2, Oakshores				
Electricity	1	0.0	9	0
Subtotal 2 County WW Facility- Lift Station #2, Oakshores		0.0	9	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Lift Station #4, Oakshores				
Electricity	0	0.0	3	0
Subtotal 2 County WW Facility- Lift Station #4, Oakshores		0.0	3	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

Government Greenhouse Gas Emissions in 2006
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	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Lift Station #5, Oakshores				
Electricity	0	0.0	4	0
Subtotal 2 County WW Facility- Lift Station #5, Oakshores		0.0	4	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Lift Station #6, Oakshores				
Electricity	0	0.0	4	0
Subtotal 2 County WW Facility- Lift Station #6, Oakshores		0.0	4	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Los Ranchos Lift Station				
Electricity	5	0.0	78	0
Subtotal 2 County WW Facility- Los Ranchos Lift Station		0.0	78	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Madbury Lift Pump				
Electricity	2	0.0	37	0
Subtotal 2 County WW Facility- Madbury Lift Pump	2	0.0	37	0

Source(s):
- Reported by Public Works.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
2 County WW Facility- Oakshores Disposal Area				
Electricity	32	0.1	523	0
Subtotal 2 County WW Facility- Oakshores Disposal Area		0.1	523	0

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Source(s):
- Reported by Public Works.

Acct.#2970528278

2 County WW Facility- Oakshores Effluent Pumps

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	8	0.0	128	0
Subtotal 2 County WW Facility- Oakshores Effluent Pumps		0.0	128	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

2 County WW Facility- Sebastian Way Sewer Pump, Nipomo

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity	5	0.0	75	0
Subtotal 2 County WW Facility- Sebastian Way Sewer Pump, Nipomo		0.0	75	0

Source(s):
- Reported by Public Works.

Acct.#2970528278

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Water/Sewage	413	1.2	6,659	0

Waste

San Luis Obispo County, CA

County Solid Waste — *Disposal Method - Managed Landfill*

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Paper Products	152	0.4		0
Food Waste	50	0.1		0
Plant Debris	22	0.1		0
Wood/Textiles	40	0.1		0
Subtotal County Solid Waste	265	0.8		0

Source(s):
- County solid waste data provided by David Clew, County of San Luis Obispo Utility Coordinator, dclew@co.slo.ca.us, (805) 781-5221.

Notes:
- Landfill solid waste composition provided by the California Integrated Waste Management Board, Waste Characterization Report (2004) http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Waste	265	0.8		0

Other

San Luis Obispo County, CA

1 Misc. Equipment- Golf Course Facilities

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Nitrous Oxide	1	0.0		
Subtotal 1 Misc. Equipment- Golf Course Facilities	1	0.0		

Source(s):
- Data received by General Services. Contact- Dave Clue

Notes:
- Data given in gallons used and cost. Used Table G.11 from CARB Local Goverment Operations Protocal (August 2008) for conversion factor. Used other small/large utility (gasoline)= .22 g/ gallon fuel; other large utility (diesel) = .26 g/ gallon fuel.
- Equipment reported includes:

15 riding motors (some stationary diesel)
3 sprayers
12 utility carts
1 sweeper
1 walk behind mower
dump truck
1 aerial lift
6 small pickups
1 full-sized pickup
6 tractors (stationary diesel)
1 brush clipper (stationary diesel)

1 Misc. Equipment- Park Facilities

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Nitrous Oxide	0	0.0		
Subtotal 1 Misc. Equipment- Park Facilities	0	0.0		

Source(s):
- Data received by General Services. Contact- Dave Clue

Notes:
- Data given in gallons used and cost. Used Table G.11 from CARB Local Goverment Operations Protocal (August 2008) for conversion factor. Used other small/large utility (gasoline)= .22 g/ gallon fuel; other large utility (diesel) = .26 g/ gallon fuel.
- Equipment used for County parks includes (23 categories):

38 Chainsaws
28 Blowers
36 Line Trimmers
1 Cement Mixer
1 Chemical Pump
1 fire truck pump
14 push mowers
3 pressure washers
1 power auger
3 gas drills
1 pressure washer with heal element (stationary diesel)
14 hedge trimers
9 edgers

Government Greenhouse Gas Emissions in 2006
Detailed Report

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

4 pole saws
2 generators
2 log splitters
1 auger
1 jackhammer
1 vaccum
2 golf carts
3 spray rigs
1 rototiller
2 aerators

1 Misc. Equipment- Unknown gen. services equipment

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Nitrous Oxide	1	0.0		
Subtotal 1 Misc. Equipment- Unknown gen. services equipment		0.0		

Source(s):
- Data received by General Services. Contact- Dave Clue

Notes:
- Data given in gallons used and cost. Used Table G.11 from CARB Local Goverment Operations Protocal (August 2008) for conversion factor. Used other small/large utility (gasoline)= .22 g/ gallon fuel; other large utility (diesel) = .26 g/ gallon fuel.

	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Other	2	0.0		
Total	34,335	101.1	491,045	2,185,347

APPENDIX 2C: DETAILED METHODOLOGY FOR COMMUNITY-WIDE INVENTORY

Detailed Methodology for Community-Wide Inventory

The following is a detailed explanation of data sources and methodology for calculating greenhouse gas (GHG) emissions in each sector of the community-wide analysis. The purpose of this appendix is to prove legitimacy of this Inventory, outline data limitations, and give guidance for future County inventories to maintain methodological consistency.

ELECTRICITY AND NATURAL GAS

Note: *We attempted to collect energy production/consumption data besides that from natural gas and electricity such as propane, solar, and wind, however the data was to unreliable to make an estimate. As an example, we were only able to gather the number of solar arrays permitted by the County in 2006 and not the total number of solar arrays in the County.*

Residential

PG&E and Southern California Gas Company provided residential electricity and natural gas consumption data. Specifically, data was provided by:

Jeremy Howard, Account Executive with PG&E (805-595-6430)

Colby Morrow, Southern California Gas Company & San Diego Gas and Electric Company Air Quality Manager, Customer Programs Environmental Affairs (559-324-0109)

The raw data received from these sources is summarized in the chart below. This raw data was inputted into the CACP software in kWh and therms. CACP Average Grid Electricity, RCI Average, and Fuel CO_2 coefficient sets were amended per PG&E and State guidance (see ‘electricity and natural gas coefficients’ section).

2006 Residential Energy Emissions	Input Data	Metric Tons CO_2e per year
PG&E Electricity	309,596,296 kWh	65,514
PG&E Natural Gas	149,932 Therms	798
Southern CA Gas Co. Natural Gas	12,496,649 Therms	70,055

Commercial / Industrial

Commercial and industrial electricity and natural gas were combined into one section due to the California 15/15 Rule. The 15/15 Rule was adopted by the California Public Utilities Commission (CPUC) in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 Rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers. A single customer's load must be less than 15 percent of an assigned category. If the number of customers in the complied data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released. The Rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened already using the 15/15 Rule, the customer must be dropped from the information provided.[1]

As a result, PG&E reports for commercial energy consumption also contained industrial consumption. Southern California Gas Company separated commercial and industrial gas usage (shown in the chart below); however, it would have been misleading for an 'Industrial' category to include only these gas emissions; therefore, the Southern CA Gas Company emissions were aggregated with commercial as well.

Data for this sector was provided by:

Jeremy Howard, Account Executive with PG&E (805-595-6430)

Colby Morrow, Southern California Gas Company & San Diego Gas and Electric Company Air Quality Manager, Customer Programs Environmental Affairs (559-324-0109)

Raw data received from these sources is reflected in the table below. CACP Average Grid Electricity, RCI Average, and Fuel CO_2 Coefficient Sets were amended to reflect California standards (See 'electricity and natural gas coefficients' section).

2006 Commercial / Industrial Energy Emissions	**Scope**	**Input Data**	**Metric Tons CO_2e per year**
PG&E Commercial + Industrial Natural Gas	1	215057 Therms	1,144
PG&E Commercial + Industrial Electricity	2	323,627,500 kWh	68,483
SoCal Gas Co. Commercial Natural Gas	1	12,881,770 Therms	72, 214
SoCal Gas Co. Industrial Natural Gas	1	13,224,305 Therms	74,135

[1] This information was provided by Corie Cheeseman, Program Manager with Pacific Gas and Electric Company - Customer Energy Efficiency, 415-973-4999.

Electricity and Natural Gas Coefficients

Electricity and natural gas coefficients are defaulted to national averages in the CACP software. To make the Inventory more accurate and representative of the county's real impact on climate change, tailored coefficient sets for California were obtained. Sources and coefficient values are summarized in the table below.

Average Grid Electricity Set	Unit	CO_2	N_2O	CH_4
PG&E California, 2006	Lbs / MWh	455.81	0.032799794	0.025804

Source: Howard, Jeremy. Account Executive. Pacific Gas and Electric Co. (805.595-6430)

Marginal Grid Electricity Set
13-Western Systems Coordinating Council/CNV

Source: Coefficient set provided by CACP

Average CHP Heat Set
USA total

Source: coefficient set provided by CACP

RCI Average Set		Units	N_2O	CH_4
California Coefficients for Natural Gas*				
Natural Gas	Commercial	kg/mmbtu	0.0001	0.0059
Natural Gas	Industrial	kg/mmbtu	0.0001	0.0059
Natural Gas	Residential	kg/mmbtu	0.0001	0.0059

Source: The "California Coefficients for Natural Gas" coefficient set is based on a PG&E eCO_2 emissions factor of 53.05 kg/MMBtu of delivered natural gas, certified by the California Climate Action Registry and the CEC, and was reported to ICLEI in Dec 2007 by Jasmin Ansar. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

Fuel CO_2 Set	Unit	CO_2 Coefficient
PG&E and CEC Emission Factor for Natural Gas*	Lbs / therm	11.695523

Source: custom coefficient set created by Ayrin Zahner, ICLEI Program Associate, per coefficients provided by CCAR. Only use for PG&E natural gas, not for SoCal Gas Co or other natural gas providers. The "California Coefficients for Natural Gas" coefficient set is based on a PG&E eCO_2 emissions factor of 53.05 kg/MMBtu of delivered natural gas, certified by the California Climate Action Registry and the CEC, and was reported to ICLEI in Dec 2007 by Jasmin Ansar. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

TRANSPORTATION

Community On-Road VMT

Community on-road vehicle miles traveled (VMT) are miles on locally maintained roads within the unincorporated county. State roads, highways, and interstate routes are not included in this calculation. Local VMT data was obtained from the Caltrans Highway Performance Maintenance System (HPMS) 2006 Report.[2] The raw data obtained from this report is reflected in the table below.

CALTRANS HPMS DATA FOR SAN LUIS OBISPO COUNTY, 2006

County	Jurisdiction	Maintained Miles			Daily Vehicle Miles of Travel (DVMT) (1,000)		
		Rural	Urban	Total	Rural	Urban	Total
San Luis Obispo							
Cities:	Arroyo Grande	0	58.52	58.52	0	200.7	200.7
	Atascadero	4.36	147.29	151.65	1.86	336.32	338.18
	Grover Beach	0	46.96	46.96	0	105.61	105.61
	Morro Bay	0	49.51	49.51	0	115.77	115.77
	Paso Robles	6.55	112.82	119.37	3.89	203.16	207.05
	Pismo Beach	0	45.47	45.47	0	64.25	64.25
	San Luis Obispo	0	121.08	121.08	0	433.36	433.36

[2] 2006 HPMS Data, http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2006PRD.pdf

CALTRANS HPMS DATA FOR SAN LUIS OBISPO COUNTY, 2006

County	Jurisdiction	Maintained Miles			Daily Vehicle Miles of Travel (DVMT) (1,000)		
		Rural	Urban	Total	Rural	Urban	Total
Other:	County (unincorporated)	1,006.33	315.16	1,321.49	773.19	448.12	1,221.31
	State Highway	276.06	87.83	363.89	2,503.50	2,853.60	5,357.10
	State Park Service	20.56	1.7	22.26	1.85	5.78	7.63
	US Forest Service	42.5	0	42.5	1.28	0	1.28
SAN LUIS OBISPO Total		**1356.36**	**986.34**	**2,342.71**	**3285.57**	**4766.67**	**8052.24**

The rural and urban daily vehicle miles of travel (DVMT) were then converted to annual VMT by multiplying by 365 days/year. The HPMS DVMT average includes lessened travel on weekends, which means this methodology is appropriate.

CALTRANS HPMS DATA ADJUSTED FOR ANNUAL VMT PER JURISDICTION , 2006

City	Community On-Road Annual VMT
Arroyo Grande	73,255,500
Atascadero	123,435,700
Grover Beach	38,547,650
Morro Bay	42,256,050
Paso Robles	75,573,250
Pismo Beach	23,451,250
San Luis Obispo	158,176,400
Unincorporated County	445,778,150
Total	980,474,000

Highway VMT

Highway VMT is also given in the Caltrans HPMS report, however it is aggregated by county and not separated by jurisdiction. As such, we calculated unincorporated county VMT by determining the portion of total highway road segments in unincorporated areas versus incorporated. This was done using Geographic Information Systems (GIS) to clip a map of highway roads in the county by jurisdictional boundary. The analysis concluded that 84.57% of total state and federal highways and roads are included in unincorporated county areas. Using this as an indicator of VMT, we concluded that approximately 1,653 million VMT occurred in unincorporated areas in 2006. This methodology of distributing VMT by road segment length is supported by ICLEI; however, it does assume constant levels of traffic along all roads within the county. The levels of traffic along each road segment in each jurisdiction are unavailable, therefore this methodology is the best available at this time.

This analysis includes the following State Routes:

- US 101
- SR 1
- SR 33
- SR 41
- SR 46
- SR 58
- SR 166
- SR 227

City	Highway maintained miles	Percentage of total maintained highway miles	Highway VMT Annual Totals per jurisdiction
Arroyo Grande	4.3683	1.2147%	23,752,263.77
Atascadero	15.4372	4.2927%	83,937,892.74
Grover Beach	0.9577	0.2663%	5,207,397.79
Morro Bay	5.7539	1.6000%	31,286,318.52
Paso Robles	10.6936	2.9737%	58,145,210.13
Pismo Beach	7.8788	2.1909%	42,840,275.46
San Luis Obispo	10.3831	2.8873%	56,456,745.41
Unincorporated County	304.1360	84.5739%	1,653,707,711.16
Total	359.61	99.9996%	1,955,333,814.98

Transportation Coefficients

By default, the CACP software uses a national average distribution of vehicles by type (passenger vehicle, light truck, heavy truck, etc), national average fuel economies per vehicle type (miles per gallon), and national average emissions coefficients. In order to provide an accurate assessment of the emissions within the county, we obtained county-specific emissions data from the California Air Resources Board EMissions FACtors (EMFAC) software. The

EMFAC2007 model calculates emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. In the EMFAC model, the emission rates are multiplied with vehicle activity data provided by the regional transportation agencies to calculate the statewide or regional emission inventories.

The EMFAC analysis was performed by the California Air Resources Board for the county. Specifically, the data was provided by:

- Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, Tscheffe@arb.ca.gov

This data was then manipulated to fit the format of CACP, which uses different vehicle classification categories than EMFAC. For instance, CACP defines "heavy duty truck" as trucks with a gross vehicle weight of over 8,000 pounds, which includes EMFAC classifications for Light Heavy-Duty Trucks (LHDT) 1, LDHT 2, Medium Heavy-Duty Trucks (MHDT), and Heavy Heavy-Duty Trucks (HHDT). Also, for simplicity in re-running this analysis for future Inventories, tailored coefficients and VMT distributions were only applied to five vehicle types, which included the following EMFAC vehicle classifications:

1) **Heavy truck:** LHDT1, LHDT2, HHDT, OB, MHDT
2) **Light truck/SUV/Pickup:** Medium-Duty Truck (MDT)
3) **Passenger Vehicle:** Passenger Car, Light-Duty Truck 1 (LDT1), Light-Duty Truck 2 (LDT2), Motor Home (MH)
4) **Transit Bus:** Urban Bus (UB), School Bus (SB)
5) **Motorcycle:** Motorcycle (MC)

For each of the five vehicle classes above, a weighted average was calculated using the EMFAC coefficients and their portion of total vehicle miles traveled.

WASTE

The methane commitment method embedded in CACP is based on the EPA's WARM model for calculating lifecycle emissions from waste generated within the jurisdictional boundary of the county in 2006. The analysis does not use the waste-in-place method, which calculates emissions from all waste generated in 2006 *and* all waste already existing in the landfill before the baseline year.

The waste sector only takes into account the waste sent to landfill from county residents, businesses, and institutions. It does not calculate emissions from the total amount of waste sent to County landfills (Paso Robles, Cold Canyon, and Chicago Grade) in 2006 since those landfills accept waste from other counties and incorporated cities.

Additionally, this analysis does not take into account sewage waste. At this time, there is no methodology for calculating a jurisdiction's portion of emissions from a wastewater treatment facility. Additionally, the County does not currently track the number or capacity of active private septic systems. Population is not a viable factor for distributing treatment plant emissions among jurisdictions as different cities have different production rates and water conservation practices or regulations.

Solid waste tonnage data per jurisdiction was provided by:

"2006 Disposal Report" by quarter, prepared by the San Luis Obispo Integrated Waste Management Board on 3/6/07. Document provided by Tom Martin, Waste Connections, Inc. (tmartin@wasteconnections.com).

And, since the composition of waste sent to landfill in 2006 is unknown for the county, we used a statewide average waste composition provided by:

CIWMB 2004 Statewide Waste Characterization Study,
http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097.

The waste characterization study's distribution of waste by type was then converted into the five categories included in the CACP software, which resulted in the following waste characterization:

- Paper Products: 20.5%
- Food Waste: 12%
- Plant Debris: 9.3%
- Wood/Textiles: 19.2%
- All other waste: 39%

The CACP software does not have the ability to assign an individual methane recovery factor to each landfill, therefore we took a weighted average (58%) based on the portion of waste in each landfill. The landfills have the following methane recover factors:

Methane recovery and indicator inputs, 2006	Methane Recovery	Total gas generated (mmcf/yr)	Total gas transferred (mmcf/yr)	Data Source	Waste Tonnage from County, 2006 (tons)
Chicago Grade	60%	170.21	102.13	Data from APCD 2006 Inventory, Gencalc. Received from Courtney Ward on 10/1/08	26,348
Cold Canyon	60 %	763.1	457.84	Data from APCD 2006 Inventory, Gencalc. Received from Courtney Ward - trklst06	64,138
Paso Robles	50%	144.48	72.24	Data from APCD 2006 Inventory, Gencalc. Received from Courtney Ward - trklst06	14,487

Other- Cattle and Sheep

Emissions were estimated using the number of cattle, calves, and sheep from the San Luis Obispo County Department of Agriculture 2006 Crop Report.[3] The report stated that there were 95,000 heads of cattle and calves and 6,210 heads of sheep in San Luis Obispo in 2006. Half of these cattle are in the county year-round and half are only in the county 50% of the year.

Cattle and sheep emit methane through a digestive process that is unique to ruminant animals called enteric fermentation.[4] Their manure also accounts for a smaller release of methane into the atmosphere. Emissions from cattle are not a built-in function of CACP; however, they were included in this inventory because they are a significant contributor to the county's inventory. Livestock and sheep emissions were calculated outside of CACP and then inputted into the software in the 'other' category. Methane emissions coefficients were obtained from the Intergovernmental Panel on Climate Change (IPCC) 2006 Guidelines for National Greenhouse

[3] San Luis Obispo County Crop Report 2006, http://www.slocounty.ca.gov/Page9918.aspx

[4] US EPA, Ruminant Livestock FAQ, http://www.epa.gov/rlep/faq.html

Gas Inventories, as shown below.[5] Since there are no dairies in San Luis Obispo, all of the cattle were assumed to be in the 'other/meat' category.

Methane emissions coefficients from cattle and sheet, Tier 1, 2006	Cattle in the other/meat category (kg CH_4/head/year)	Sheep (kg CH_4/head/year)
Enteric Fermentation	53	8
Manure Management	2	0.28[6]

Other – Off-road agricultural equipment

Off-road agricultural equipment emissions were calculated using the OFFROAD2007 modeling software developed by the California Air Resources Board. The tool calculates total emissions per off-road category per emission type (CH_4, N_20, CO_2, etc) for the entire county, including incorporated and unincorporated areas.

To separate the aggregate 2006 emissions outputs for off-road agricultural equipment in the County, we used agriculture and crop GIS shape files[7] provided by the County. These shape files were clipped with the jurisdictional boundaries within the county by PMC to yield the following results:

Ag land and off-road ag equipment emissions per jurisdiction, 2006	Ag/OS (acres)	% of total	N_2O (tons/yr)	CH_4 (tons/yr)	CO_2 (tons/yr)
Arroyo Grande	365.10	0.11%	0.0010	0.0156	79.6520
Atascadero	740.20	0.23%	0.0020	0.0316	161.4857
Grover Beach	287.10	0.09%	0.0008	0.0123	62.6352
Morro Bay	1,040.80	0.32%	0.0027	0.0445	227.0661
Paso Robles	2,517.50	0.78%	0.0067	0.1075	549.2303

[5] IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Livestock, http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_Ch10_Livestock.pdf

[6] For Sheep in temperate average temperatures (15-25 degrees C)

[7] The County agriculture and crop GIS data was published in September 2007

Ag land and off-road ag equipment emissions per jurisdiction, 2006	Ag/OS (acres)	% of total	N_2O (tons/yr)	CH_4 (tons/yr)	CO_2 (tons/yr)
Pismo Beach	119.90	0.04%	0.0003	0.0051	26.1580
San Luis Obispo	311.20	0.10%	0.0008	0.0133	67.8929
Unincorporated	317,226.40	98.33%	0.8381	13.5494	69,207.6810
Total	322,608.20	100.00%	0.852313918	13.7793	70381.80107

The OFFROAD software calculates emissions from other sources of off-road equipment as well, including recreational vehicles and watercrafts, however these emissions were not included because there was no feasible methodology for separating these emissions per jurisdiction within the county. Population is proven to not be an accurate indicator of consumption rates. To remain consistent with protocol and practice, emissions must be separated in a spatial manner, similar to how highway emissions are determined by road segment length within each jurisdiction. It should also be noted that many location-sources of off-road emissions, such as recreational vehicle emissions, occur in State Parks or Beaches outside of the jurisdiction of each city or the county.

Other - Aircrafts

Aircraft travel was calculated by Courtney Ward in an engineering report prepared for the Air Pollution Control District in 2007 (**Appendix 2E**). This emission category accounts for all aircraft exhaust emissions, excluding agricultural crop dusting. The operating emissions considered were those that occur in San Luis Obispo County below 3,000 ft., the average mixing depth in the U.S., which is also the assumed inversion height. Data for the report was obtained from the San Luis County Airport, Paso Robles Municipal Airport, and Oceano Municipal Airport (references cited in report).

The emissions calculated in the engineering report are CO, HC, VOC, NOx, Sox, PM10, and PM2.5. However, since only CH_4, N_20, and CO_2 are included in the CACP calculation of CO_2 equivalent, the emissions from aircraft takeoffs and landings are not shown as a source of emissions in this report.

2020 FORECAST

The 2020 forecast calculates business-as-usual growth based on population, job, and household growth rates. Employment and population growth rates were obtained from the San Luis Obispo Council of Governments report, "Long Range Socio-Economic Projections (Year 2030)" prepared by Economic Research Associates (ERA) in May 2006, Revised July 2006. Mid-range estimates of growth were used in both instances (Figures 16 and 31). The population growth rates were calculated using US census data adjusted by the County for use in their General Plan update.

It should be noted that this forecast does not take into consideration any planned or actual efficiency or conservation measures after 2006. For example, the State Renewable Energy portfolio has advanced significantly since 2006, but the forecast calculates 2020 energy emissions by assuming constant emissions factors.

APPENDIX 2D: DETAILED METHODOLOGY FOR COUNTY GOVERNMENT OPERATIONS INVENTORY

Detailed Methodology for County Government Operations GHG Emissions Inventory

The detailed methodology for County government operations is much less complex than the community-wide methodology explanation. Since the County government operations GHG emissions inventory is a facility-scale study, data records are much more reliable and consistent. In addition, the availability of the Local Government Operations Protocol gives us a verified guide for calculating emissions in each sector.

BUILDING

The building sector includes all emissions from natural gas and electricity consumed in County-owned and –operated facilities. It also includes emissions from propane use reported by a few buildings. The kWh of electricity, therms of natural gas, and US gallons of propane were then entered into the CACP software where they were converted to CO_2e. For a complete list of buildings included in this sector, please see the detailed CACP report in **Appendix 2B**.

The building sector used the PG&E verified Average Grid Electricity Set and the CEC Emission Factor for Natural Gas RCI Average Set, as defined in **Appendix 2C**. The analysis did not use the PG&E natural gas coefficient for the fuel CO_2 set because natural gas largely comes from the Southern California Gas Company.

VEHICLE FLEET

The vehicle fleet sector includes gasoline and diesel vehicles from the following County departments:

- Air Pollution Control District (APCD)
- County Cal Fire
- General Services
- Library Fleet (book mobile)
- Public Works

Gasoline and diesel consumption for calendar year 2006 was obtained from billing records. Specific sources of data within each organization are outlined in the notes of **Appendix 2B**.

For the vehicle fleet, we used the default coefficients for gasoline and diesel included in the CACP software. It is likely that using the County EMFAC coefficients would have significantly skewed the numbers under such a micro-scale inventory. The EMFAC coefficients, described in

Appendix 2C, are weighted averages per multiple vehicle types, which are appropriate and more accurate for a large number of vehicles, but not on the scale of a vehicle fleet.

EMPLOYEE COMMUTE

Employees were surveyed in July 2008 through an online system run by the County. The questions, attached as **Appendix 2F**, asked employees about their current commuting patterns. Of those questions, we used the following for our analysis:

- What is your approximate one-way distance to work?
- How has your commute behavior changed in the past 2 years?
- What type of transportation do you take to work each week? Please indicate the number of days for each type of transportation that you use during an average work week. Choices:
    - Drive alone
    - Carpool
    - Vanpool
    - Public transit
    - Motorcycle
    - Bicycle
    - Walk
    - Telecommute
    - Other
- If you drive to work, what type of vehicle do you drive?
- If you drive to work, what type of fuel or energy do you use?

Approximately 1,300 employees responded to the survey with usable information, meaning that all essential questions were answered. Answers with mileage left blank or with highly inconsistent data (ex: saying they walked three days to work, biked two, and drove five) were omitted. In addition, if a respondent did not describe their 'other' category of transportation, the entry was omitted.

To perform this analysis, we took the following steps:

1) Separate entries by what type of vehicle they own and operate (Light truck, motorcycle, passenger car, or blank). Within each new group, separate the entries by diesel or gasoline.

2) For each group of entries with the same vehicle type and fuel, multiply the number of miles to work by 2 (to get round-trip estimate) and then by the number of ‘drive alone’ days for each entry. Multiply the number of miles to work by the number of ‘carpool’ days, which assumes another County employee in the car (half of the ‘drive alone’ emissions). (Note: If a respondent entered that they motorcycle to work, but own a car as well, the motorcycle miles were moved to the motorcycle category). Adjust for hybrids (see below)
3) Add all miles per vehicle type and fuel and multiply by 52.18 work weeks/year.
4) Calculate the multiplier to adjust survey response data to the entire 2006 employee population. In July 2006, there were 2,567 employees. This, divided by the 1,260 survey entries, gives us our multiplier of 2.037302.
5) Multiply the mileage per vehicle per fuel type by the multiplier.
6) Divide the number of hybrid miles by three and add the difference to the ‘passenger car’ category. This is to account for the large increase in hybrid sales between 2006 and 2008. Source: Hybridcars.com sales statistics.
7) Enter final miles into the CACP software per vehicle type and fuel.

Vehicle Group	**2008 Survey results**		**Adjusted for 2006**	
	Annual VMT	**Fuel Type**		
Light Truck/SUV/Pickup	3,086,462.65	Gasoline	6,288,055.26	Gasoline
	110,621.60	Diesel	225,369.56	Diesel
Motorcycle	127,517.48	Gasoline	259,791.57	Gasoline
Passenger Vehicle	25,226,718.43	Gasoline	51,766,151.53	Gasoline
	80.00	Diesel	162.98	Diesel
	273,684.10	Hybrid	185,859.02	Hybrid
Total	28,825,084.26		58,725,389.93	

The CACP software does not have a method of calculating emissions from hybrid cars. As a result, these emissions were divided by 2.14 based on the difference between average fuel economy of a 2006 Toyota Prius and the average fuel economy included in the 2006 SLO EMFAC data and then entered into the CACP software under 'passenger vehicle' (Source: www.fueleconomy.gov).

This analysis did not take into consideration the question ‘how have your commuting patterns changed in the last two years.’ The majority of responses was blank and might have corresponded to a different job location. It was not clear whether respondents were referencing the same commute or whether they had moved homes or jobs.

STREETLIGHTS

Public works provided billing information for the electricity used to operate County streetlights and traffic signals. The total kWh were entered into the CACP software using the verified PG&E Average Grid Electricity Set outlined in **Appendix 2C**.

WATER / SEWAGE

This sector calculates emissions from energy consumption at County-operated wastewater facilities. It does not calculate the total emissions from all water used or treated for the community. Doing so would be including emissions that are accounted for in another jurisdiction, which would cause double-counting. The County is largely not involved with the movement and treatment of water for its residents and businesses, which is why this sector appears insignificant.

Public works provided the electricity consumption for each of the water facilities outlined in **Appendix 2B**. These totals were entered into the CACP software with the PG&E Average Grid Electricity Set outlined in **Appendix 2C**.

WASTE

The San Luis Obispo Utility Coordinator reported solid waste tonnage produced by County operations. The County produced 912 tons of waste in 2006 that was sent to managed landfill. The waste composition was unknown for the County; therefore, we used the California averages provided by the 2004 California Integrated Waste Management Board Waste Characterization Report. A weighted average methane recovery factor of 58% was used in this analysis, as outlined in **Appendix 2C**.

OTHER

The other sector includes miscellaneous equipment from park services, general services, and golf course facilities. Equipment included in these sectors is outlined in the detailed CACP report notes in **Appendix 2B**. There is no automated calculation included in CACP for these sources of emissions, therefore calculations were made outside of CACP and entered into the 'other' category.

Data was given in gallons used per equipment type. A conversion factor of gallons to grams N_20 was obtained from Table G.11 of the California Local Government Operations Protocol (August 2008).

- Small/large utility (gasoline)= .22 g/ gallon fuel;
- Other large utility (diesel) = .26 g/ gallon fuel.

The resulting levels of nitrous oxide are as follows:

- Golf Course Facilities: 2,283 Grams N_20
- Park Facilities: 523 Grams N_20
- Unknown general services: 2,253 Grams N_20

APPENDIX 2E: AIRCRAFT ENGINEERING REPORT BY THE SAN LUIS OBISPO AIR POLLUTION CONTROL DISTRICT, 2007

Area Source Emissions
from

Aircraft Operations
EIC Codes:
81080411400000
81080211400000
81081214000000
81081014000000
81080814000000
81080011400000

Engineering Report

By Courtney Ward

Courtney Ward
August 12, 2008

Executive Summary

EIC Code (CES#)
81080411400000 (57331) - Aircraft - Other - Piston - Civil
81080211400000 (57315) - Aircraft - Other - Piston - Commercial
81081214000000 (47589) - Aircraft - Other - Jet - Civil
81081014000000 (47555) - Aircraft - Other - Jet – Commercial
81080814000000 (47571) - Aircraft - Government - Jet - Military
81080011400000 (57323) - Aircraft - Government - Piston - Military

Date Completed: August 12, 2008
Inventoried Year: 2007
Author: Courtney Ward

Table 1. Aircraft Emissions (tpy) for the County of San Luis Obispo (SLO)

Description	CO	HC	VOC	NOx	SOx	PM10	PM2.5
Commercial-Jet (47555)	64.715	13.848	12.852	16.787	3.461	0.735	0.735
Civil-Jet (47589)	192.729	19.747	17.724	2.038	0.810	0.270	0.270
Civil-Piston (57331)	218.334	29.177	24.357	0.763	0.391	0.006	0.006
Military-Jet (47571)	8.930	4.398	4.129	0.675	0.220	0.082	0.082
Military-Piston (57323)	0.18	0.053	0.049	0.007	0.003	0.001	0.001
Totals	**484.888**	**67.223**	**59.111**	**20.270**	**4.885**	**1.094**	**1.094**

Sources

This emission category accounts for all aircraft exhaust emissions (excluding agricultural crop dusting). The operating emissions considered were those that occur in San Luis Obispo County below 3,000 ft., the average mixing depth in the U.S., which is also the assumed inversion height. In the Piston engine the basic unit is the combustion chamber in which fuel and air are mixed, burned, and thus expanded to force a piston and a crank shaft to drive a propeller. The Jet or turboprop engine consists of a compressor, a combustion chamber and a turbine. Air entering the forward end of the engine is compressed and then heated by burning fuel in the combustion chamber.

The Jet and Piston military aircraft categories assess the significant emissions from military aircraft inside San Luis Obispo County. The Army is the primary military presence in the county. The Air Force, Marine, Navy and Coast Guard activity is not significant. The Army is able to use any landing strip in the county and currently has two operating bases, Camp San Luis Obispo and Camp Roberts. Camp San Luis Obispo has minimal activity and is strictly a helicopter base with no refueling depot. Camp Roberts lies on the San Luis Obispo/Monterey County line with the landing strip and the majority of the air operations occurring in Monterey County. Therefore, the jurisdiction for Camp Roberts falls on Monterey Bay Unified Air Pollution Control District.

Methodology
The number of landing and takeoff operations (LTO) was obtained from the major airports in San Luis Obispo County. The LTO cycle has its equivalent operating time-in-mode (TIM). The TIM is the time for a particular aircraft to go through each of the five modes, approach, taxi in, taxi out, takeoff, and climb out. (see AP-42, Table II-1-3). Composite model emission rates (MER) for each of the various types of aircraft engines now in general use were developed from FAA (Federal Aviation Administration). Emission rates will vary according to engine type and operating mode.

Aircraft emissions are computed using FAA Emissions & Dispersion Modeling System (EDMS 5.0.2). EDMS 5.0.2 provides emission factors for the majority of aircraft. Aircraft-specific TIMs for takeoff, climbout, approach, taxi-idle modes during the LTO's and touch-and-go cycles (T&G's) are provided in EDMS. Average taxi-idle TIMs, which were estimated by the larger airports, are applied to all aircraft for these airports.

Description
The aircraft operations are broken up into five categories: Jet Aircraft – Commercial, Jet Aircraft – Military, Jet Aircraft – Civil, Piston Aircraft – Military, and Piston Aircraft – Civil. These five categories encompass all aircraft engine emissions excluding agricultural aircraft which occurs below 3,000 ft. The California Department of Forestry's firefighting aircraft and the California Highway Patrol is accounted for under Civilian Aircraft.

The Military Aircraft covered in this section include both fixed wing aircraft and helicopters used by the Army. There are relatively few Air Force, Marine, Navy or Coast Guard aircraft operating in SLOC. These categories do not include any government aircraft, such as Police, Fire/Rescue, or California Department of Forestry. The Governmental aircraft are listed under Aircraft - Other - Civil. All of the aircraft used by the military are under the title of Jet Aircraft. This title includes turboprop and turboshaft aircraft.

Procedure

The number of LTOs is obtained from the listed major airports within SLO County:

San Luis County Airport
Paso Robles Municipal Airport
Oceano Municipal Airport

Estimates of aircraft mix for each of the airports is developed based on historical activity and data on home-based aircraft. The 2007 aircraft operations data for the three airports listed above are from the 2007 airport Final Environmental Assessment and Impact Reports found on their websites. The reports include type of aircraft and engine, and number of operations. The inquiries as to the make up of aircraft were referenced through: Craig Piper, General Services, Assistant Airport Manager San Luis Obispo (805) 781-5205 and Roger Oxborrow, Paso Robles Airport Services Coordinator (805) 237-3877. EDMS questions were referenced through Ralph Lovinelli at FAA (202) 267-3566.

The California Department of Forestry (CDF) maintains a permanent Air Attack Base in Paso Robles. Stationed there are an average of five military – jet aircraft per month consisting of 3 helicopters and two Lockheed C-130 Hercules. There are also two typical firefighting aircraft, one large SP-2H radial piston engine aircraft and a smaller turboprop Cessna Skymaster. These durable aircraft are built strong with large power to weight ratios so that they may take off, land and maneuver close to steep terrain with fire fueled cross winds. They are required by efficiency measures to land fully loaded with fire retardant and fuel which puts added strain on the plane. These extraordinary conditions require rich fuel mixtures and powerful engines which can contribute considerably to emissions. Fuel mixtures cannot be analyzed directly, but a generalized output of emissions can give a reasonable idea of the scope of emissions.

Emission Summary

Table 2. SLO Airport 2007 Emission Summary (tpy)

Aircraft	Engine	CO	HC	VOC	NOx	SOx	PM10	PM2.5	# Of Operations/yr	LTO/yr
EMB-120	PW118	15.823	0.080	0.076	2.283	0.660	0.056	0.056	7,300	3,650
SF-340-A	CT7-5	5.020	1.384	1.310	2.637	0.446	0.127	0.127	4,380	2,190
DHC-8-400	PW123	1.460	0.013	0.013	0.636	0.123	0.011	0.011	1,000	500
CL600	ALF 502L-2	3.253	0.687	0.631	0.712	0.157	0.045	0.045	730	365
REG'L JET 200	CF34-3B	13.732	2.643	2.503	2.305	0.591	0.193	0.193	2,920	1,460
Embraer ERJ 170	CF34-8E5	4.935	0.084	0.080	5.724	0.814	0.106	0.106	2,000	1,000
CITATION II	JT15D-4 (B,C,D)	8.696	4.968	4.568	0.375	0.147	0.100	0.100	1,512	756
CITATION X	AE3007C (Type 1)	0.824	0.236	0.217	0.845	0.110	0.019	0.019	408	204
Citation VII	TFE731-3	1.816	0.483	0.444	0.213	0.060	0.012	0.012	480	240
Learjet 35/36	TFE731-2-2B	16.851	8.101	7.450	1.281	0.448	0.159	0.159	5,277	2,639
Cessna 441 Conquest 2	TPE331-8	0.370	0.056	0.052	0.082	0.027	0.003	0.003	643	322
DHC-6	PT6A-20	0.631	0.081	0.076	0.069	0.025	0.004	0.004	543	272
Navajo (1)	TIO-540-J2B2	93.436	4.406	3.678	0.036	0.092	0.000	0.000	4,429	2,215
Navajo (2)	TIO-540-J2B2	59.225	2.793	2.331	0.023	0.058	0.000	0.000	2,808	1,404
Piper PA-28 (1)	O-320	25.922	1.385	1.156	0.014	0.031	0.000	0.000	9,307	4,654
N 24A Nomad 24A (1)	250B17B	7.623	3.861	3.690	0.471	0.184	0.087	0.087	4,285	2,143
Cessna 172 Skyhawk (1)	TSIO-360C	63.474	13.417	11.200	0.202	0.125	0.000	0.000	32,867	16,434
Cessna 208 Caravan (1)	PT6A-114	1.048	0.151	0.139	0.178	0.057	0.008	0.008	2,234	1,117
Piper PA-28 (2)	O-320	16.437	0.878	0.733	0.009	0.019	0.000	0.000	5,901	2,951
N 24A Nomad 24A (2)	250B17B	4.834	2.449	2.340	0.299	0.116	0.055	0.055	2,717	1,359
Cessna 172 Skyhawk (2)	TSIO-360C	40.242	8.507	7.100	0.128	0.079	0.000	0.000	20,838	10,419
Cessna 208 Caravan (2)	PT6A-114	0.665	0.096	0.088	0.113	0.036	0.005	0.005	1,417	709
Robinson R22 (1)	TSIO-360C	5.766	0.964	0.805	0.018	0.011	0.000	0.000	2,234	1,117
SD330	PT6A-45R	0.092	0.031	0.030	0.010	0.003	0.001	0.001	48	24
DHC-6	PT6A-20	0.028	0.004	0.003	0.003	0.001	0.000	0.000	24	12
H-46 SEA KNIGHT	T58-GE-8F	0.228	0.222	0.212	0.003	0.002	0.003	0.003	24	12
H-53D Sea Stallion	T64-GE-413	0.628	0.292	0.279	0.062	0.021	0.006	0.006	124	62
H-60 Black Hawk	T700-GE-700	0.532	0.769	0.735	0.046	0.017	0.013	0.013	200	100
Robinson R22 (2)	TSIO-360C	3.655	0.611	0.510	0.011	0.007	0.000	0.000	1,416	708
TOTAL		397.246	59.652	52.449	18.788	4.467	1.013	1.013	118,066	59,033

Note: Divide '# of Operations/yr' by 2 to account for landing and takeoff.

Table 3. Oceano Airport 2007 Emission Summary (tpy)

Aircraft	Engine	CO	HC	VOC	NOx	SOx	PM10	PM2.5	# of Operations per month	LTO/yr
Cessna 172 Skyhawk (1)	TSIO-360C	0.576	0.133	0.102	0.002	0.001	0.000	0.000	25	150
Cessna 150	O-200	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Cessna 170 (1)	O-201	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Piper Aeronca (PA-28) (1)	O-320	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Cessna 172 (1)	TSIO-360C	1.383	0.294	0.245	0.004	0.003	0.000	0.000	60	360
PiperPA28B	O-320	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Beech 95 (1)	PT6A-20	0.014	0.002	0.002	0.001	0.001	0.000	0.000	1	6
Cessna 172 (2)	TSIO-360C	0.046	0.010	0.008	0.000	0.000	0.000	0.000	2	12
Lancair	IO-360-B	0.164	0.010	0.009	0.001	0.000	0.000	0.000	7	42
Piper Aeronca (PA-28) (2)	O-320	0.167	0.009	0.007	0.000	0.000	0.000	0.000	5	30
Eagle II (Cessna 421 Golden)	TIO-540-J2B2	0.506	0.024	0.020	0.000	0.001	0.000	0.000	2	12
Cessna 170 (2)	O-201	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Piper Cub (Antonov 12 Cub)	T56 series I	0.077	0.034	0.032	0.104	0.019	0.002	0.002	20	120
Beech 95 (2)	TIO-540-J2B2	0.567	0.015	0.013	0.000	0.001	0.000	0.000	1	6
Piper Archer	O-320	0.067	0.004	0.003	0.000	0.000	0.000	0.000	2	12
Piper Cherokee (1)	O-320	0.067	0.004	0.003	0.000	0.000	0.000	0.000	2	12
Piper Arrow	O-320	0.266	0.014	0.012	0.000	0.000	0.000	0.000	8	48
Cessna 172 Skyhawk (2)	O-320	0.176	0.009	0.008	0.000	0.000	0.000	0.000	5	30
Piper Cherokee (2)	O-320	0.033	0.002	0.001	0.000	0.000	0.000	0.000	1	6
Europa Turbo	PT6A-62	0.180	0.053	0.049	0.007	0.003	0.001	0.001	6	36
TOTAL		**4.454**	**0.627**	**0.519**	**0.119**	**0.029**	**0.003**	**0.003**	**152**	**912**

Note: Divide '# of Operations per month' by 2 to account for landing and takeoff and multiply by 12 to convert units.

Table 4. Paso Robles Airport 2007 Emission Summary (tpy)

Aircraft	Engine	CO	HC	VOC	NOx	SOx	PM10	PM2.5	# Of Operations/yr	LTO/yr
Cessna 150	O-200	6.962	0.369	0.308	0.009	0.009	0.000	0.000	2,500	1250
Piper PA-28	O-360	32.448	1.148	0.958	0.146	0.045	0.000	0.000	9,000	4500
Cessna 182	O-470	19.800	1.220	1.018	0.099	0.032	0.000	0.000	10,000	5000
Cessna 206	IO-520	14.952	0.612	0.511	0.074	0.021	0.000	0.000	5,000	2500
Beechcraft King-Air C-90	PT-6	1.159	0.178	0.164	0.113	0.041	0.006	0.006	1,000	500
Bell 206 JetRanger	250B17B	0.638	0.157	0.144	0.017	0.010	0.004	0.004	500	250
Cessna 525 Citation	FJ-44	3.420	1.821	1.674	0.079	0.042	0.033	0.033	500	250
Lear 60	P&W 305A	0.668	0.113	0.104	0.131	0.029	0.005	0.005	200	100
Grumman S-2T	TEP-331	1.270	0.233	0.223	0.100	0.031	0.005	0.005	500	250
Lockheed Hercules C-130	T-56	0.241	0.105	0.101	0.320	0.059	0.006	0.006	100	50
Lockheed Neptune P2V	R-3350	0.992	0.831	0.794	0.258	0.060	0.015	0.015	200	100
Miscellaneous	Varies	0.638	0.157	0.144	0.017	0.010	0.004	0.004	500	250
TOTAL		**83.188**	**6.944**	**6.143**	**1.363**	**0.389**	**0.078**	**0.078**	**30,000**	**15000**

Note: Divide '# of Operations per month' by 2 to account for landing and takeoff.

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Appendix

EDMS ID	Aircraft	Engine	Baseline Condition	2010 No Action Alternative	2010 Proposed Action	2023 Proposed Action
AC1	EMB-120	PW118	7,300	6,800	2,552	--
AC2	SF-340-A	CT7-5	4,380	4,081	1,456	--
AC3	DHC-8-400	PW123	--	1,672	1,336	--
AC4	CL600	ALF 502L-2	730	836	1,602	3,000
AC5	REG'L JET 200	CF34-3B	2,920	3,351	4,008	7,500
AC6	Embraer ERJ 170	CF34-8E5	--	--	2,406	4,500
GA1	CITATION II	JT15D-4 (B,C,D)	1,512	1,610	1,610	1,891
GA2	CITATION X	AE3007C (Type 1)	408	435	435	510
GA3	Citation VII	TFE731-3	480	511	511	600
GA4	Learjet 35/36	TFE 731-2-2B	5,277	5,620	5,620	6,599
GA5	Cessna 441 Conquest2	TPE331-8	643	685	685	804
GA6	DHC-6	PT6A-20	543	578	578	679
ME1	Navajo	TIO-540-J2B2	4,429	4,627	4,627	5,430
ME2	Navajo	TIO-540-J2B2	2,808	3,082	3,082	3,620
SE1	Piper PA-28	O-320	9,307	9,722	9,722	11,411
SE2	N 24A Nomad 24A	250B17B	4,285	4,476	4,476	5,254
SE3	Cessna 172 Skyhawk	TSIO-360C	32,867	34,332	34,332	40,297
SE4	Cessna 208 Caravan	PT6A-114	2,234	2,334	2,334	2,739
SE5	Piper PA-28	O-320	5,901	6,476	6,476	7,607
SE6	N 24A Nomad 24A	250B17B	2,717	2,981	2,981	3,502
SE7	Cessna 172 Skyhawk	TSIO-360C	20,838	22,869	22,869	26,865
SE8	Cessna 208 Caravan	PT6A-114	1,417	1,555	1,555	1,826
HE1	Robinson R22	TSIO-360C	2,234	2,333	2,333	2,739
MY1	SD330 Sherpa	PT6A-45R	48	97	97	97
MY2	DHC-6	PT6A-20	24	49	49	49
MY3	H-46 SEA KNIGHT	T58-GE-8F	24	49	49	49
MY4	H-53D Sea Stallion	T64-GE-413	124	250	250	250
MY5	H-60 Black Hawk	T700-GE-700	200	405	405	405
LH1	Robinson R22	TSIO-360C	1,416	1,554	1,554	1,826
	Air Carriers		15,330	16,739	13,360	15,000
	General Aviation		99,316	105,780	105,780	124,200
	Military		420	850	850	850
	Total		115,066	123,009	119,990	140,050

I. SLO Airport Operations (See Appendix F-25 of Final Environmental Assessment and Impact Report).

TABLE 1E
General Aviation Pilot Survey

Survey No.	Aircraft	Aircraft Based at	Hangar/ Tiedown	Base at Oceano if Hangars available?	Ops Per Month at Oceano	Percent of Local Ops
1	Ultralight	Oceano	Tiedown	--	10	3.0%
2	Cessna 172	Camarillo	Tiedown	Y	25	0.0%
3	Cessna 150	Camarillo	Tiedown	N	1	0.0%
4	Cessna 170	Corona	Tiedown	N	1	25.0%
5	Piper Aeronca	Oceano	Hangar	--	1	0.0%
6	Ultralight	Oceano	Tiedown	--	4	5.0%
7	Cessna 172	Santa Barbara	Tiedown	N	60	0.0%
8	Piper PA28B	Santa Barbara	Tiedown	N	1	0.0%
9	Beech 95	Redlands	Tiedown	Y	1	0.0%
10	Cessna 172	Santa Maria	Tiedown	N	2	10.0%
11	Lancair 360	Lompoc	Hangar	Y	7	10.0%
12	Globe Swift	Lompoc	Tiedown	Y	2	10.0%
13	Piper Aeronca	Oceano	Hangar	--	5	0.0%
14	Eagle II	Paso Robles	Hangar	N	2	0.0%
15	Cessna 170	Paso Robles	Hangar	N	1	0.0%
16	Piper Cub	Oceano	Hangar	--	20	10.0%
17	Beech 95	Van Nuys	Tiedown	N	1	0.0%
18	Piper Archer	Santa Clara	Hangar	N	2	0.0%
19	Piper Cherokee	Bakersfield	Hangar	N	2	0.0%
20	Piper Arrow	SLO Co.	Hangar	Y	8	0.0%
21	Cessna 172	Santa Barbara	Hangar	N	5	0.0%
22	Piper Cherokee	Santa Monica	Hangar	N	1	0.0%
23	Europa Turbo	Ramona	Tiedown	N	6	30.0%

II. Oceano Airport Operations (See Chapter 1 of Oceano Airport Masterplan).

APPENDIX 2F: COUNTY EMPLOYEE COMMUTE SURVEY, 2008

County Employee Commute Survey, 2008

Thanks for taking part in this survey. Please take a few minutes to answer these 11 short questions. Please complete this survey by September 9, 2008.

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1) How would you characterize your typical work week?

- ☐ Five 8-hour days a week
- ☐ Four 10-hour days a week
- ☐ 1 day off every two weeks ("9/80")
- ☐ Part-time: Three days a week or less
- ☐ Other: ____________________________________

2) What is your approximate one-way distance to work?

Enter distance (in miles): ____________________________________

3) How has your commute behavior changed in the past 2 years?

- ☐ I drive an additional day per week
- ☐ I drive one or fewer days per week
- ☐ I carpool more frequently
- ☐ I carpool less frequently
- ☐ I bike/walk more frequently
- ☐ I bike/walk less frequently
- ☐ I changed my work schedule
- ☐ No Change

4) What type of transportation do you take to work each week? Please indicate the number of days for each type of transportation that you use during an average work week.

Drive Alone	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Carpool	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Vanpool	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Public transit	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Motorcycle	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Bicycle	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Walk	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days
Telecommute	☐1 day	☐2 days	☐3 days	☐4 days	☐5 days

Other

5) If you drive to work, what type of vehicle do you drive?

- ☐ Compact/Sub-Compact car (Civic, Corolla, Focus, Neon, Cavalier, Jetta or similar)
- ☐ Mid-size car (Accord, Camry, Passat, Monte Carlo, Sable, Sebring or similar)
- ☐ Full-size car (Impala, Intrepid, Taurus, Crown Victoria, Bonneville, Town Car or similar)
- ☐ Small Truck/SUV/Pickup (RAV4, Chev S10, Pickup (4 cylinder), PT Cruiser or similar)
- ☐ Medium-Small Truck/SUV/Pickup (minivan,Sonoma Pickup Truck or similar)
- ☐ Medium-Large Truck/SUV/Pickup (Durango, Safari Cargo Van, Ford F150 or similar)
- ☐ Large Truck/SUV/Pickup (Suburban, Expedition, Navigator, Ford E250/350/450 or similar)
- ☐ Motorcycle

6) If you drive to work, what type of fuel or energy do you use?

- ☐ Gasoline
- ☐ Diesel
- ☐ Biodiesel
- ☐ Hybrid
- ☐ Electric
- ☐ Other (Specify): ___________________________________

7) How often do you use a vehicle to leave the work site at lunch or on breaks each week?

- ☐ Once per week
- ☐ Twice a week
- ☐ Three times per week or more
- ☐ Never

8) If you use a carpool or vanpool, how many share the car/van with you?

Enter # of people: ___________________________________

9) The things most important to me when using alternative transportation are:

- ☐ Avoiding traffic
- ☐ Parking costs
- ☐ Travel time
- ☐ Convenience/Flexibility
- ☐ Cost of gas and wear and tear on my car
- ☐ Other: ___________________________________

10) Do you participate in the County's Commute + program?

- ☐ Yes
- ☐ No

11) What is your zip code?

Zip Code: ____________________________________

Introduction

San Luis Obispo County has many significant biological features. These include several distinct vegetation and wildlife habitat communities, plant and animal species of rare and/or endangered status, depleted or declining species, and species or habitat types of limited distribution, such as wetlands. Human activity has had major adverse effects on the health and sustainability of the County's natural communities. Since the mid-19th century, grazing, logging, agriculture, road building, and development have markedly altered the natural landscape.

This appendix identifies biological resources of importance in San Luis Obispo County and outlines the existing federal and state regulatory framework pertaining to biological resources. While this section identifies these resources individually, it is important that they also be recognized as a whole ecosystem, with several subsystems. A healthy system is diverse, unstressed and contains enough redundancy to withstand changes brought naturally or by development.

Ecosystems[1]

Ecosystems hold the key for preserving vegetation and wildlife. In fact, we cannot truly protect endangered species unless we preserve the ecosystem that they depend on and interact with. Accordingly, the wisest and most efficient strategy for preserving rare or endangered species - and in the long run the least costly - is to prevent them from becoming rare and endangered in the first place.

An ecosystem can be defined as all the components of a biological community and the physical environment, and the interactions among and between them. Ecosystems are more than just the sum of their various components, involving a complex system of linkages between plants, animals, their environment, and humans.

The key to protecting biological resources and sustaining the great variety of lifeforms on earth is to protect and sustain healthy, functioning ecosystems and the biological diversity within them. "Biodiversity" refers to all living organisms and the ecological setting on which they depend for life; the natural variety, abundance and variability of different plant and animal species. One of the generally accepted key principles of ecology is that biological diversity leads to stability of an ecosystem.

The connectivity between species in a natural community is demonstrated when one looks at the food web, as shown in **Figure A3-1**. If one of the key links in the system is broken - a certain keystone species is lost, for example - the functioning of the entire ecosystem upon which many plants and animals depend can be weakened and the natural communities lost. Extinction of a

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[1] This section is excerpted directly from the Open Space Element (San Luis Obispo County 1998).

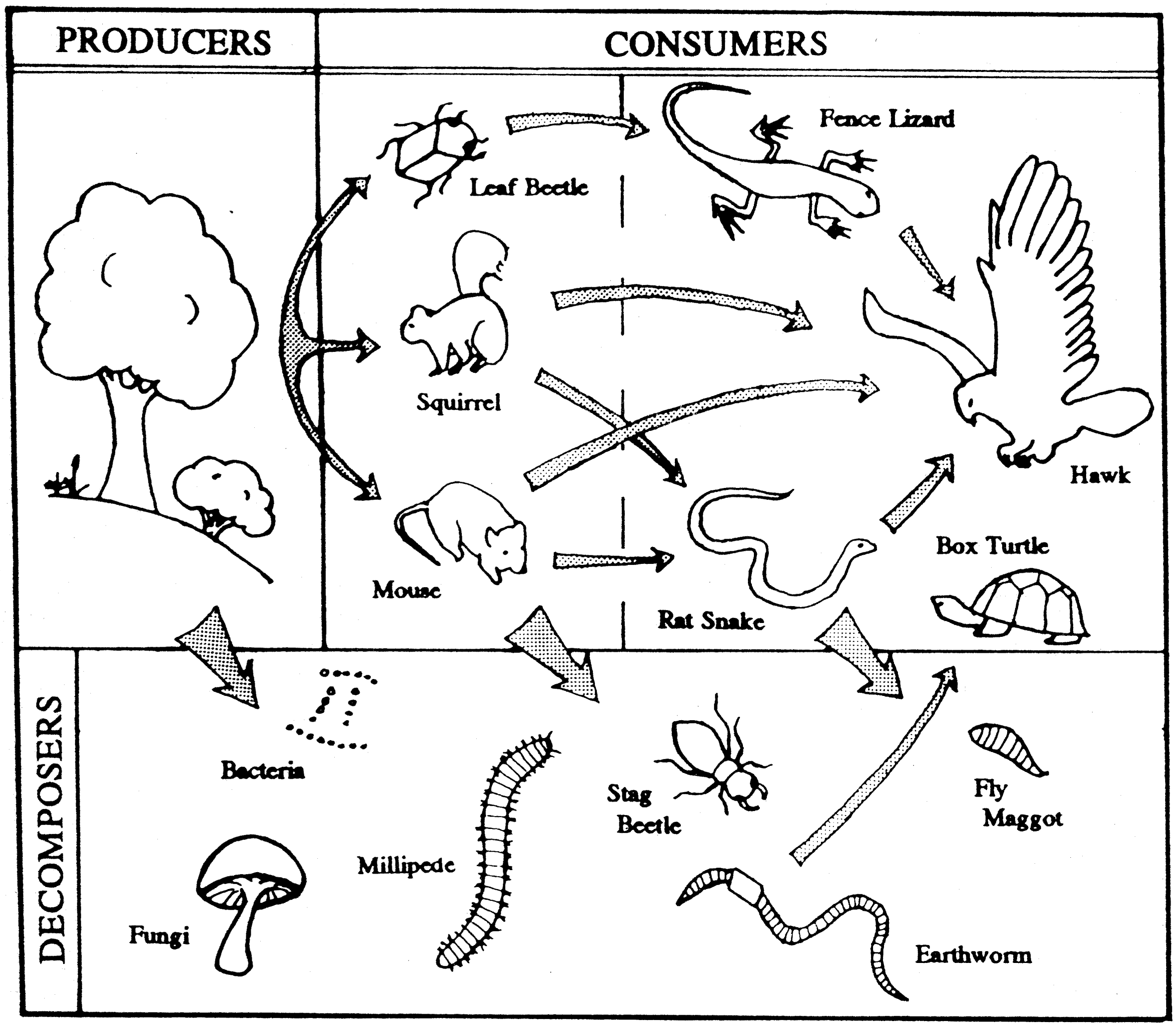
key plant or animal - predator or prey - can be the beginning of the end for an ecosystem. The key to avoiding this is to maintain the complex system of linkages in the ecosystem wherever possible. This can be done by maintaining large, unfragmented areas of natural habitat and by maintaining physical connections between those areas to enable wildlife migration - preserving biological diversity.

This Conservation and Open Space Element is an important step towards conservation planning in San Luis Obispo County. If planning programs can be more effective on an ecosystem basis, the programs will be more effective at protecting those species already listed as rare and endangered. More effective programs could also reduce the number of new species added to the rare and endangered lists.

It is often argued that there is not the technical information on which to base broad conservation plans. However, it is important to keep in mind that there may never be all the information needed. Waiting until all the information is available will mean no action, possibly resulting in the loss of many species and options. Also, it is less costly in both economic and ecological terms to conserve a healthy ecosystem than to recreate natural resources that have been lost. Therefore, efforts towards conservation planning should move forward, with each plan considered an experiment to be monitored and evaluated for appropriate changes as more data become available over time.

The most effective strategy would be to sustain entire natural ecosystems. This approach is complicated by the fact that ecosystems often span many types of land uses and ownership patterns, and do not respect political boundaries. They often cross the jurisdictions of cities, counties, government lands, and states. By waiting until species are endangered before taking steps to protect them, the task becomes difficult, costly and usually controversial. The focus should shift from trying to protect individual species once they become endangered (although that is still important) to protecting entire ecosystems before that happens. Since ecosystems exist on such a large scale, their protection must involve new and innovative measures that go beyond traditional land use regulations.

FIGURE A3-1 THE CONNECTIVITY BETWEEN MEMBERS OF THE ECOSYSTEM CAN BE SEEN IN THE FOOD WEB.



Source: Peck, Sheila, Landscape Conservation Planning: Preserving Ecosystems in Open Space Networks; Integrated Hardwood Range Management Program, U.C. Cooperative Extension, 1993.

A network of Major Ecosystems should be established in areas that have minimal disturbance and high biological diversity, with the minimum size and the boundaries of the system based on accepted principles of ecology and wildlife management. The core of the Major Ecosystems network should be existing public lands, such as those controlled by the Bureau of Land Management and the U.S. Forest Service. County Natural Area Preserves also have excellent potential to serve as the cores of Major Ecosystems.

In order to be as viable as possible, Major Ecosystems should be comprised of large, contiguous areas rather than several smaller, isolated, fragmented islands of habitat. The ecosystem must be large enough to allow for the migration of wildlife and to sustain the diversity of wildlife populations. There should be large open space areas that can be connected by landscape corridors to enable species and ecological processes to move from one area to another. The objective of the spatial design of the Major Ecosystem should be to create a system that will maximize the identified ecological values and minimize the negative impacts to and from surrounding lands.

As a network of Major Ecosystems is created, a variety of spatial design parameters need to be considered. Careful attention should be given to maintaining overall landscape connectivity, with particular attention given to retaining adequate areas of interior habitat. Where possible, habitat areas should be linked by corridors of similar habitat to enable species movement.

WILDLIFE CORRIDORS[2]

Habitat corridors will also be critical to the continued success of the ecosystem. If the corridor is going to function for the benefit of the plants and animals, the habitat within the corridor should consist of native vegetation that has been part of the historical landscape, and it must be similar to the habitat found in the patches being connected by the corridors. In contrast, small, isolated areas of habitat are not conducive to sustaining wildlife population over the long term. If the habitat patches become even more dispersed on the landscape, each patch will become an "island." Over time, the number of different species and the numbers of individual animals will decline in these habitat islands due to inbreeding and competition for food and habitat.

Wildlife corridors between habitat areas are a way to minimize the island effect. Good examples of wildlife corridors are streams and riparian corridors. Wildlife corridors can also be recreated and protected by humans. The protection of corridors could be required in certain circumstances in order to minimize the effects of public and private construction projects on wildlife migration.

The island effect also occurs when habitat areas are surrounded by development. Animals that leave the habitat, or are exposed to more impacts because of the larger edge, are more likely to permanently leave the area. If they stay, they are more likely to be killed by such hazards as household pets, pesticides and other human impacts, or succumb to a habitat that cannot provide the necessary life support factors. Without contiguous areas of natural habitat, the animal populations are not replenished from adjacent areas of habitat like they are in larger undeveloped areas, where animals can move freely from one area to another. Therefore, over time, the numbers and diversity of wildlife will decline.

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[2] This section is excerpted directly from the Open Space Element (San Luis Obispo County 1998).

UNIQUE OR SENSITIVE PLANT AND ANIMAL HABITATS[3]

Sustaining a healthy ecosystem where biological diversity is maintained is essential to the survival of unique or sensitive vegetation and wildlife. Unique plant or animal habitat includes the following: habitat of rare, endangered or threatened plant or animal species as classified by state and federal agencies and the California Native Plant Society (CNPS); wetlands and marshes; areas subject to Sensitive Resource Area combining designations in the LUE applied because of unique or sensitive species; and sensitive natural communities as identified in the California Department of Fish and Game Natural Diversity Data Base (such as Valley Oak Woodland, California Bay forest, Central maritime Chaparral, and Pine Bluegrass Grassland). Protection of sensitive natural communities is important because they often contain groups of rare, threatened or endangered species (also see the prior discussion of Ecosystems).

Protecting unique or sensitive plant and animal habitat is also beneficial because it provides:

- A high aesthetic and environmental quality that also contributes to the attractiveness of this county for visitors and the tourism industry they support;
- Opportunities for people to experience and appreciate the natural environment;
- Opportunities for education and scientific research, including the discovery of new medicines and ways to increase agricultural productivity.

Wetland habitats [4]

Conserving valuable but rapidly diminishing wetland habitats also provides the benefits of filtering pollution, protecting water quality, controlling flooding, and maintaining a high water table. The importance of wetlands has been long recognized in the county general plan. Wetlands are also recognized at the state and federal levels as area worthy of special consideration. Unfortunately, there is no inventory of the wetland resources in the county, so the identification and protection of these resources most often occurs when a development proposal is submitted on property that may include a wetland. The project review must then try to minimize or eliminate the potential impacts from the proposed development.

Public and private development must help carry out the important objective of maintaining and protecting the unique and sensitive habitats. This plan proposes strategies that would enable development in isolated areas of unique or sensitive vegetation and wildlife as a trade-off to the preservation of larger, more significant areas. By doing so, development can be beneficial to the preservation of important habitats which have been degraded.

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[3] This section is excerpted directly from the Open Space Element (San Luis Obispo County 1998).

[4] This section is excerpted directly from the Open Space Element (San Luis Obispo County 1998).

Streams and Riparian Corridors

Streams and their associated riparian vegetation corridor are important open space resources. Maintaining streams and riparian corridors in a natural state offer many benefits, including:

- Conserving important habitat for wildlife such as fish spawning areas and key corridors for wildlife migration and survival, thereby contributing to the overall health of the ecosystems;
- Maintaining the productivity of estuaries downstream;
- Providing ground water recharge;
- Maintaining high aesthetic quality;
- Providing potential recreational opportunities where identified by this or other plans.

Maintaining adequate setbacks between development and streams and the riparian corridor provides the following benefits:

- Provides a needed buffer area to protect natural habitat from direct impacts of development;
- Reduces erosion and sedimentation of the stream;
- Maintains natural channels to carry storm water flow (see Figure 3-10) while reducing the possibility of flooding without the need for costly, unsightly and environmentally damaging stream channelization.

As noted in the previous discussion of ecosystems, wildlife corridors for species movements are critical to the survival of the ecosystem. One of the most important types of corridors is along streams. Waterways not only provide the water on which species depend for life, the riparian vegetation also provide the habitat cover needed to provide for security of movement, possible food sources, and breeding and nesting areas.

The ecological processes operating within a landscape are strongly influenced by the hydrology of the area. If the natural flows of waterways are interrupted, the effects on the ecosystem can be very damaging because the plants and animals are limited in their ability to adapt to changing conditions. Therefore, maintaining or, where necessary, restoring hydrologic patterns is vital for protection of the ecological processes that support species.

SENSITIVE SPECIES AND IMPORTANT BIOLOGICAL RESOURCE AREAS

Sensitive resources include jurisdictional wetlands, occurrences of special-status species, occurrences of sensitive natural communities, wildlife nurseries and nesting areas, and wildlife movement corridors.

Several sensitive habitats types, plant taxa, and animal taxa have been recently or historically known to occur in the County. The California Natural Diversity Data Base (CNDDB) is a computerized inventory of California's sensitive plants, animals, and natural plant communities. The term "sensitive species" is used throughout this section and includes plants and animals that are officially listed by a regulatory organization or agency as well as those considered to be of local concern or interest by recognized monitoring agencies such as California Native Plant Society (CNPS), CDFG or Audubon Society.

Fieldwork was not conducted as part of this analysis to confirm or deny the presence of these or other sensitive species. Specific studies, including those conducted by the United States Fish and Wildlife Service (USFWS, 1997), CMCA (2000, 2002), and mapping conducted by Jones & Stokes (1997) and CMCA (2002) have verified the presence of some sensitive species. It is important to note that additional, previously unidentified species or habitats could also occur within the County. Site specific surveys for any potentially sensitive species would be necessary to confirm their presence within a particular area proposed for development. The following discussion is intended to provide a general understanding of sensitive species in San Luis Obispo County.

NATURAL COMMUNITIES

San Luis Obispo County is home to a number of diverse and important natural communities, from coastal marine environments to riparian habitats, and a mosaic of forests, woodlands, grasslands, and chaparral.

San Luis Obispo County supports a variety of natural communities, some of which are considered rare or sensitive by the regulatory agencies. The term “natural community” is generally intended to refer to plant and wildlife associates in specific habitat types. **Table A3-2** lists each natural community that has the potential or is known to occur in each planning area within the County. Natural Communities classified as “rare” are habitats that are either known or believed to be of high priority by the California Department of Fish and Game. The assessment of plant communities occurring within the County was based on review of the literature, previous EIRs in the County. Important types of habitat in the County that take on a regional character include:

TABLE A3-2 NATURAL COMMUNITIES/HABITAT TYPES AND POTENTIAL/KNOWN OCCURRENCES WITHIN SAN LUIS OBISPO COUNTY PLANNING AREAS

Natural Communities/ Habitat Types	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Agricultural Land[2]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Alvord Oak Woodland	•						•						•		
Beaches and Coastal Dunes[2]			•					•		•				•	
Big Sagebrush Scrub													•		
Black Oak Forest	•												•		
Blue Brush Chaparral											•				
Blue Oak Woodlands	•	•		•	•	•	•		•				•		•
Buck Brush Chaparral	•	•	•	•	•	•	•	•	•			•	•		•
Ceanothus megacarpus Chaparral												•			
Central (Lucian) Coastal Scrub			•	•				•		•	•	•		•	•
Central Coast Arroyo Willow Riparian			•												
Central Coast Cottonwood-Sycamore Riparian	•	•					•		•						
Central Coast Live Oak Riparian Forest							•	•							
Central Dune Scrub[1]			•											•	
Chamise Chaparral	•	•		•	•	•	•	•	•	•	•	•	•		
Central Foredunes[1]														•	
Central Maritime Chaparral[1]			•					•		•	•				
Coast Live Oak Forest	•	•	•	•	•	•	•	•	•	•	•	•			•
Coast Live Oak Woodlands	•			•		•		•	•	•	•	•			•

Natural Communities/ Habitat Types	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Coast Range Ponderosa Pine Forest							•	•							
Coastal and Valley Freshwater Marsh[1]			•									•		•	
Coastal Brackish Marsh[1]			•												
Coulter Pine Forest	•					•	•						•		
Diablan Sage Scrub		•		•	•	•			•			•	•		•
Dry Salt Flat[2]													•		
Dryland Grain Crops[2]													•		
Foothill Pine-Oak Woodlands	•	•		•	•	•	•	•	•				•		
Great Valley Cottonwood Riparian Forest													•		
Interior Coast Range Saltbrush Scrub													•		
Juniper-Oak Cismontane Woodland													•		
Leather Oak Chaparral							•		•			•			
Mixed Evergreen Forest	•					•	•	•	•			•			
Mixed Serpentine Chaparral	•						•	•	•		•	•			
Mojavean Pinyon and Juniper Woodlands													•		
Monterey Pine Forest[1]								•							
Mule Fat Scrub				•										•	•
Non-Native Grassland	•	•		•	•	•	•	•	•	•	•	•	•		•
Northern Coastal Salt Marsh[1]			•												
Northern Claypan Vernal Pool[1]													•		
Northern Interior Cypress Forest[1]									•						
Open Foothill Pine Forest	•	•			•	•	•						•		
Orchard or Vineyard[2]	•	•							•				•		

Natural Communities/ Habitat Types	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Permanently-flooded Lacustrine Habitat	•		•	•	•		•					•			
Red Shank Chaparral	•														
Sandy Area Other than Beaches[2]		•							•					•	
Semi-Desert Chaparral				•		•							•		
Serpentine Bunchgrass[1]												•			
Serpentine Foothill Pine-Chaparral Woodlands									•						
Upper Sonoran Subshrub Scrub													•		
Urban or Built-up Land[2]	•	•	•					•	•	•	•	•	•		•
Valley Needlegrass Grassland[1]			•												
Valley Oak Woodland[1]	•				•				•						
Valley Saltbush Scrub													•		
Valley Sink Scrub[1]													•		
Venturan Coastal Sage Scrub	•		•	•		•						•	•		•

Source: San Luis Obispo County Affordable Housing Ordinance EIR, 2007
(CNDDB database queried on December 11, 2006)
Notes: [1] CNDDB Communities
[2] Habitat Type Provided by the County and not included in Holland 1986

The Nipomo Dunes. This national natural landmark located south of Point Buchon is host to a large number of endemic and rare plant species, as well as dune uplands lakes and wetlands.

Estuaries. Estuaries are a notable feature of the coastal areas, occurring wherever flowing streams meet the ocean. They are the nursery for the local fisheries along the coastline. Morro Bay contains the region's largest estuary, with a saltwater marsh located on the east side where Chorro and Los Osos creeks enter the bay. This is one of the most significant wetlands remaining on the California coast, providing nesting habitat for blue herons, cranes and other important species of woodland birds and wildlife. Morro Bay estuary is also a designated state and national estuary. Smaller coastal lagoons and marshes are also scattered along the shoreline.

The Upper Salinas River Valley. This area is characterized by a variety of vegetation communities including riparian, oak woodlands, wetlands, native and non-native grasslands, and chaparral. Coast Live Oak and Blue Oak are dominant features of the landscape, with a variety of wildlife supported by the oak woodlands scattered throughout the area. Riparian trees such as sycamores, cottonwoods and willows are common along drainage channels, streams, reservoirs, and marshes. Grassland vegetation is widespread on the rolling hills and flat areas that are either too dry to support oak woodland or have been cleared of oaks in the past.

The Carrizo Plain. This basin in the east county is a dry salt lake with alkali flats and saltbush-scrub as the principal vegetation. The upland areas are characteristic of an arid prairie, with little vegetation except dry grass. This region is best described as a steppe - a dry grass-covered area with wide temperature fluctuations.

Coastal Streams. Coastal streams (perennial and intermittent) are environmentally sensitive habitat areas. Several coastal streams may support steelhead trout during periods of sufficient flow. Steelhead trout are anadromous rainbow trout that return to spawn in freshwater streams during the spring. This species is an important fishery resource along the entire west coast and has recently been listed as “threatened” by the National Marine Fisheries Service. The biggest threat to this species is due to damming of coastal streams, however, they are also threatened by low instream flows resulting from water diversion and groundwater pumping, and water quality degradation due to erosion.

HABITAT TYPE [5]

In the early 1980's, the California Wildlife-Habitat Relationships (WHR) System was developed as a standardized methodology for identifying and assessing wildlife and habitat relationships. In 1988, the state published "A Guide to Wildlife Habitats of California" (Kenneth E. Mayer and Wm. F. Landenslayer, editors), which contains a detailed description of the 19 different types of wildlife habitats that constitute the WHR classification system. The following is a brief description of the various habitat types found in San Luis Obispo County.

Oak Woodlands. Oak Woodlands are a major component of SLO County's rural landscape and the highest priority vegetation in the county. According to the Oak Woodland Voluntary Management Plan, oak woodlands covered more than 36 percent of the total land area of the county in 1994 which put the County in the State's "Top Ten" both in total oak woodland acreage and in proportion of county lands that are oak woodlands. This habitat type is a major component of the rural landscape of the county. Throughout California, oak woodlands in general are considered sensitive habitat primarily due to their limited acreage, high wildlife value, gradual loss as a result of development, and lack of regeneration. Over time, oak dominated woodlands have been degraded by urban and rural residential development, livestock, and the expansion of agriculture. In most areas, the understory cover is either lacking or is composed primarily of non-native species. Oak woodlands in San Luis Obispo County have experienced many of the same impacts over the years.

The following is a description of the various types of oak woodlands.

Valley Oak Woodland. This habitat occurs in a wide range of settings, but is best developed on deep, well drained alluvial soils usually in valley bottoms, and on non-alluvial soils in the coast ranges. Valley oak woodland varies from savanna-like to forest-like stands with partially closed canopies, with a grassy understory. Individual trees may reach 115 feet in height. Valley oak woodland intermixes with valley oak riparian forest near rivers and with blue oak woodland in drier locations. These woodlands provide important food and cover for many species of wildlife.

Blue Oak Woodland. Blue oak woodlands are usually associated with shallow, rocky, infertile, well-drained soils. Blue oaks are well adapted to dry, hilly terrain where the water table is usually unavailable. Blue oak woodland intergrades with valley oak woodland, but generally occurs on drier slopes. This habitat varies in structure from open savanna to dense woodland

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[5] This section is excerpted from the following County documents: Open Space Element (San Luis Obispo County 1998) and the Estero Area Plan Final Impact Report (San Luis Obispo County 2003), and the San Luis Obispo County Affordable Housing Ordinance Final Environmental Impact Report (San Luis Obispo 2007).

and is typically found in the valleys and foothills of the coast ranges. Typical understory is composed of an extension of Annual Grassland vegetation.

Blue Oak-Grey Pine. This habitat is typically diverse, with a mix of hardwoods, conifer, and shrubs. Associated species are the coast live oak and valley oak. Soils are generally well drained materials, ranging from gravelly loam through stony clay loam, and are typically rich in rock fragments. Most mature stands of this type have a canopy closure that can range up to 59 percent, and generally have small accumulations of dead and downed woody material and relatively few snags compared to other tree habitats. Concern has been expressed for the long-term existence of this habitat because there has been little regeneration since the late 1800's due to the seedlings and yearly acorn crop being eaten by livestock, deer, birds, insects and rodents.

Coastal Oak Woodlands. These woodlands are extremely variable. They are known to exist on over 15 different types of soils in the county, generally occurring on moderately to well drained soils that are moderately deep and have low to medium fertility. The overstory consists of deciduous and evergreen hardwoods, mostly oaks, up to 70 feet in height. The understory can vary from shrubs that are dense and almost impenetrable, to more scattered under and between trees, to grasslands where the trees are scattered to form an open woodland. Most coastal oak woodlands are comprised of medium to large trees with few seedlings and saplings, especially in heavily grazed areas.

These woodlands are comprised of slow growing, long-lived trees, so succession requires a long time. Regeneration of most oaks in coastal oak woodlands have not been thoroughly studied, but they are generally thought to not have the serious regeneration problems found in blue oak and valley oak. Coastal oak woodlands provide habitat for a large variety of wildlife species, up to as many as 110 species of birds observed during the breeding season in California habitats where oaks form a significant part of the canopy or subcanopy. The continuing loss of coastal oak woodland habitat is a significant concern.

Montane Hardwood. A typical montane hardwood habitat is composed of a pronounced hardwood tree layer, with poorly developed shrub and herbaceous layers. On better sites the trees may be only three feet apart, while on poorer sites the spacing may be as much as over 30 feet, with individual tree heights ranging from 50 to nearly 100 feet. Canyon live oak often form pure stands on steep canyon slopes and rocky ridgetops, but can be found on a wide range of slopes ranging from moderate to steep. Soils are for the most part rocky, alluvial, coarse textured, poorly developed and well drained. This habitat is characterized by bird and animal species that include both disseminators of acorns, as well as species that depend on acorns as a food source.

Conifer. True coniferous forest is rare in San Luis Obispo County. These evergreens are irregular in location and are usually rather small in area. However, there are several stands that can be considered true coniferous forest, including the Cambria Pine forest on the North Coast, Ponderosa Pines on Pine Mountain above San Simeon, Bishop Pines south of Coon Creek in the San Luis Range, Knobcone Pine mixed to a limited extent with Coulter Pine southeast of Cuesta Pass, and some Sargent Cypress with scattered Coulter Pines northwest of Cuesta Pass. Typically, the trees are closely spaced but may be more scattered when mixed with other species.

Shrub (chaparral). This habitat is characterized as mixed chaparral. Chaparral is a sort of catch-all that describes a wide variety of closely crowded shrubs with thick, stiff heavy evergreen leaves. The habitat extends throughout the county, from near the coastline to the La Panza Range on the eastern border of the county. Shrub height and crown cover can vary widely, depending on age since the last burn, rainfall, slope, orientation and soil types. Mixed chaparral can support a wide variety of woody plants, including scrub oak, chaparral oak, several species of ceanothus, manzanita, toyon and others. There are no wildlife species restricted to chaparral habitat.

Annual Grassland. The majority of grasslands throughout California are dominated by non-native grasses that were accidentally introduced from the Mediterranean region during the Spanish Colonization period. Grasslands in San Luis Obispo County are generally composed of introduced annual grasses. These introduced species occupy what was once pristine native grassland. However, small, scattered patches of native grasslands may still exist. Grasslands occur as understory plants in valley oak woodland and other habitats. This habitat provides important foraging, denning, and nesting opportunities for a variety of wildlife species.

Eucalyptus Woodland. Eucalyptus woodland is typically represented by dense stands of gum trees, commonly referred to as eucalyptus, that were originally imported primarily from Australia. The trees were originally planted in groves throughout many regions of coastal California as a potential source of lumber and building materials and for their use as windbreaks. They have increased their cover through natural regeneration, particularly in moist areas sheltered from strong coastal winds. Where the trees exist in dense stands, they tend to completely supplant native vegetation, greatly altering community structure and dynamics. Very few native plant species are compatible with eucalyptus.

Riparian Forest. Riparian forest lands can take one of two forms on the central coast. One is an open, low riparian forest dominated by coast live oak. This association occurs on drier, slightly elevated floodplains along perennial streams, and typically occupies a transitional zone between more moist cottonwood or willow-dominated communities and the more dry chaparral vegetation types.

A second type of riparian forest is the cottonwood-sycamore riparian forest. This is a habitat dominated by western sycamore, cottonwood, and valley oak. This association typically occupies course soils of the floodplains of low velocity streams. Cover is nearly complete and a dense thicket of shrubs may form in the understory. This habitat is found in canyons and creeks throughout the coastal area.

Coastal Saltmarsh. This is a wetland plant community comprised of salt tolerant species, reaching approximately three feet in height and forming moderate to dense cover. This association occupies sheltered inland margins of bays, lagoons, and estuaries subject to tidal inundation. Extensive areas of this habitat occur around Morro Bay.

Wetlands. Wetlands are considered important natural resources because the proper functioning of stream systems is a critical component of high-quality fish habitat. Woody vegetation provides shade that keeps water temperatures within tolerable ranges for fish and other aquatic organisms, stabilizes streambanks and floodplains, provides protective cover for wildlife, and contributes debris to stream channels for fish habitat structure. Herbaceous vegetation helps stabilize streambanks, and filters and traps sediments and pollutants.

Marine Intertidal. Marine intertidal communities consist of various aquatic plant species occurring in the nearshore marine environment. Aquatic plants within these communities are adapted to alternating exposure to air and inundation by seawater. Most marine aquatic vegetation is established on rocky substrate in areas influenced by marine tidal action. Rocky sea bottoms occupy a small portion of the entire coastline adjacent to the Estero planning area. Intertidal plant communities within these areas consist of a mixture of algae and marine angiosperms (flowering plants).

Estuarine. Estuarine communities occur where freshwater from streams mixes with water from the marine environment in a protected embayment. Estuarine communities are particularly abundant within Morro Bay. Large variations in salinity and water levels occur within the estuarine environment, primarily due to the indirect influence of the tides and seasonal changes in freshwater runoff from streams. Aquatic plants existing in the estuarine environment are generally inundated for prolonged periods, yielding plant species that are generally soft-bodied and somewhat flexible. Eelgrass (Zostera marina) is a common aquatic flowering plant species that occurs in estuarine environments and is adapted to constant inundation. This species is abundant within Morro Bay and is established on substrate consisting of deposited silt. Algal species, which occur as part of estuarine communities in the Estero planning area, include Ulva sp. and Cladophora sp.

Coastal Salt Marsh. Coastal Salt Marsh communities typically occur adjacent to the shallow waters occupied by the estuarine environment and function as an interface between marine and freshwater environments. These communities exhibit similar characteristics to those of estuarine communities, however, plants occurring within the coastal salt marsh are adapted to the stresses of variation in salinity, periodic inundation and extreme fluctuations in temperature. In the Estero planning area, coastal salt marsh communities are extensive and occur at the mouths of small coastal streams such as Chorro and Osos Creeks.

Freshwater Marsh. Freshwater Marsh communities occur in slow moving, shallow freshwater streams and lakes and are typified by areas containing nutrient rich mineral soil consistently saturated throughout the growing season. These communities are often found inland and adjacent to coastal saltmarsh communities. These communities also occur in isolated areas where the water table is at or near the ground surface, and are often referred to as "freshwater seeps". Freshwater marsh communities occupy a very small portion of the total planning area, and vegetation occurring as part of these communities is adapted to harsh environmental conditions, including prolonged soil saturation.

Riparian Scrub/Riparian Woodland. Riparian Scrub/Riparian Woodland communities are characterized as sparse to dense corridors of vegetation occurring adjacent to streams and rivers or in areas with a high ground water table. These communities occur as corridors bordering coastal and their tributaries. The structure of riparian communities within the planning area is variable and alternates between dense tree thickets (riparian woodland) and open, shrub dominated areas (riparian scrub). In addition, species composition often varies along the course of each coastal stream in conjunction with changes in topography. The extent of the vegetation in riparian communities within the planning area is highly dependent upon factors such as seasonal changes in flow rate, the size and nature of the streambank and by historical patterns of land use. Riparian scrub communities generally occur along perennial and intermittent streams and are typically dominated by willows (Salix spp.) and other various shrubs. Species like poison hemlock (Conium maculatum), wild blackberry (Rubus ursinus), twinberry (Lonicera involucrata), and sting nettle (Urtica holosericea) often comprise riparian scrub understory. Riparian woodland communities within the planning area are dominated by black cottonwood (Populus trichocarpa) and sycamore (Platanus racemosa). Understory species occurring within these communities.

Coastal Foredune. Coastal foredune communities usually occur adjacent to open sandy beaches and barren active dunes near the coast. These communities often integrate with dune scrub communities on more stabilized dunes away from the coast and in areas with well established dune hummocks (Holland, 1986). Because of the harsh environmental conditions present, coastal strand communities usually contain low species diversity. Plants occurring in these areas are tolerant of repeated burial by shifting sands and leaves of the members of these communities are usually small and somewhat succulent. Coverage within these areas varies from nearly complete to scattered.

Central Dune Scrub. Central dune scrub communities are generally located inland from coastal foredune communities and open sandy beaches. They are primarily established on recent to ancient coastal sand dunes. Away from the coast, these communities typically integrate with chaparral, coast live oak woodland or coastal sage scrub communities. Because central dune scrub communities are usually located in the wind shadow of active dune areas and they contain more vegetative cover, the soils tend to be considerably more stable than those of foredune areas. Species composition is highly variable within these communities, but generally contain high species diversity. Characteristic species include a variety of semi-woody shrubs such as mock heather (Ericameria ericoides), sand almond (Prunus fasciculata var. punctata), dune buckwheat (Eriogonum parvifolium), coastal silver lupine (Lupinus chamissonis), black sage (Salvia mellifera), and California sagebrush (Artemisia californica). Understory of central dune scrub communities is typically sparse and primarily comprised of various forbs and lichens.

Central (Lucian) Sage Scrub. Central sage scrub communities are found along the California coast south of the San Francisco Bay area (Holland, 1986). Most often, these communities occur in pockets in the outer and inner southern Coast Ranges and in scattered areas along the immediate coast. Species composition is highly variable in coastal scrub areas and is generally dependent upon topography, soils and slope aspect. Plants occurring in coastal scrub communities are characterized as being aromatic, low growing and drought tolerant. Common plant species include California sagebrush, coyote brush (Baccharis pilularis), monkeyflower (Mimulus spp.), poison oak (Toxicodendron diversilobum), California buckwheat (Eriogonum fasciculatum) and black sage (Salvia mellifera). Understory within coastal scrub communities is generally sparse and includes forbs such as plantain (Plantago sp.) and yarrow (Achillea sp.).

Central Maritime Chaparral. Central maritime chaparral communities occur in windswept areas of central and northern California. In San Luis Obispo County, they are most often established on well-drained, sandy substrates within the zone of summer fog incursion (Holland, 1986). Maritime chaparral is found to form a mosaic with central dune scrub, coastal scrub, and coast live oak communities. Stiff, woody shrubs such as Arctostaphylos spp. and Ceanothus spp dominate maritime chaparral communities. Other species frequently occurring as part of this community include toyon (Heteromeles arbutifolia), coffeeberry (Rhamnus californica), black sage, chamise (Adenostoma fasciculatum), and poison oak. Occasionally, in areas exposed to strong coastal winds, coast live oak (Quercus agrifolia) will also form a part of the community.

Ruderal (Disturbed habitat). Ruderal vegetation has been significantly disturbed by agriculture, construction, or other land clearing activities. Disturbed habitat occurs throughout the county in vacant lots, abandoned fields, roadsides, agricultural fields, greenbelts, parks, golf courses, and development areas. The primary difference between non-native grasslands and ruderal habitats are that the soil is often disturbed in ruderal habitats, which also lack the native wildflowers found in the grasslands. Characteristic uncultivated species recorded in disturbed habitats include non-native species such as wild mustard, wild radish (Raphanus sativus), Russian thistle (Salsola iberica), castor bean (Ricinus communis), wild oat, soft chess, red brome, ripgut grass (Bromus diandrus), sweet fennel (Foeniculum vulgare), Bermuda grass (Cynodon dactylon), and red stem filaree.

VEGETATION[6]

The County is comprised of multiple different plant communities. The wide variety of vegetation types add immeasurable beauty to the county's landscape, whether it be the oak studded hillsides, pines along a mountain ridge, or lush willows along the streams. In addition to the beauty, plants are a vital part of the ecosystem: shelter for wildlife; cleansing the air; preventing soil erosion and water pollution; and as food for man and animals.

As discussed in the regulatory framework section, special-status species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (ESA); those considered "species of concern" by the USFWS; those listed or proposed for listing as rare, threatened, or endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act (CESA); animals designated as "Species of Special Concern" by the CDFG; and the CDFG *Special Vascular Plants, Bryophytes, and Lichens List* (September 2004).

Based on information obtained by the review of existing literature and a search of the CNDDB, 103 special-status plant species were identified as having the potential to occur within the County. **Table A3-2** lists each sensitive plant species that has the potential to occur or is known to occur within the County, including the name and legal status of these species organized by planning area.

[6] This section is excerpted from the following County documents: Open Space Element (San Luis Obispo County 1998) and the Estero Area Plan Final Impact Report (San Luis Obispo County 2003), and the San Luis Obispo County Affordable Housing Ordinance Final Environmental Impact Report (San Luis Obispo 2007).

TABLE A3-2 SENSITIVE PLANT SPECIES POTENTIAL/KNOWN OCCURRENCES WITHIN SAN LUIS OBISPO COUNTY

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Abies bracteata	bristlecone fir	None	None	1B.3	S2.3							•	•							
Agrostis hooveri	Hoover's bent grass	None	None	1B.2	S2.2					•	•				•	•				•
Allium hickmanii	Hickman's onion	None	None	1B.2	S2.2								•							
Allium howellii var. clokeyi	Mt. Pinos onion	None	None	1B.3	S2.3						•							•		
Arctostaphylos cruzensis	Arroyo de la Cruz manzanita	None	None	1B.2	S2.2	•		•				•	•		•	•	•			
Arctostaphylos hookeri ssp. hearstiorum	Hearst's manzanita	None	None	1B.2	S1.2								•							
Arctostaphylos luciana	Santa Lucia manzanita	None	None	1B.2	S2.2	•		•			•			•			•			
Arctostaphylos montereyensis	Monterey manzanita	None	None	1B.2	S2.1							•								
Arctostaphylos morroensis	Morro manzanita	T	None	1B.1	S2.2			•								•	•			
Arctostaphylos osoensis	Oso manzanita	None	None	1B.2	S1.2			•												

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Arctostaphylos pechoensis	Pecho manzanita	None	None	1B.2	S2.2	•		•			•				•	•	•			
Arctostaphylos pilosula	Santa Margarita manzanita	None	None	1B.2	S2.2	•			•	•	•	•		•		•	•			
Arctostaphylos rudis	sand mesa manzanita	None	None	1B.2	S2.2															•
Arctostaphylos tomentosa ssp. daciticola	dacite manzanita	None	None	1B.1	S1.1			•												
Arctostaphylos wellsii	Wells's manzanita	None	None	1B.1	S2.1				•					•	•	•	•			•
Arenaria paludicola	marsh sandwort	E	E	1B.1	S1.1			•							•	•			•	•
Aristocapsa insignis	Indian Valley spineflower	None	None	1B.2	S2.2						•							•		
Astragalus didymocarpus var. milesianus	Miles's milk-vetch	None	None	1B.2	S2.2	•	•	•	•					•			•			•
Atriplex cordulata	heartscale	None	None	1B.2	S2.2													•		
Atriplex joaquiniana	San Joaquin spearscale	None	None	1B.2	S2.1			•												
Atriplex serenana var. davidsonii	Davidson's saltscale	None	None	1B.2	S2														•	•
Atriplex vallicola	Lost Hills crownscale	None	None	1B.2	S1.1													•		

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Baccharis plummerae ssp. glabrata	San Simeon baccharis	None	None	1B.2	S1.2	•							•							
Blepharizonia plumosa	big tarplant	None	None		S1.1													•		
Bloomeria humilis	dwarf goldenstar	None	None	1B.2	S1.1								•							
Calochortus clavatus var. recurvifolius	Arroyo de la Cruz mariposa lily	None	None	1B.2	S1.2								•							
Calochortus obispoensis	San Luis mariposa lily	None	None	1B.2	S2.1			•					•	•		•				
Calochortus palmeri var. palmeri	Palmer's mariposa lily	None	None	1B.2	S2.1				•		•									
Calochortus simulans	San Luis Obispo mariposa lily	None	None	1B.3	S2.3		•			•	•			•		•	•	•		
Calochortus weedii var. vestus	late-flowered mariposa lily	None	None	1B.2	S2.2						•							•		
Calycadenia villosa	dwarf calycadenia	None	None	1B.1	S2.1	•	•				•	•						•		
Calystegia subacaulis ssp. episcopalis	Cambria morning-glory	None	None	1B.2	S1.2			•						•		•	•			

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Camissonia hardhamiae	Hardham's evening-primrose	None	None	1B.2	S1.2		•			•				•				•		
Carex obispoensis	San Luis Obispo sedge	None	None	1B.2	S2.2	•		•		•	•	•		•			•			
Castilleja densiflora ssp. obispoensis	Obispo Indian paintbrush	None	None	1B.2	S2.2	•		•						•	•	•	•			
Caulanthus californicus	California jewel-flower			1B.1	S1.1													•		
Caulanthus coulteri var. lemmonii	Lemmon's jewelflower	None	None	1B.2	S2.2	•					•	•						•		
Ceanothus hearstiorum	Hearst's ceanothus	None	None	1B.2	S1.2								•							
Ceanothus maritimus	maritime ceanothus	None	None	1B.2	S2.2								•							
Centromadia parryi ssp. congdonii	Congdon's tarplant	None	None	1B.2	S3.2			•									•			
Chlorogalum pomeridianum var. minus	dwarf soaproot	None	None	1B.2	S1.2									•			•			
Chlorogalum purpureum var. reductum	Camatta Canyon amole	T	R	1B.1	S1.1						•							•		

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Chorizanthe breweri	Brewer's spineflower	None	None	1B.3	S2.2			•					•	•		•	•			
Chorizanthe pungens var. pungens	Monterey spineflower	T	None	1B.2	S2.2								•							
Chorizanthe rectispina	straight-awned spineflower	None	None	1B.3	S1.2	•	•			•	•			•		•		•		
Cirsium fontinale var. obispoense	Chorro Creek bog thistle	E	E	1B.2	S1.2	•					•		•	•			•			
Cirsium loncholepis	La Graciosa thistle	E	T	1B.1	S2.2										•	•	•		•	
Cirsium occidentale var. compactum	compact cobwebby thistle	None	None	1B.2	S2.1			•					•							
Cirsium rhothophilum	Surf thistle	None	T	1B.2	S2.2											•			•	
Clarkia speciosa ssp. immaculata	Pismo clarkia	E	R	1B.1	S1.1											•	•			•
Cordylanthus maritimus ssp. maritimus	salt marsh bird's-beak	E	E	1B.2	S2.1			•												
Deinandra halliana	Hall's tarplant	None	None	1B.1	S1.1											•		•		

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Deinandra increscens ssp. foliosa	leafy tarplant	None	None	1B.2	S2.2				•	•	•		•				•			
Delphinium parryi ssp. blochmaniae	dune larkspur	None	None	1B.2	S2.2						•						•		•	•
Delphinium recurvatum	recurved larkspur	None	None	1B.2	S2.2													•		
Delphinium umbraculorum	umbrella larkspur	None	None	1B.3	S3.3	•			•		•									
Dithyrea maritima	beach spectaclepod	None	T	1B.1	S2.1			•							•	•			•	
Dudleya abramsii ssp. bettinae	San Luis Obispo serpentine dudleya	None	None	1B.2	S1.2	•		•									•			
Dudleya abramsii ssp. murina	San Luis Obispo dudleya	None	None	1B.3	S2.3			•								•	•			
Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya	None	None	1B.1	S2.1	•		•					•				•			
Entosthodon kochii	Koch's cord-moss	None	None	1B.3	S1.3	•														
Eriastrum luteum	yellow-flowered eriastrum	None	None	1B.2	S2.2	•	•			•	•	•		•				•		
Erigeron blochmaniae	Blochman's leafy daisy	None	None	1B.2	S2.2			•							•	•			•	•

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Eriodictyon altissimum	Indian Knob mountainbalm	E	E	1B.1	S2.2			•								•				
Eriogonum temblorense	Temblor buckwheat	None	None	1B.2	S2.2													•		
Erodium macrophyllum	round-leaved filaree	None	None		S2.1		•				•			•				•		
Eryngium aristulatum var. hooveri	Hoover's button-celery	None	None	1B.1	S2.1								•				•			
Eschscholzia rhombipetala	diamond-petaled California poppy	None	None	1B.1	S1.1													•		
Fritillaria ojaiensis	Ojai fritillary	None	None	1B.2	S1.2						•									
Fritillaria viridea	San Benito fritillary	None	None	1B.2	S3.2			•						•			•			
Galium hardhamiae	Hardham's bedstraw	None	None	1B.3	S2.3	•						•								
Horkelia cuneata ssp. puberula	mesa horkelia	None	None		S2.1		•						•	•	•	•	•			
Horkelia cuneata ssp. sericea	Kellogg's horkelia	None	None	1B.1	S1.1									•					•	•
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	None	None	1B.1	S2.1			•					•					•		

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Lasthenia macrantha ssp. macrantha	perennial goldfields	None	None	1B.2	S2.2															
Layia heterotricha	pale-yellow layia	None	None	1B.1	S1.1							•								
Layia jonesii	Jones's layia	None	None	1B.2	S1.1	•		•							•	•	•	•		
Layia munzii	Munz's tidy-tips	None	None	1B.2	S1.1													•		
Lepidium jaredii ssp. album	Panoche pepper-grass	None	None	1B.2	S1.2													•		
Lepidium jaredii ssp. jaredii	Jared's pepper-grass	None	None	1B.2	S1.2		•							•				•		
Lupinus ludovicianus	San Luis Obispo County lupine	None	None	1B.2	S2.2				•	•				•		•				
Lupinus nipomensis	Nipomo Mesa lupine	E	E	1B.1	S1.1														•	•
Madia radiate	showy madia	None	None	1B.1	S2.1						•							•		
Malacothamnus davidsonii	Davidson's bush mallow	None	None	1B.2	S1.1							•								
Malacothamnus palmeri var. involucratus	Carmel Valley bush mallow	None	None	1B.2	S2.2	•								•						
Malacothamnus palmeri var. palmeri	Santa Lucia bush mallow	None	None	1B.2	S2.2	•							•	•						

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Malacothrix saxatilis var. arachnoidea	Carmel Valley malacothrix	None	None	1B.2	S2.2	•														
Microseris paludosa	marsh microseris	None	None	1B.2	S2.2								•							
Monardella crispa	crisp monardella	None	None	1B.2	S2.2			•							•				•	•
Monardella frutescens	San Luis Obispo monardella	None	None	1B.2	S2.2										•	•			•	
Monardella palmeri	Palmer's monardella	None	None	1B.2	S2.2			•		•		•	•	•			•			
Monolopia congdonii	San Joaquin woollythreads	E	None	1B.2	S3.2													•		
Nasturtium gambelii	Gambel's water cress	E	T	1B.1	S1.1														•	•
Navarretia nigelliformis ssp. radians	shining navarretia	None	None	1B.2	S1.1	•	•							•				•		
Navarretia prostrata	prostrate navarretia	None	None	1B.1	S2.1	•														
Pedicularis dudleyi	Dudley's lousewort	None	R	1B.2	S2.2								•							
Pinus radiate	Monterey pine	None	None	1B.1	S1.1								•							
Plagiobothrys uncinatus	hooked popcorn-flower	None	None	1B.2	S2.2	•						•								

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Poa diaboli	Diablo Canyon blue grass	None	None	1B.2	S1.2										•	•				
Sanicula maritima	adobe sanicle	None	R	1B.1	S2.2			•					•				•			
Scrophularia atrata	black-flowered figwort	None	None	1B.2	S2.2										•	•				
Senecio aphanactis	rayless ragwort	None	None	2.2	S1.2		•				•						•	•		
Sidalcea hickmanii ssp. anomala	Cuesta Pass checkerbloom	None	R	1B.2	S1.2									•			•			
Sidalcea hickmanii ssp. Parishii	Parish's checkerbloom	C	R	1B.2	S1.2						•									
Streptanthus albidus ssp. peramoenus	most beautiful jewel-flower	None	None	1B.2	S2.2	•		•					•			•	•			
Stylocline masonii	Mason's neststraw	None	None	1B.1	S1.1													•		
Suaeda californica	California seablite	E	None	1B.1	S1.1			•												
Sulcaria isidiifera	splitting yarn lichen	None	None	None	S1.1			•												
Symphyotrichum defoliatum	San Bernardino aster	None	None	1B.2	S3.2		•								•	•		•	•	•

Scientific Name	Common Name	Federal	State	CNPS	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Trifolium depauperatum var. hydrophilum	saline clover	None	None	1B.2	S2.2												•			
Triteleia ixioides ssp. Cookie	Cook's triteleia	None	None	1B.3	S2.3	•						•	•							
Tropidocarpum capparideum	caper-fruited tropidocarpum	None	None	1B.1	S1.1									•						
Viola aurea	golden violet	None	None	2.2	S2,S3													•		

Source: San Luis Obispo County Affordable Housing Ordinance EIR, 2007 (CNDDB database queried on December 11, 2006)
Notes:
Federal: T = threatened, E = endangered, C = candidate
State: T = threatened, E = endangered, R = rare
California Native Plant Society (CNPS):
List 1B = rare, threatened, endangered, in California and elsewhere.
List 2 = rare, threatened, or endangered in California, but more common elsewhere.
1 - Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
2 – Fairly endangered in California (20-80% occurrences threatened)
3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)
California Department of Fish and Game (CDFG):
S1 = Less than 6 viable Eos or less than 1,000 individuals or less than 2,000 acres;
S1.1 = very threatened,
S1.2 = threatened,
S1.3 = not very threatened or no current threats known.
S2 = 6-20 Eos or 1,000-3,000 individuals or 2,000-10,000 acres;
S2.1 = very threatened,
S2.2 = threatened,
S2.3 = not very threatened or no current threats known.
S3 = 21-80 Eos or 3,000-10,000 individuals or 10,000-50,000 acres
S3.1 = very threatened,
S3.2 = threatened,
S3.3 = not very threatened or no current threats known.

WILDLIFE[7]

There are a number of rare, threatened, and endangered species known to occur in the county, and others which have yet to be identified. Based on information obtained by the review of existing literature, a search of the CNDDB, and analysis of the habitat types present conducted as part of the environmental impact assessment of the County's proposed Affordable Housing Ordinance (San Luis Obispo, 2007), 53 special-status animal species were identified as potentially occurring within the County. **Table A3-3** provides a listing of each sensitive wildlife species that has the potential to occur or is known to occur within the County by planning area.

The San Joaquin Kit Fox and Morro Shoulderband Snail are high priority species in the County. The County has developed a Habitat Conservation Plans HCP) for the Morro Shoulderband Snail, and is currently seeking funding/preparing an HCP for the Kit Fox in the County. The following wildlife species appear to be the known priority species, among others:

Fish. Native fish species which may potentially occur in streams within the County include the partially-armored threespine stickleback (*Gasterosteus aculeatus microcephalus*), speckled dace (*Rhinichthys osculus*), and prickly sculpin (*Cottus asper*). The non-native mosquitofish (*Gambusia affinis*), is commonly found in association with these native freshwater species. Resident species of rainbow trout (*Oncorhynchus mykiss*) may also be present in the upper reaches of perennial streams in the planning area. Migratory steelhead trout (*Oncorhynchus mykiss*) are known to occur seasonally in coastal streams such as Chorro and Toro Creeks. In addition, marine species such as staghorn sculpin (*Leptocottus armatus*) will often enter coastal lagoons and estuarine habitats to feed and/or reproduce during the winter and spring when sand bars at the mouths of the streams have been breached.

Amphibians. Various amphibian species potentially utilize coastal streams and adjoining riparian corridors within San Luis Obispo County. The more common of these amphibians include native species such as Pacific chorus frog (*Psuedacris regilla*), western toad (*Bufo boreas*), ensatina (*Ensatina eschscholtzii*), newts (*Taricha* spp.), as well as the non-native bullfrog (*Rana catesbiana*). Other less-common amphibians that are known from the planning area include tiger salamander (*Ambystoma tigrinum*) and California red-legged frog (*Rana aurora draytoni*). Some of the amphibians that occur within the Estero planning area will utilize adjoining protected upland areas where sufficient moisture is present.

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[7] This section is excerpted from the following County documents: Open Space Element (San Luis Obispo County 1998) and the Estero Area Plan Final Impact Report (San Luis Obispo County 2003), and the San Luis Obispo County Affordable Housing Ordinance Final Environmental Impact Report (San Luis Obispo 2007).

Reptiles. Reptiles occur in a diverse array of habitats throughout San Luis Obispo County. Species which are expected to be present include, but are not limited to, western skink (*Eumeces skiltonianus*), southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), common kingsnake *(Lampropeltis getulus*), California horned lizard (*Phrynosoma coronatum*), common garter snake (*Thamnophis sirtalis*), striped garter snake (*Thamnophis couchii*), western rattlesnake (*Crotalus viridus*), and southwestern pond turtle (*Clemmys marmorata pallida*).

Mammals. The assorted habitats of the County support a variety of mammals including Virginia opossum (*Didelphis virginiana*), black-tailed jack rabbit (*Lepus californica*), Audubon's cottontail (*Sylvilagus audubonii*), Botta's pocket gopher (*Thomomys bottae*), western gray squirrel (*Sciurus griseus*), California ground squirrel (*Citellus beecheyi*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), striped and Western spotted skunk (*Mephitis mephitis*, *Spilogale gracilis*), badger (*Taxidea taxus*), black-tailed deer (*Odocoileus hemionus*), long-tailed weasel (*Mustela frenata*), ringtail (*Bassaricus astutus*) and several species of rodents and bats. Marine mammals, such as the Southern sea otter (*Enhydra lutris*), California sea lion (*Zalophus californianus*), and harbor seal (*Phoca vitulina*) utilize marine intertidal and estuarine habitats for feeding, and haul-out along rocky shore areas to rest.

Birds. Birds are found in every habitat throughout the County. Common bird species occurring within San Luis Obispo are identified below using standard nomenclature. Typical species that utilize open grassland areas and fields include red-tailed hawk, red-shouldered hawk, American kestrel, Cooper's hawk, white-shouldered kite, western meadowlark, Say's phoebe, and western bluebird. Riparian habitats support Anna's hummingbird, northern flicker, scrub jay, bushtit, black phoebe, belted kingfisher, black-crowned night heron and white-breasted nuthatch. Woodlands and coastal scrub areas provide resources for California quail, acorn woodpecker, brown towhee, and dark-eyed junco. Wading birds such as the snowy and great egret, and great blue heron frequent and utilize coastal saltmarsh and freshwater marsh habitats for feeding. Migratory shorebirds, including snowy plovers, avocets, sandpipers, and marbled godwits, occur in and utilize open sandy beach areas and estuarine habitats in the planning area. Telephone poles and tall trees provide roosting and hunting perches for raptors including red- tailed and red-shouldered hawks. Windrow trees, such as eucalyptus, often provide suitable nesting sites for birds of prey such as the great horned owl and barn owl.

Insects. Insects occur in all habitats within the County. They are considered valuable food sources for a variety of wildlife and often function as indicators as to the overall health of various habitats, particularly of aquatic habitats. The variety of insect species occurring within the planning area is extensive and representatives from all insect orders are expected to occur.

TABLE A3-3 SENSITIVE ANIMAL SPECIES POTENTIAL/KNOWN OCCURRENCES WITHIN SAN LUIS OBISPO COUNTY

Scientific Name	Common Name	Federal	State	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Accipiter cooperii	Cooper's hawk	None	None	SC			•		•	•	•		•	•	•		•	•	
Accipiter striatus	sharp-shinned hawk	None	None	SC															•
Agelaius tricolor	tricolored blackbird	None	None	SC												•	•		
Ambystoma californiense	California tiger salamander	T	None	SC				•		•						•	•		
Ammospermophilus nelsoni	Nelson's antelope squirrel	None	T	None													•		
Anniella pulchra pulchra	silvery legless lizard	None	None	SC			•			•			•				•		
Antrozous pallidus	pallid bat	None	None	SC	•		•					•	•			•	•		
Asio otus	long-eared owl	None	None	SC													•		
Athene cunicularia	burrowing owl	None	None	SC	•											•	•	•	
Branchinecta longiantenna	longhorn fairy shrimp	E	None	None													•		
Branchinecta lynchi	vernal pool fairy shrimp	T	None	None	•	•				•			•				•		
Buteo regalis	ferruginous hawk	None	None	SC								•	•						

Scientific Name	Common Name	Federal	State	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Charadrius alexandrinus nivosus	western snowy plover	T	None	SC			•							•				•	
Charadrius montanus	mountain plover	None	None	SC													•		
Coccyzus americanus occidentalis	western yellow-billed cuckoo	C	E	None												•			
Coelus globosus	globose dune beetle	None	None	None			•												
Corynorhinus townsendii	Townsend's big-eared bat	None	None	SC									•						
Cypseloides niger	black swift	None	None	SC								•							
Danaus plexippus	monarch butterfly	TP	None	None	•		•					•		•	•	•		•	•
Dipodomys heermanni morroensis	Morro Bay kangaroo rat	E	E	None			•												
Dipodomys ingens	giant kangaroo rat	E	E	None													•		
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	E	E	None													•		

Scientific Name	Common Name	Federal	State	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Emys (=Clemmys) marmorata pallida	southwestern pond turtle	None	None	SC	•											•			
Eremophila alpestris actia	California horned lark	None	None	SC												•			
Eucyclogobius newberryi	tidewater goby	E	None	SC	•		•					•		•	•			•	
Eumops perotis californicus	western mastiff bat	None	None	SC												•			
Euphilotes enoptes smithi	Smith's blue butterfly	E	None	None								•							
Gambelia sila	blunt-nosed leopard lizard	E	E	None													•		
Gila orcuttii	arroyo chub	None	None	SC														•	
Gymnogyps californianus	California condor	E	E	None				•		•							•		
Haliaeetus leucocephalus	bald eagle	T	E	None	•						•								
Helminthoglypta walkeriana	Morro shoulderband (=banded dune) snail	E	None	None			•								•				
Laterallus jamaicensis coturniculus	California black rail	None	T	None			•												

Scientific Name	Common Name	Federal	State	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Masticophis flagellum ruddocki	San Joaquin whipsnake	None	None	SC													•		
Neotoma lepida intermedia	San Diego desert woodrat	None	None	SC			•							•					
Neotoma macrotis luciana	Monterey dusky-footed woodrat	None	None	SC	•														
Nyctinomops macrotis	big free -tailed bat	None	None	SC			•												
Oncorhynchus mykiss irideus	steelhead - south/central California coast esu	T	None	None	•		•	•			•	•	•	•	•	•		•	
Onychomys torridus tularensis	Tulare grasshopper mouse	None	None	SC													•		
Perognathus inornatus psammophilus	Salinas pocket mouse	None	None	SC	•								•						
Phrynosoma coronatum (frontale population)	Coast (California) horned lizard	None	None	SC			•								•	•	•		
Progne subis	purple martin	None	None	SC									•						
Rallus longirostris obsoletus	California clapper rail	E	E	None			•												

Scientific Name	Common Name	Federal	State	DFG	Adelaida	El Pomar-Estrella	Estero	Huasna-Lopez	Las Pilitas	Los Padres	Nacimiento	North Coast	Salinas River	San Luis Bay Coastal	San Luis Bay Inland	San Luis Obispo	Shandon-Carrizo	South County Coastal	South County Inland
Rana aurora draytonii	California red-legged frog	T	None	SC	•		•	•		•		•	•	•	•	•	•	•	•
Rana boylii	foothill yellow-legged frog	None	None	SC								•							
Spea (=Scaphiopus) hammondii	western spadefoot	None	None	SC	•				•	•			•				•		•
Sterna antillarum browni	California least tern	E	E	None														•	
Taricha torosa torosa	Coast Range newt	None	None	SC	•			•				•	•						
Taxidea taxus	American badger	None	None	SC	•	•		•		•			•		•	•	•		•
Thamnophis hammondii	two-striped garter snake	None	None	SC	•			•		•		•							
Trimerotropis occulens	Lompoc grasshopper	None	None	None									•						
Tryonia imitator	mimic tryonia (=California brackishwater snail)	None	None	None			•							•				•	
Vulpes macrotis mutica	San Joaquin kit fox	E	T	None	•	•				•			•				•		

Source: San Luis Obispo County Affordable Housing Ordinance EIR, 2007 (CNDDB database queried on December 11, 2006)
Notes:
Federal: C = candidate, T = threatened, E = endangered
State: T = threatened, E = endangered
California Department of Fish and Game (CDFG): SC = Species of Concern

Regulatory Framework

Federal and State laws regulate wetlands, stream channels, and plant and animal species vulnerable to change or threatened with extinction. The jurisdiction, resource management practices, and code enforcement activities of the federal and State regulatory agencies vary depending on the specific sensitive resource. Wetlands and special-status plants and animals listed as “endangered” or “threatened” receive the highest protection. Other plant and animal species that are not listed are still considered vulnerable enough to be recognized as special status species. In addition, a number of unique natural communities (sensitive natural communities) are recognized by the California Department of Fish and Game because of their scarcity and continued loss as a result of development. The County development review process typically requires a site assessment by qualified professionals to confirm whether any sensitive resources could be affected, and to identify measures necessary to protect those resources and mitigate potential impacts. Detailed surveys are necessary where there is a potential for occurrence of sensitive resources. Consultation and permit authorization from regulatory agencies may be required where proposed development would affect essential habitat for listed special-status species or jurisdictional wetlands, although avoidance is the preferred mitigation whenever feasible. Enactment of local ordinances also serves to regulate potential loss of sensitive resources and establishes standards for protection and mitigation.

Regulation of plants, wildlife and their habitat, wetlands and riparian areas, occurs through a combination of federal, state, and local regulations, policies, and programs. Presentation of the regulatory framework provides the opportunity to identify jurisdictional responsibilities of key issues for the county, such as protection of listed species.

FEDERAL REGULATIONS AND POLICIES

Endangered Species Act

The Endangered Species Act of 1973 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. In general, the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) is responsible for protection of ESA-listed marine species and anadromous fish while other listed species come under the U.S. Fish and Wildlife Service (USFWS) jurisdiction. Endangered refers to species, subspecies, or distinct population segments that are in danger of extinction throughout all or a significant portion of their range while threatened species applies to species, subspecies, or distinct population segments that are likely to become endangered in the near future. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited. “Take” is defined in the Endangered Species Act (ESA) as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

Two key provisions of the ESA, commonly referred to as “Section 10” and “Section 7,” are summarized below. Section 10 provides a means for nonfederal entities (states, local agencies, and private parties) that are not permitted or funded by a federal agency to receive authorization to disturb, displace, or kill (i.e., take) threatened and endangered species. An incidental take permit is required when non-Federal activities will result in “take” of threatened or endangered wildlife. A habitat conservation plan (HCP) must accompany an application for an incidental take permit. The purpose of the habitat conservation planning process associated with the permit is to ensure there is adequate minimizing and mitigating of the effects of the authorized incidental take. The purpose of the incidental take permit is to authorize the incidental take of a listed species, not to authorize the activities that result in take.

Section 7 of the Endangered Species Act directs all Federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the Service, to ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat. Section 7 applies to management of Federal lands as well as other Federal actions that may affect listed species, such as Federal approval of private activities through the issuance of Federal permits, licenses, or other actions.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 imposes criminal and civil penalties for persons in the U.S. or within U.S. jurisdiction lands who take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export or import a bald eagle or golden eagle, alive or dead, of any part, nest, or egg of these eagles; or violates any permit or regulations issued under the Act without the permission of the Secretary of the Interior. The Secretary of the Interior may permit the taking, possession, and transportation of bald and golden eagles and nests for scientific or religious purposes, or for the protection of wildlife, agricultural, or other interests, if such actions are compatible with eagle preservation. The Secretary of the Interior may authorize the take of golden eagle nests that interfere with resource development or recovery operations.

National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) mandates all federal agencies or departments to disclose their projects’ effect on the environment. To meet this requirement, federal agencies prepare a detailed statement known as an Environmental Impact Statement (EIS). An EIS must include the environmental impacts of the proposed action; unavoidable adverse environmental impacts; alternatives including no action; the relationship between short term uses of the environment and maintenance of long-term ecological productivity; irreversible and irretrievable commitments of resources; and secondary/cumulative effects of implementing the proposed action. NEPA was created to ensure federal agencies and federal actions, such as federal approval of private activities through the issuance of federal permits, licenses, or other actions, consider the environmental impacts of their actions and decisions.

Migratory Bird Treaty Act

Migratory birds are protected under the MBTA of 1918 (16 USC 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The vast majority of birds found in the study area are protected under the MBTA. Thus, project construction has the potential to directly take nests, eggs, young or individuals of these protected species. Further, construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to the abandonment of nests, a violation of the MBTA.

STATE REGULATIONS AND POLICIES

California Environmental Quality Act

The California Environmental Quality Act (CEQA) is the regulatory framework by which California public agencies identify and mitigate significant environmental impacts. A project normally has a significant environmental impact on biological resources if it substantially affects a rare or endangered species or the habitat of that species; substantially impacts riparian habitat wetlands or other sensitive communities; substantially interferes with the movement of resident or migratory fish or wildlife; or substantially diminishes habitat for fish, wildlife, or plants.

According to the State CEQA Guidelines it is assumed that a proposed project would result in a significant impact if it would:

- Have a substantial adverse impact, either directly or through habitat modifications, any
- endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (§670.2 or 670.5) or in Title 50, Code of Federal Regulations (§17.11 or 17.12);
- Have a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;
- Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service;

- Adversely impact federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan or other approved local, regional, or state habitat conservation plan.

California Forest Practice Rules

The California Forest Practice Rules (Rules) (Title 14, California Code of Regulations Chapters 4, 4.5 and 10) implement the provisions of the Z'berg-Nejedly Forest Practice Act of 1973. Under the Rules, owners of timberland to another use (as defined in Section 1102) must obtain a Timberland Conversion Permit from the California Department of Forestry and Fire Protection.

California Endangered Species Act

The California Endangered Species Act (CESA) establishes state policy to conserve, protect, restore, and enhance endangered or threatened species and their habitats. The CESA is administered by the California Department of Fish and Game (DFG). The CESA prohibits all persons from taking species that are state listed as endangered or threatened except under certain circumstances. Definitions of endangered and threatened species in the CESA parallel those defined in the ESA. Take authorizations from California Department of Fish and Game (DFG) are required for any unavoidable impact on state-listed species resulting from proposed projects. Before considering a species for protected status, DFG designates the species as a species of special concern. Species of special concern are those species for which DFG has information to indicate that the species is declining.

California Fish and Game Code

The California Fish and Game Commission protects wildlife and plants listed as endangered or threatened under the California Endangered Species Act (CESA). The California Fish and Game Code identifies species that are fully protected and protects all birds and their nests. The DFG also has jurisdictional authority over streams and lakes and the wetland resources associated with these aquatic systems under California Fish and Game Code Sections 1600 et seq.

Fully Protected Species

California statutes also accord “fully protected” status to a number of specifically identified birds, mammals, reptiles, and amphibians. Section 3505 of the California Fish and Game Code makes it unlawful to “take” “any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird.”

Section 3511 protects from “take” the following “fully protected birds”: (a) American peregrine falcon (*Falco peregrinus anatum*); (b) brown pelican (*Pelecanus occidentalis*); (c) California black rail (*Laterallus jamaicensis coturniculus*); (d) California clapper rail (*Rallus longirostris obsoletus*); (e) California condor (*Gymnogyps californianus*); (f) California least tern (*Sterna albifrons browni*); (g) golden eagle; (h) greater sandhill crane (*Grus canadensis tabida*); (i) light-footed clapper rail (*Rallus longirostris levipes*); (j) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (k) trumpeter swan (*Cygnus buccinator*); (l) white-tailed kite (*Elanus leucurus*); and (m) Yuma clapper rail (*Rallus longirostris yumanensis*).

California Fish and Game Code Section 4700 identifies the following “fully protected mammals” that cannot be “taken”: (a) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (b) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (d) Guadalupe fur seal (*Arctocephalus townsendi*); (e) ring-tailed cat (genus *Bassariscus*); (f) Pacific right whale (*Eubalaena sieboldi*); (g) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (h) southern sea otter (*Enhydra lutris nereis*); and (i) wolverine (*Gulo gulo*).

Fish and Game Code Section 5050 protects from “take” the following “fully protected reptiles and amphibians”: (a) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*); (b) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); (c) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*); (d) limestone salamander (*Hydromantes brunus*); and (e) black toad (*Bufo boreas exsul*).

Fish and Game Code Section 5515 also identifies certain “fully protected fish” that cannot lawfully be “taken” even with an incidental take permit. The following species are protected in this fashion: (a) Colorado River squawfish (*Ptychocheilus lucius*); (b) thicktail chub (*Gila crassicauda*); (c) Mohave chub (*Gila mohavensis*); (d) Lost River sucker (*Catostomus luxatus*); (e) Modoc sucker (*Catostomus microps*); (f) shortnose sucker (*Chasmistes brevirostris*); (g) humpback sucker (*Xyrauchen texanus*); (h) Owens River pupfish (*Cyprinoden radiosus*); (i) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*); and (j) rough sculpin (*Cottus asperrimus*).

Wildlife Corridors

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link undisturbed areas that would otherwise be fragmented. Maintaining the continuity of established wildlife corridors is important to a) sustain species with specific foraging requirements, b) preserve a species' distribution potential, and c) retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

Protection of Birds and Their Nests

Eggs and nests of all birds are protected under Section 3503, nesting birds (including raptors and passerines) under Sections 3503.5 and 3513, and birds of prey under Section 3503.5. Migratory nongame birds are protected under Section 3800, and other specified birds under Section 3505. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., hawks, owls, eagles, and falcons), including their nests or eggs.

Native Plant Protection Act

The Native Plant Protection Act (NPAA) was enacted in 1977 to protect rare and endangered plants. The Act directs the Department of Fish and Game (DFG) to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The NPAA gave the California Fish and Game Commission the power to designate native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants.

Stream and Lake Protection

The Department of Fish and Game (DFG) has jurisdictional authority over streams and lakes and the wetland resources associated with these aquatic systems under California Fish and Game Code Sections 1600 et seq. DFG has the authority to regulate work that will "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake."

DFG enters into a streambed or lakebed alteration agreement with the project proponent and can impose conditions in the agreement to minimize and mitigate impacts to fish and wildlife resources. A lake or streambed alteration agreement is not a permit, but rather a mutual agreement between DFG and the project proponent. Because DFG includes under its jurisdiction streamside habitats that may not qualify as wetlands under the federal Clean Water Act definition, DFG jurisdiction may be broader than Corps jurisdiction.

A project proponent must submit a notification of streambed alteration to DFG before construction. The notification requires an application fee for streambed alteration agreements, with a specific fee schedule to be determined by DFG. DFG can enter into programmatic agreements that cover recurring operation and maintenance activities and regional plans. These agreements are sometimes referred to as Master Streambed Alteration Agreements (MSAAs).

Oak Woodland Conservation Act of 2001

The Oak Woodlands Conservation Act of 2001 recognizes the importance of California's oak woodlands and the critical role private landowners have in the conservation of oaks. The Act identifies the Wildlife Conservation Board (WCB) as the responsible entity to implement the Oak Woodlands Conservation Program. The Act created the Oak Woodlands Program with the expressed intent to accomplish the following:

- Support and encourage voluntary, long-term private stewardship and conservation of California oak woodlands by offering landowners financial incentives to protect and promote biologically functional oak woodlands;
- Provide incentives to protect and encourage farming and ranching operations that are operated in a manner that protect and encourage farming and ranching operation that are operated in a manner that protect and promote healthy oak woodlands;
- Provide incentives for the protection of oak trees providing superior wildlife values on private land, and;
- Encourage planning that is consistent with oak woodlands preservation.

In 2005, Senate Bill (SB) 1334 was passed by the California Legislature, mandating that counties require feasible and proportional habitat mitigation for impacts on oak woodlands as part of the CEQA process. Under Public Resources Code (PRC) Section 21083.4, a county is required to determine whether projects "may result in a conversion of oak woodlands that will have a significant effect on the environment." The law applies to all oak woodlands except those dominated by black oak. When it is determined that a project may have a significant effect on oak woodlands, mitigation is required. PRC Section 21083.4 institutes a cap on planting oaks for habitat mitigation (cannot fulfill more than 50 per cent of the required mitigation) and prescribes four mitigation options:

1) conserving oak woodland through the use of conservation easements,
2) contributing funds to the Oak Woodlands Conservation Fund to purchase oak woodlands conservation easements,
3) replanting trees, or
4) implementing other mitigation actions as outlined or developed by the county.

Regional Habitat Conservation Planning Efforts

Regional scale conservation planning efforts are occurring through the development of habitat conservation plans (HCPs) and natural community conservation plans (NCCPs). Section 10(a) of the Endangered Species Act authorizes HCPs and allows issuance of incidental-take permits upon approval of a conservation plan developed by the permit applicants. In 1991, the State of California passed the Natural Community Conservation Planning Act, which established the natural community planning program. NCCPs are carried out under state law and can be even broader than HCPs.

General Plan Guidelines (2003)

To assist local governments in meeting the state requirement to prepare and implement a comprehensive, long-term general plan, the Governor's Office of Planning and Research is required to adopt and periodically revise guidelines for the preparation and content of local general plans (Government Code 65040.2). The 2003 edition of *General Plan Guidelines* provides requirements for the elements in the General Plan.

The San Luis Obispo Conservation Element includes conservation element and open space element requirements, as defined by the Guidelines. The following requirements apply to biological resources in the Conservation Element:

- Managed production of forest resources
- Managed production of fisheries resources
- Water and its hydraulic force
- Rivers and other waters
- Harbors oriented towards public access and transportation or goods and services

LOCAL POLICIES

The County uses a combination of the General Plan, Land Use Ordinances, and CEQA Guidelines, where applicable, to avoid or minimize impacts of development and urbanization to sensitive biological resources. In many cases, the County incorporates state and federal approaches to protect sensitive resource areas.

The County's Inland and Coastal Land Use Ordinances applies Sensitive Resource Areas (SRA) combining designation is applied to areas of the county with special environmental qualities, or areas containing unique or endangered vegetation or habitat resources. The purpose of these combining designation standards is to require that proposed uses be designed with consideration of the identified sensitive resources, and the need for their protection. Development is permitted in SRAs provided that is found not to create significant adverse effects on the natural features of the site or vicinity that were the basis for the SRA designation, and will preserve and protect such features through the site design.

Voluntary Oak Woodland Management Plan

San Luis Obispo County is home to a wide variety of oak woodland habitats. These habitats provide numerous economic and environmental benefits on both a local and regional level. Historically oak woodlands have provided a foundation for livestock grazing, habitat for a variety of plants and animals, helped purify the water we drink, and filter the air we breathe. During the last century local oak woodlands have been most substantially affected by:

- Tree removal for urban development, agriculture, charcoal and firewood
- Introduction of nonnative, competitive plants
- Excessive livestock grazing, and
- Conversion from grazing to more intensive uses such as crop production and urban development.
- As the local population increases and the long-term economic feasibility of livestock production remains in question, pressures on local oak woodlands will continue. The challenge for San Luis Obispo County is twofold:
- To conserve our existing oak woodlands, and to enhance those woodlands that may have been impacted in the past.

The Voluntary Oak Woodland Management Plan is designed to encourage the long-term conservation of oak woodlands and recognizes that farming, ranching, and grazing operations can be compatible with oak woodland conservation.

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Introduction

Archaeological, cultural, and historical resources occur throughout the county, in all types of land use designations. This Element recognizes the importance of these resources and provides policies and implementation strategies to ensure that the County and private landowners identify and protect these resources. This Element works in partnership with the Land Use Ordinances (Titles 22 and 23) and state and federal laws, where applicable, to honor, identify, and protect cultural resources.

Cultural resources include prehistoric resources, historic resources, Native American resources, and paleontological resources. Prehistoric resources correspond to the remains of human occupation prior to European settlement. Historic resources refer to remains after European settlement and may be part of a "built environment," including human-made structures used for habitation, work, recreation, education, and religious worships such as houses, factories, office buildings, schools, churches, museums, hospitals, bridges and other structural remains. Native American resources include ethnographic elements pertaining to Native American issues and values.

Native Americans like the Chumash practice religion and learn about their history at special places such as Whale Cave, near Avila Beach, and Diablo Canyon. These places have special cultural significance and include sacred sites where prayer and spiritual ceremonies have been performed over hundreds and thousands of years. To Native Americans, such places represent their link with the past and are essential to their identity and culture.

The archaeological, cultural, and historical resources of this county, especially those related to Native Americans, are an important part of the history and heritage of this county. The need to preserve and protect these resources is not new as stated in the county's 1974 Environment Plan:

> *Unfortunately, many significant archaeological and cultural sites have been destroyed. Urbanization and uncontrolled public access appear to be the principal sources of destruction. Acquisition of sites is desirable, but funds are difficult to obtain for that purpose. Therefore, the application of special standards for the review of development can be the most effective way to protect archaeological and cultural resources, as well as historic sites. Educating the general public as well as landowners can also help protect these resources by increasing awareness and appreciation of their importance. (San Luis Obispo County, 1974, Environment Plan, Historic Element)*

This appendix provides an overview of the County's history, cultural resources, and regulatory context to supplement the goals, policies, and implementation strategies included in Chapter 4 of this Element.

Setting

Regional Prehistory

Archaeological research on California's Central Coast has tended to focus on Monterey Bay and the Santa Barbara area. Research has been conducted in other areas of the Central Coast, but the interpretation of archaeological data from these areas generally relies on cultural chronologies and artifact typologies developed for either Monterey Bay or the Santa Barbara area. Cultural connections certainly existed across the Central Coast from Monterey Bay to Santa Barbara, but research suggests that the area from San Luis Obispo to the northern end of the Santa Barbara Channel possesses unique environmental, archaeological, and ethno historical characteristics to have experienced at least some degree of independent development (Bouey and Basgall 1991). Regardless, recent cultural investigations and previous comprehensive overviews (cf., Glassow 1996; Jones and Stokes 1996; Roper et al 1996; Jones and Waugh 1995; King 1990; Bouey and Basgall 1991; Breschini et al 1983; Tainter 1971, 1977) do provide a framework for archaeological sites in the planning area.

The earliest documented collection of artifacts from the region dates to 1793 and consists of Chumash artifacts (Pilling 1952). Archaeological excavations along the southern California began during the late 1800s. These excavations generally concentrated on the recovery of artifacts for museum collections, and negatively affected numerous sites in the area. For example, Paul Schumacher excavated and subsequently damaged numerous sites attempting to amass collections of artifacts for the Smithsonian Institute (Moratto 1984: 123). Schumacher (1875), however, also conducted what might be described as a "scientific" survey of coastal middens in the sand dunes south of Pismo Beach for the Smithsonian Institute. The initial work of Schumacher and his contemporaries was followed in the early 1900s by the work of Philip Mills Jones. Jones (1900) made surface collections of artifacts at CA-SLO-56, the current location of the San Luis Bay Inn, for the University of California Anthropology Museum. The site was subsequently excavated in 1929, and defined as a large site complex, possibly a "capital of a regional chief" (King 1970).

George C. Carter initiated systematic excavation in the region in 1941, and documented three strata at Point Sal. These strata suggested strong affinities to already developed chronologies for the Santa Barbara Chumash. Regional archaeological research continued from the 1950s through the early 1970s at several localities such as Point Sal and other coastal sites (Pilling 1951); Arroyo Grande (Wallace 1962; Tainter 1971; Warren 1971); Morro Bay (Hoover 1973); Cayucos (Riddell 1960; Reinman 1961); and Pico Creek and Little Pico Creeks (Leonard et al. 1968). This work highlighted survey and single site excavation, and tended to reinforce theories that linked local cultures with surrounding groups, particularly groups to the south along the Santa Barbara Channel.

The excavations of six sites in Diablo Canyon by Greenwood (1972), is arguably one of the pivotal projects conducted in the region. Greenwood's excavations initiated large-scale cultural resource management (CRM) studies in the region, and provided the first radiometrically dated chronological sequence for the area. Radiocarbon dates obtained from two sites in Diablo Canyon documented a long cultural sequence that spans more than 9,000 years of prehistory. Other regional CRM and academic investigations have also tended to concentrate on the coast rather than inland areas. This research includes excavations at: CA-SLO-463 in the Los Osos Valley (Hoover 1973); CA-SLO-214 (Hoover and Sawyer 1977); the Fowler Site (Tainter 1971); CA-SLO-978 near Morro Bay (Gibson 1981); CA-SLO-372 (Baker 1977); several sites in Cambria and Piedras Blancas (Gibson 1979; Rudolph 1983); CA-SLO-99 in Pismo Beach (Breschini et al 1988); CA-SLO-7 and -8 in Diablo Canyon (Breschini and Haversat 1988); CA-SLO-186 and -187 in San Simeon State Park (Hines 1986); and CA-SBA-539, -670, and -931 on Vandenberg Air Force Base (Glassow 1996). The emphasis on coastal archaeological research has limited investigations in the immediate inland zone. Somewhat of an exception to this pattern is the work by Hoover and Sawyer (1977) at CA-SLO-214, the Los Osos Junior High School site.

Jones (1993) subdivided the Central Coast into three districts, Monterey Bay, Big Sur, and San Luis Obispo, to highlight geographic and cultural differences and similarities along it. Most archaeological research in the San Luis Obispo district has been conducted along the coast. There is relatively scant archaeological information regarding the inland area of this part of the Central Coast. In addition, most discussions regarding chronology have been site-specific rather than regional in perspective. Extant regional chronologies either tend to borrow from sequences established for Monterey Bay area or, more commonly, for the Santa Barbara Channel. Consequently, recent efforts at "building" local chronologies (cf., Glassow 1996; Jones and Waugh 1995; Bouey and Basgall 1991; Moratto 1984; King 1981) are still reliant, to some extent, on imported sequences from both the north and south of the San Luis Obispo district.

Established chronologies for the area do suggest continuity across the San Luis Obispo district. For example, the work of Carter (1941), Greenwood (1972), and Bouey and Basgall (1991) highlight similar developments and chronological correlates from the north to south end of the San Luis Obispo district. The regional chronological sequence, especially during early periods, also corresponds with frameworks developed for southern California (cf., Wallace 1955; Warren 1968). Recent research (cf., Moratto 1984; Jones and Waugh 1995; Glassow 1996) is beginning to address and rectify this circumstance.

Chronological models for the San Luis Obispo district of California's Central Coast generally identify four cultural periods: the Paleocoastal Period 11,000-8,000 B.P., the Early Period 8,000-3,000 B.P., the Middle Period 3,000-1,000 B.P., and the Late Period A.D. 1000-1800. The Paleocoastal Period (11,000-8,000 B.P.) proposed by Moratto (1984) and supported by Glassow (1996) is primarily represented by two sites at Diablo Canyon (Greenwood 1972). This poorly represented period correlates with Wallace's (1955) Early Man Horizon I and possibly Bedwell's (1970) Western Pluvial Lakes Tradition. Sites associated with this period tend to be located near estuaries and bay shores, and highlight a pattern of resources exploitation that includes both marine and terrestrial species.

The Early Period (8,000-3,000 B.P.) correlates with other cultural designations such as Oak Grove (Rogers 1929), Archaic (Olson 1930), Millingstone Horizon (Wallace 1955), and Encinita and Campbel Traditions (Warren 1968). Sites during this period are no longer situated near bays and estuaries, but are located on knoll tops and inland areas near permanent sources of fresh water. Typical artifacts include large flake tools, side-notched dart points, bone fishhooks and harpoon barbs, and manos and metates. The settlement shift during this period is typically explained by the migration of populations due to regional changes in environmental patterns (cf., Rogers 1929; Harrison and Harrison 1966; King 1981; Moratto 1984).

The Middle Period (3,000-1,000 B.P.), as proposed by King (1981), correlates with Rogers' (1929) Hunting People, Wallace's (1955) Intermediate Horizon, and Warren's (1968) Campbell and Chumash Traditions. There appears to be some continuity in site use from the Early Period through the Middle Period, but identifying sites that exhibit initial use and/or occupation is not unusual. This period is highlighted by an expansion of the subsistence base (i.e., an increased reliance on large pelagic fish and acorns). The settlement system includes both large villages and smaller logistic camps, and assemblages reveal an increase in shell beads and exotic trade items such as obsidian. This period seems to represent a time of cultural expansion, increased cultural complexity, and increased sociopolitical interaction (Hoover 1980).

The Late Period (A.D. 1000-1800), as proposed by King (1981), correlates with Rogers' (1929) Canaliño and Chumash cultures and Wallace's (1955) Late Prehistoric Horizon. The period is generally representative of ethnographic Chumash culture, and is characterized by an increase in population, the location of settlements to facilitate ocean access, introduction of the bow and arrow, and an increase in acorn use. There is also evidence of site specialization and a developed social hierarchy as suggested by burials and their associated grave goods (Hoover 1980; Bouey and Basgall 1991).

Full cultural development of the Chumash occurred during the Late Period. Marine fishing and trading constituted the principal economic pursuits. Differentiation in social status developed to a point at which village chiefs inherited their rank and probably controlled trade and redistribution. Only certain high-ranking lineages built and operated plank canoes. Trade and redistribution of goods from different environmental zones was facilitated by the use of shell bead "money," made almost exclusively on the Channel Islands where a specialized industry of producing microdrills (used to make shell beads) from local chert emerged (Arnold, 1987: 247). Coastal Chumash villages featured circular houses made of willow poles and thatch, with a hearth located in the center of the floor. Each village also contained a sweathouse, sacred council area, dance floor, and cemetery (Rogers, 1929).

During the Late Period, terrestrial animals were hunted with the bow and arrow (in addition to snares and traps), indicated by smaller projectile points weighing less than 3.5 grams (Fenenga, 1953). Acorns continued as a valuable food source, processed with stone mortars and pestles. As a storable food, acorns played an important role in increasing sedentism and developing social complexity (Johnson and Earle, 1987). Fashioned by specialists, shell ornaments and beads were used to reinforce status differences as well as provide a standard of exchange.

Current archaeological research along the Central Coast is attempting to refine chronologies and clarify relationships between groups across the area. The relationship of inland areas to coastal areas is also being investigated to identify settlement and subsistence strategies. This research will certainly expand and improve our understanding of regional prehistory.

Ethnography

San Luis Obispo County is within the territory historically occupied by the Obispeño Chumash (Gibson, 1990; Greenwood, 1978; Kroeber, 1953), with some overlap in the northern part of the County by the Salinan people. The Obispeño were the northernmost of the Chumashan speakers, occupying most of the western half of the county. The Obispeño dialect was quite divergent from the other Chumash languages (San Luis Obispo 2003).

When the mission period began in 1769, the Chumash occupied coastal areas from Malibu Canyon to Morro Bay and inland areas as far as the western edge of the southern San Joaquin Valley (Grant, l978a). The overall Chumash ethnolinguistic group included several dialectical subdivisions corresponding to territories around missions established by the Spanish, who assigned names to these groups. These subdivisions included the Ventureño near Mission San Buenaventura, the Barbareño near Mission Santa Barbara, the Ynezeño near Mission Santa Ynez, the Purismeño near Mission La Purísima, and the Obispeño near Mission San Luis Obispo. These missions were founded between 1772 and 1804. The Cuyama, Emigdiano, and Castaic Chumash lived further inland where no missions were built. Similarly, the Island Chumash inhabited the mission-less northern Channel Islands (San Luis Obispo 2007).

The Salinan are divided into 3 major divisions: the Antoniaño, Migueleño, and the Playanos. The southernmost Migueleño inhabited the northern portion of the county and derived its names from the Mission San Miguel Arcangel. The availability of archaeological and ethnohistoric data on the Migueleño is limited, especially when compared to the available data regarding the Chumash. The Salinan followed a hunting and gathering lifestyle based on the collection of plants foods; fishing and trade were also important components of their society (San Luis Obispo 2003).

Settlement, Social Organization, and Subsistence Patterns

Chumash occupy the California coast and Coast Range between Malibu and Estero Bay/San Simeon, including the Channel Islands (Kroeber 1925; Heizer 1966; Grant 1978 a,b,c). The aboriginal population has been estimated at between 15,000 and 20,000 (Cook and Heizer 1965; Brown 1967). Most descriptions of Chumash culture indicate a relatively dense population that exhibited an elaborate economic, social, and political life. The “complex” character of Chumash society is grounded in a flexible and mixed economic strategy highlighting both rich maritime and terrestrial resources (Hoover 1980).

Chumash primarily occupied villages comprised of round, domed structures made of willow poles and tule. Village locations are tied to seasonal strategies of resource exploitation (e.g., acorn, seed collecting, and fishing locales) (Landberg 1965).

Chumash society and their settlement system were organized around ranked lineages and distinct social stratification (King 1981). Chiefly lineages and other lineages associated with bureaucratic and ritual offices held the political and economic power of the social group. Villages were usually controlled by a hereditary chief who maintained power through the accumulation and expenditure of wealth, primarily in the form of Olivella shell bead money. In turn, high status “regional chiefs” controlled groups of villages. Other wealthy individuals, such as traders, were also capable of dominating certain aspects of the local and regional economy (King 1971, 1974). In addition, Chumash recognized other status positions associated with eclectic knowledge (e.g., weather predictors), specific rituals, and craft specialists (Bean 1974).

Technology

Chumash technology highlights the exploitation of marine resources. A typical Chumash toolkit includes Haliotis fishhooks, angled bone hooks, nets, traps, harpoons, and other projectiles (Hoover 1973). Northern Chumash groups used a distinctive Mytilus shell fishhook formed in a small J-shape and a circular form made of Haliotis shell. Chumash are routinely associated with ocean-going plank canoes, but their construction and use is limited to the Santa Barbara Channel (Greenwood 1978). The nature of the coastline within Purisimeño Chumash territory certainly limited the potential use of plank canoes and other types of watercraft in the area.

Steatite, bone, and shell beads were used for personal adornment. In addition, the giant Pismo clam (Tivela stultorum) was ground into beads and disks for use as money (Greenwood 1978). These shell disks were strung and traded by length, with the standard length being the circumference of the palm and outstretched fingers. Drilled tubes of clamshell were also very valuable, used as money, and also occasionally worn in the nasal septum (Greenwood 1978). Other popular non-utilitarian items of Chumash culture include wooden and bone flutes, steatite pipes, charmstones, and incised stone tablets.

Polychrome rock paintings of figures and abstract forms are well known traits of Chumash, particularly in the Santa Barbara Channel region.

History

Euroamerican Contact

Pedro de Unamuno's visit to Morro Bay in 1587 is the earliest documented Euroamerican contact with groups of Chumash in the general project area (Greenwood 1978:520). Unamuno was followed by Sebastian Cermeño, who stopped at San Luis Obispo Bay in 1595 (Greenwood 1978:520). The first overland expedition to the area was led by Gaspar de Portolá in 1769 (Greenwood 1978:520). The founding of Mission San Luis Obispo de Tolosa in San Luis Obispo in 1772 and the Mission San Miguel Archangel in 1797 had a dramatic effect on Chumash culture.

The Mission San Luis Obispo de Tolosa and the Mission San Miguel Archangel dominated the social, political, and economic lives of the people in the area during the Spanish Period (ca. 1769-1821). The Native American population, however, was slow to adapt to the mission "system" and convert to Catholicism (Englehart 1933). Religious conversion of the local Chumash population increased as the strength of the mission grew. This factor in combination with the onset of European diseases virtually ended the traditional life of Chumash in the region by the beginning of the early 1800s (Englehart 1933).

The Mexican Period (ca. 1821-1848) in California is an outgrowth of the Mexican Revolution, and its accompanying social and political views affected the mission system. In 1833, the missions were secularized and their lands divided among the Californios as Ranchos in the form of land grants. The ranchos facilitated the growth of a semi-aristocratic group that controlled large ranchos or land grants. The local Native American populations, who were essentially used as forced labor, worked on these large tracts of land. Consequently, the Purisimeño Chumash, as well as other groups across California, were forced into a marginalized existence as peons on the large land grant ranchos (Englehart 1933). Ranchos in the general project area include Guadalupe (San Luis Obispo), Punta de la Laguna, and Casmalia (Beck and Haase 1974).

The Chumash and Salinan way of life was forever altered with Spanish colonization. As the Spanish compelled many Chumash to live within the mission compounds, they were transformed from hunters and gatherers into agricultural laborers. They were also exposed to European diseases to which they had no resistance. As a result of sickness and poor treatment, large numbers of Chumash perished under the Spanish regime. By the end of the Mission Period in 1834, the Chumash and Salinan population had been decimated by disease and low birth rates. The native population at Mission San Luis Obispo, for example, plummeted from 919 individuals in 1803 to just 170 by 1838 (Greenwood, 1978: 521). Population loss as a result of disease and economic deprivation continued into the next century (San Luis Obispo 2007).

The end of the Mexican-American War and the signing of the Treaty of Guadalupe Hidalgo in 1848, mark the beginning of the American Period (ca. 1848-Present) in California history. The onset of this period did not alter the economic condition of the Native American populations working on the ranchos. The rancho system generally remained intact until 1862-1864 when a drought forced many landowners to sell or subdivide their holdings. Ranges began to be fenced and the economy shifted from cattle ranching to dairy farming and agriculture based on new crops such as wheat.

With the coming of the American Period, San Luis Obispo County was established as one of the original counties into which the new state of California was divided in 1850, but the present boundaries were not finalized until the Historical Survey Commission recommended more detailed codification of County boundary laws in 1919 (Coy, 1973: 233-237). First noted as a Spanish-Mexican pueblo in 1845 (Angel, 1883: 129), the City of San Luis Obispo was formally laid out in 1850 (Bright, 1998: 134; Gudde, 1998: 340). A stage line between San Francisco and San Diego included regular stops in San Luis Obispo from the 1850s through the early 1880s (Newmark, 1984: 153, 496).

By the 1870’s, San Luis Obispo County began to transform from a poor, remote, and sometimes violent outpost of rural California to a locale prized for its diverse and spectacular topography, breathtaking scenery, and rich farms and mines. The cinnabar mining rush began in the Cambria area and dairy farms predominated in Edna Valley and along the coast. The region began to transform and dairy and mining commerce generated the need for improved modes of transportation. By 1894, San Luis Obispo was accessible by rail, and California State Polytechnic College was established.

Regardless of a change of economic focus, the plight of Native American populations remained, at best, relatively unchanged (e.g., the U.S. Senate rejected treaties between the government and Native Americans in 1851 and 1852, and military reserves were established to maintain various groups) (Heizer 1974). The Santa Ynez Chumash Reservation was established in 1901 at Santa Ynez, just east of Santa Barbara. Regardless, conflicts concerning reservation lands and federal recognition of Native American groups continue to the present.

Throughout the 1900’s San Luis Obispo County remained largely an agricultural county. The World Wars and the Korean War brought economic growth to San Luis Obispo County as local suppliers supported the war effort. The County’s agricultural diversity shielded it from the worst of the Great Depression of the 1930s. There were difficult times, however, for many of those who came from other areas looking for work. The second half of the century was punctuated with infrastructure projects needed to support post-war population increases. The Army Corps of Engineers built the Santa Margarita Dam in 1942 to supply water for Camp San Luis Obispo; however, the water from the lake was never used for that purpose. Pacific Gas and Electric completed construction of the Morro Bay Power Plant in 1955. The 1960s saw the completion of Whale Rock Dam (the first major dam designed and constructed by DWR) and the Lopez Dam.

PALEONTOLOGICAL RESOURCES

Paleontological resources are fossilized remains of ancient environments, including fossilized bone, shell, and plant parts; impressions of plant, insect, or animal parts preserved in stone; and preserved tracks of insects and animals. Paleontological resources are valued for the information they yield about the history of the earth and its past ecological settings. In addition, fossils provide important chronological information used to interpret geological processes and regional history. They range from the well known and well publicized (such as dinosaur and mammoth bones) to the more obscure but scientifically important fossils (such as paleobotanical remains, trace fossils, and microfossils).

Paleontological resources are generally found in sedimentary rock units in which the boundaries of a sedimentary rock unit define the limits of paleontologic sensitivity in a given region. Most fossil material is found where bedrock is exposed on the surface, typically in mountainous terrain or in areas where erosion has removed the soil or regolith surface. As a result, paleontological sites are normally discovered in cliffs, ledges, steep gullies, or along wave-cut terraces where vertical rock sections are exposed. Fossil material may be exposed by a trench, ditch, or channel caused by construction (San Luis Obispo County 2007).

Regional geologic papers usually present numerous invertebrate fossil sites especially in marine rocks. Some invertebrate fossil sites are more productive than others. The richness of invertebrate fossils in marine rocks makes a particular invertebrate fossil discovery of less critical concern and significance (San Luis Obispo County 2007). In the county, the Coastal Franciscan domain generally lies along the mountains and hills associated with the Santa Lucia Range (San Luis Obispo 2003). Fossils recorded from the Coastal Franciscan formation include trace fossils (preserved tracks or other signs of the behaviors of animals), mollusks, and marine reptiles.

Nonmarine or continental deposits are more likely to contain vertebrate fossil sites. Occasionally vertebrate marine fossils such as whale, porpoise, seal, or sea lion can be found in marine rock units such as the Miocene Monterey Formation and the Pliocene Sisquoc Formations known to occur throughout Central and Southern California. Vertebrate fossils of continental material are usually rare, sporadic, and localized (San Luis Obispo County 2007). Scattered vertebrate remains (mammoth, mastadon, horse, groundsloth, camel, and rodents) have been identified from the Pleistocene non-marine continental terrace deposits on Vandenberg Air Force Base to the south (Flarz, 2003). Presently, these sites are known through fossil catalogues (Jefferson 2001, Revised).

Regulatory Framework

Several federal, state, and local regulations and policies protect the county's cultural resources. These regulations and policies establish a regulatory framework for the County's cultural resources.

FEDERAL REGULATIONS AND POLICIES

National Historic Preservation Act

The National Register of Historic Places is the nation's official list of cultural resources that warrant preservation. The National Historic Preservation Act of 1966 authorized the National Register as part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect the country's historic and archaeological resources.

The National Historic Preservation Act (NHPA) of 1996, as amended, is the primary mandate governing projects under federal jurisdiction that may affect cultural resources. Section 106 of the NHPA requires that, before beginning any undertaking, a federal agency consider the undertaking's effect on historic properties and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on these actions. The Section 106 process entails the following 6 steps:

- Initiate consultation and public involvement
- Identify and evaluate historic properties
- Assess effects of the project on historic properties
- Consult with the State Historic Preservation Officer (SHPO) regarding adverse effects on historic properties, resulting in a memorandum of agreement (MOA)
- Submit the MOA to the ACHP for approval
- Proceed in accordance with the MOA

The National Register of Historic Places lists 34 historically recognized locations within San Luis Obispo county; 18 of these sites are in the unincorporated county (refer to Table A3-3 below). National Register properties are distinguished by having been documented and evaluated according to uniform standards.

In addition to these sites, it is possible that other sites will qualify to be listed on the National Register of Historic Places or the California Register of Historical Resources in the future. Sites qualify for inclusion in these registers if they are determined to be associated with events or persons that are important in broad patterns of history; embody distinctive characteristics of design and/or construction, represent the work of an important creative individual, or have artistic value; and/or possess the potential to yield import information in prehistory or history.

TABLE A4-1
SITES LISTED IN THE NATIONAL REGISTER OF HISTORIC PLACES

Resource Name	Address	City	Date Listed
Caledonia Adobe	0.5 miles south of 10th Street	San Miguel	1971
Caliente Mountain Aircraft Lookout Tower	Northwest of New Cuyama	New Cuyama	1975
Carrizo Plain Rock Art District	Address Restricted	California Valley	2001
Corral de Piedra	South of San Luis Obispo on Price Canyon Road	San Luis Obispo	1978
Dana Adobe South	End of Oak Glen Avenue	Nipomo	1971
Eight Mile House	Off U.S. 101 on Stagecoach Road	Santa Margarita	1995
Guthrie House	Burton and Center Streets	Cambria	1980
Hearst San Simeon Estate	3 miles northeast of San Simeon	San Simeon	1972
Lincoln School	9000 Chimney Rock Road	Paso Robles	2001
Mission San Miguel	U.S. 101	San Miguel	1971
Old Santa Rosa Catholic Church and Cemetery	Main Street	Cambria	1982
Piedras Blancas Light Station	Highway 1 on Point Piedras Blancas	San Simeon	1991
Port San Luis Site	Address Restricted	San Luis Obispo	1978
Rancheria Del Buchon	Address Restricted	Edna	1978
Rancho Canada de los Osos y Pecho y Islay	Address Restricted	San Luis Obispo	1975
San Luis Obispo Light Station	Unknown	San Luis Obispo	1973
San Luis Obispo Light Station	Point San Luis	Avila Beach	1991
Southern Pacific Railroad Depot	1300 Mission Street	San Miguel	1978

Source: National Register of Historic Places, 2007.

National Environmental Policy Act

The use of federally owned land controlled by federal agencies or any project involving the use of federal funds triggers review under the National Environmental Policy Act (NEPA). NEPA addresses potential adverse effects on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places (NRHP), and requires mitigation for loss or destruction of significant scientific, cultural, or historical resources.

STATE REGULATIONS AND POLICIES

The Comprehensive Statewide Historic Preservation Plan provides guidance to the Office of Historic Preservation and the preservation community for the identification, registration, protection, and preservation of important historic resources. It encourages both the consideration of historic preservation during planning activities at the local level and public and professional support for historic preservation. The State Historic Building Code provides regulations for the preservation, restoration, rehabilitation, relocation, or reconstruction of buildings or structures designated as qualified historic buildings or properties. Its intent is to facilitate a cost effective approach for the preservation and continued use of qualified historic buildings or properties while providing reasonable safety for building occupants and access for persons with disabilities.

The California Coastal Act provides guidance and regulations for the identification, registration, protection, and preservation of important historic resources.

California Register of Historic Resources

Per Public Resources Code Section 5024.1(a), the California Register of Historic Resources (California Register) is “an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state’s historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from substantial adverse change.” The Office of Historic Preservation in the California State Parks oversees and administers the California Register. The criteria for listing resources on the California Register are based on those developed by the National Park Service for listing on the National Register of Historic Places with modifications in order to include a broader range of resources, which reflect the history of California. The California Register includes resources listed in or formally determined eligible for listing in the National Register, as well as some California State Landmarks and Points of Historical Interest. Historical Landmarks are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. A resource is considered historically significant if it:

- Is historically or archeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and,

Meets any of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

The Office of Historic Preservation lists 13 historically recognized places within San Luis Obispo County, and 7 of those landmarks are in the unincorporated county (refer to Table A3-2 below). Historical places are distinguished by having been documented and evaluated according to uniform standards.

TABLE A4-2
CALIFORNIA STATE LANDMARKS

Resource Name	Address	City
Estrella Adobe Church, No. 542	Airport Road, 2.5 miles north of Hwy 46	Paso Robles
Hearst San Simeon State Historical Monument, No. 640	Hearst San Simeon State Historical Monument	San Simeon
Rancho Nipomo (Cpt. William G. Dana Rancho), No. 1033	6715 Oakglen Avenue	Nipomo
Rios-Caledonia Adobe, No. 936	700 Mission Street	San Miguel
Santa Margarita Asistencia Rancho, No. 364	Santa Margarita Hay Barn	Santa Margarita
The Sebastian Store, No. 726	San Simeon Road	San Simeon
Twentieth Century Folk Art Environments, No. 939	Nitt Witt Ridge, 881 Hillcrest Drive	Cambria

Source: State Office of Historic Preservation, 2007.

California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on both “historical resources” and “unique archaeological resources.” Pursuant to Public Resources Code Section 21084.1, a “project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.” Section 21083.2 requires agencies to determine whether proposed projects would have effects on “unique archaeological resources.” As a lead agency, the County is committed identifying and protecting significant resources.

“Historical resource” is a term with a defined statutory meaning (Public Resources Code, Section 21084.1 and State CEQA Guidelines, Section 15064.5 [a], [b]). The term embraces any resource listed in or determined to be eligible for listing in the California Register of Historical Resources.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the California Register and are presumed to be “historical resources” for purposes of CEQA unless a preponderance of evidence indicates otherwise (Pub. Resources Code, Section 5024.1 and California Code of Regulations, Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource potentially eligible for the California Register.

Appendix G of the State CEQA Guidelines states that a project would result in a potentially significant impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- Disturb any human remains, including those interred outside of formal cemeteries.

For historic structures, State CEQA Guidelines Section 15064.5, subdivision (b)(3), indicates that a project that follows the Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Secretary of the Interior’s Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995) shall mitigate impacts to a level of less than significant.

Potential eligibility also rests upon the integrity of the resource. Integrity is defined as the retention of the resource's physical identity that existed during its period of significance. Integrity is determined through considering the setting, design, workmanship, materials, location, feeling and association of the resource.

Archaeological Resources

As noted above, CEQA also requires lead agencies to consider whether projects will impact "unique archaeological resources." Public Resources Code Section 21083.2, subdivision (g), states that "'unique archaeological resource' means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- "Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person."

Archaeological resources may also qualify as "historical resources" and Public Resources Code 5024 requires consultation with the Office of Historic Preservation when a project may impact historical resources located on State-owned land.

The Central Coastal Information Center (CCIC), Institute of Archaeology, University of California at Santa Barbara, operated under the State Office of Historic Preservation, is the official repository for all San Luis Obispo county data concerning surveys, site records, excavations reports, and relevant literature. CCIC provides site location data and/or the exact contents of surveyed sites only to qualified professional archaeologists, who are prohibited from disclosing this information to the public. California Government Code Section 6254.10 exempts archaeological site information from the California Public Records Act, which requires that public records be open to public inspection.

Paleontological Resources

Paleontological resources are the fossilized remains of prehistoric plant and animal organisms. Paleontological resources are also the mineralized impressions (trace fossils) left as indirect evidence of the form and activity of such organisms. Paleontological resources are considered to be nonrenewable resources under state and federal law.

Section 5097.5 of the California Public Resources Code (PRC) prohibits excavation or removal of any "vertebrate paleontological site or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands." PRC 30244 requires that adverse impacts to paleontological resources from development on public land be reasonably mitigated.

Additionally, Penal Code Section 623 spells out regulations for the protection of caves, including their natural, cultural, and paleontological contents. It specifies that no "material" will be removed from any natural geologically formed cavity or cave, including all or any part of any paleontological item.

Paleontologic sensitivity

Paleontologic sensitivity is the potential for a geologic unit to produce scientifically significant fossils, as determined by rock type, past history of the rock unit in producing fossil materials, and fossil sites that are recorded in the unit. A paleontologic sensitivity rating is derived from fossil data from the entire geologic unit, not just from a specific survey area. However, it does not measure the significance of individual fossils present within the county, because it is impossible to predict what individual fossils may be discovered. The significance of an individual fossil can only be determined after it is found and evaluated (San Luis Obispo County 2007).

The Society of Vertebrate Paleontology recommends a three-fold classification of sensitivity, labeled as high, low and indeterminate, as follows:

- High Sensitivity – Indicates fossils are currently observed on-site, localities are recorded within the study area and/or the unit has a history of producing numerous significant fossil remains.
- Low Sensitivity – Indicates significant fossils are not likely to be found because of random fossil distribution pattern, extreme youth of the rock unit and/or the method of rock formation, such as alteration by heat and pressure.
- Indeterminate Sensitivity – Unknown or undetermined status indicates that the rock unit either has not been sufficiently studied or lacks good exposures to warrant a definitive rating. This rating is treated initially as having a high sensitivity or potential.

After study or monitoring, the unit may fall into one of the other categories.

Other professionals expand the previous classification to include up to three additional ratings of very high, moderate and no sensitivity, as follows:

- No Sensitivity – Some paleontologists use this for crystalline rock units such as igneous rocks, where the rock forms from molten magma, which would preclude fossil preservation.

- Moderate Sensitivity – Applied by some to geologic units that have a history of producing meager fossil collections.
- Very High Sensitivity – May be warranted for a project that contains very well known and scientifically important localities. Another example would be if a known fossil bone bed is present or is predicted to be present.

Regulations Concerning Native American Heritage

California Public Resources Code 5097.*9* states that no public agency, or a private party on a public property, shall "interfere with the free expression or exercise of Native American Religion…." The code further states that:

> *No such agency or party [shall] cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine…except on a clear and convincing showing that the public interest and necessity so require. County and city lands are exempt from this provision, expect for parklands larger than 100 acres.*

Senate Bill 18 (Gov. Code, Sections 65352.3, 65352.4) requires that, prior to the adoption or amendment of a general plan or specific plan proposed on or after March 1, 2005, a city or county must consult with Native American tribes with respect to the possible preservation of, or the mitigation of impacts to, specified Native American places, features, and objects located within that jurisdiction. The intent of SB18 is to provide California Native American tribes an opportunity to participate in local land use decisions at an early stage of planning, for the purpose of protecting, or mitigating impacts to cultural places. These consultation and notice requirements apply to the adoption and amendment of both general plans and specific plans.

Regulations Concerning Human Remains

Disturbance of human remains without the authority of law is felony (California Health and Safety Code, Section 7052). If the remains are Native American in origin, they are within the jurisdiction of the Native American Heritage Commission (NAHC) (California Health and Safety Code, 7052.5c; Public Resources Code, Section 5097.98)

According to state law (California Health and Safety Code, Section 7050.5, California Public Resources Code, Section 5097.98), if human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

- The coroner of the county has been informed and has determined that no investigation of the cause of death is required; and
- If the remains are of Native American origin.

- The descendents from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of with appropriate dignity the human remains and any associate grave goods as provided in Public Resources Code Section 5097.98; or
- The NAHC was unable to identify a descendent or the descendent failed to make a recommendation within 24 hours after being notified by the commission.

According to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the NAHC.

Relevant Agencies and Organizations

The County includes cultural societies, museums and municipal agencies that work to promote the preservation of cultural resources in the County. These organizations include, but are not limited to, the following:

- Atascadero Historical Society, Atascadero
- Camp Roberts History Museum, San Miguel
- Dana Adobe Nipomo Amigos
- El Paso de Robles Area Pioneer Museum, Paso Robles
- El Paso de Robles Historical Society and Carnegie Historic Library, Paso Robles
- Estrella Warbird Museum, Paso Robles
- Friends of the Adobes, San Miguel
- Friends of Hearst Castle, San Simeon
- Hearst San Simeon State Historic Monument, San Simeon
- Heritage Shared
- Hollister Adobe Museum, San Luis Obispo
- Jack House, San Luis Obispo Parks and Recreation Department, San Luis Obispo
- Mission San Luis Obispo de Tolosa, San Luis Obispo
- Mission San Miguel, San Miguel
- Morro Bay State Park Museum of Natural History, Morro Bay

- San Luis Obispo Archaeological Society, San Luis Obispo
- San Luis Obispo Children's Museum, San Luis Obispo
- San Luis Obispo County Historical Museum, San Luis Obispo
- Santa Margarita Historical Society
- South County Historical Society
- Shakespeare Press Museum, San Luis Obispo
- Templeton Historical Museum, Templeton
- Northern Chumash Tribal Council

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Introduction

The production, transportation, and use of energy by our society raise important public policy issues involving the activities of both government and the private sector. Energy issues affect commerce, the provision of public services, land use planning and development, transportation, as well as most other aspects of daily life.

Using energy more wisely (energy conservation and efficiency) will save residents and businesses money and will lead to a better environment. Changes in land use patterns, transportation systems, building designs, agricultural practices, and recycling efforts can all lead to greater energy efficiency and conservation. Even changes in how electricity is produced can lead to greater energy efficiency. For example, a cogeneration facility can increase efficiency by using left over heat from an industrial process to make electricity. Conversely, a cogeneration facility could first generate power and then use the waste heat for a commercial process. The energy required to generate both the electricity and the useful heat in the cogeneration facility can be significantly less than the energy required to generate the electricity and useful heat in separate processes.

The County has abundant resources (in the form of sunlight and biomass) that can be used to generate electrical energy for local use. However, the County lacks the facilities to take advantage of such resources. In particular, a solar energy farm currently being proposed in the Carrizo Plains could minimize the County's reliance on imported electricity. A decreased reliance on imported energy resources would have positive impacts on the County. For example, the money that results from the production and distribution of energy will remain in the County and strengthen the local economy. The local economy would also benefit from the monies used to build and operate the facility. However, the environmental and social impacts of any power plant and electrical transmission line facilities must be carefully evaluated prior to approval of such facilities.

There are two remaining oil and gas fields in San Luis Obispo County. There is also an extensive network of pipes, pump stations, storage tanks, and marine terminals to transport the oil resources. In the past twenty years many of the oil facilities in the county have been closed or decommissioned.

Since the publication of the original Energy Element of the General Plan in 1995, the energy focus in the county has changed from fossil fuels production and energy generation to alternative energy, efficient building (called “green building”) and reduction in vehicle miles traveled. The reasons for this change in focus include the increasing cost of fossil fuels, the move toward reducing greenhouse gas emissions and the cost of building new infrastructure for sprawling development.

Purpose and Benefits

The purpose of the Energy Chapter is to 1) increase energy efficiency in the county, 2) provide policy basis for implementation of Strategic Growth Principles, 3) lead to creation of more compact communities and reduce rural sprawl and development, 4) determine land use and environmental criteria for evaluating future energy projects, and 5) provide for green building policies to conserve energy and water resources and to guide the County toward a sustainable energy future.

The benefits of having an Energy chapter generally come in two categories: economic and environmental. Economic advantages include:

- The Energy chapter encourages smart growth patterns. These development patterns concentrate development in a central area and provide a mix of services and jobs near housing. Because jobs and/or services are closer, this will result in fewer or shorter automobile trips and less money spent on automobile fuel and maintenance.
- Energy efficiency and conservation measures can reduce residential utility bills which increases the household disposable income and purchasing power. Likewise, such measures can reduce operating costs for businesses, which will result in lower overhead expenses and increased profits. When disposable income and business profits increase, the local economy is stronger because more dollars are generally spent in the community and re-circulate to local businesses and residents. Energy efficiency and conservation measures can reduce the need to build large scale power plants. Such facilities are expensive and may cause utility rate increases.
- The Energy Chapter encourages the development of local renewable resources, such as the solar potential in the Carrizo Plains. Solar energy development is a key to reducing greenhouse gas emissions and reducing the effects of global climate change. Such development could also create local jobs and provides local sources of electricity. The Energy Element encourages the development of smaller power producing facilities that meet local needs.

Development of energy resources often raises environmental concerns related to air and water quality, resource use, and hazardous waste disposal. The environmental benefits of such actions include:

- Residents who live in compact communities tend to drive less (or at least drive shorter distances) because services are closer. Likewise, it is easier to establish convenient bus service in compact communities. Both these actions will lead to less traffic and enhanced air quality.

- Energy efficiency and conservation measures encourage residents and businesses to use less natural gas and electricity. Most power plants in California rely on natural gas or oil as fuel. With decreased electricity use, air quality will improve because less fossil fuels are burned. The need to build large power plants can be deferred or avoided, thereby avoiding environmental impacts associated with those plants.
- Using renewable fuel resources, such as hydroelectric, solar, and cogeneration, will decrease fossil fuel consumption or improve energy efficiency. Use of alternative energy will also reduce greenhouse gas emissions and the effects of global climate change.
- Land use strategies that encourage compact communities in existing urban areas also act to preserve open space and agricultural land as described in the eleven principles of smart growth adopted by the Board of Supervisors in June 2005.

Relationship of the Energy Chapter to Other General Plan Elements

The General Plan is required by law to be an internally consistent statement of community policy. Each element of the General Plan must be integrated and consistent with all other elements. This chapter is related to goals and policies in other Elements of the County's General Plan, and other chapters within the Conservation Element.

Existing Conditions and Challenges

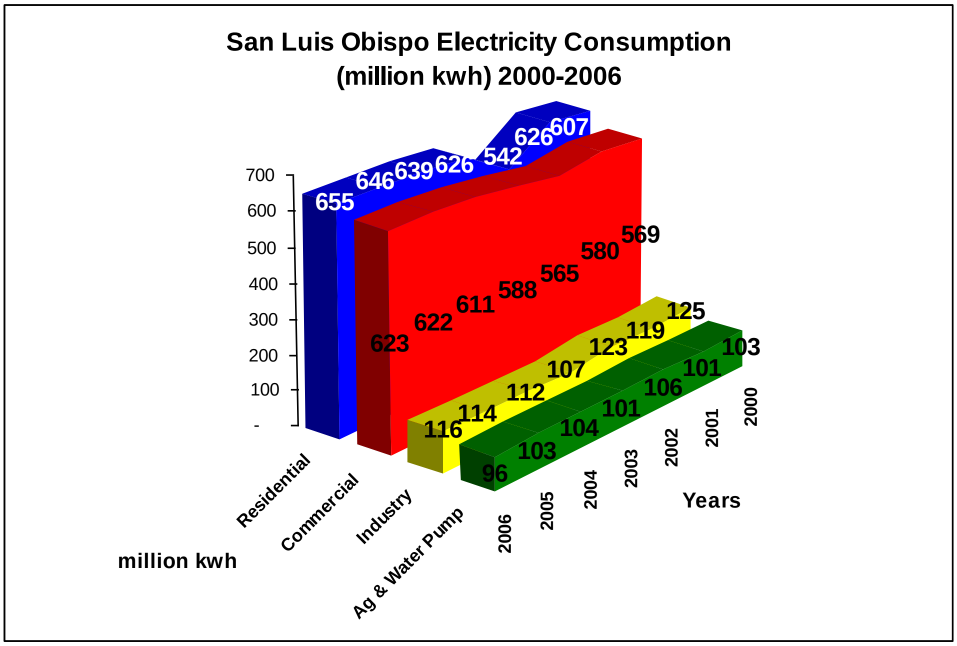
Most people have an intuitive understanding of the importance of energy conservation—using less energy saves money—not only in costs associated with utility bills but also in other costs that are harder to quantify, such as environmental degradation from pollution or resource depletion. The benefits of using energy wisely include improved air and water quality, less production of *greenhouse* gases (carbon dioxide and others that contribute to global warming), and increased environmental quality. The issues involving energy conservation and efficiency include: land use, transportation, new building construction, building retrofits, public facilities, agricultural practices, energy education, recycling and reuse, and related economic impacts of conservation and efficiency measures.

California is one of the largest users of energy in the nation. Nearly half of all energy consumed within the state is used to move people and goods. The state's residential and commercial sectors continue to rely on electricity and natural gas.

There are a number of energy resources that can be found or utilized within San Luis Obispo County, including natural gas, oil, wind, solar, biomass, and hydroelectric. In some cases available energy resources are not presently used to their potential. Some limitations include; the cost competitiveness of large scale systems, increased initial capital investment for buildings, and lack of economic incentives for developing a resource. Where the environmental consequences can be minimized, the use of local resources may offer the best alternatives to importing large amounts of energy from other areas of the state.

Energy resources are imported into the County primarily by the two major utilities that serve the County. Pacific Gas and Electric (PG&E) provides electricity and Southern California Gas Company provides natural gas. Propane is supplied by several private companies. Gasoline is imported via tankers and trucks. Uranium and natural gas are imported into the County for conversion to electricity which is then exported to the main California power grid in the San Joaquin Valley. San Luis Obispo County receives power from that grid.

FIGURE A5-1
ELECTRICITY CONSUMPTION



Source: Pacific Gas and Electric

ENERGY CONSERVATION AND EFFICIENCY

Energy efficiency and conservation reduces the need for additional power plants or other energy facilities that could cause undesirable environmental effects as mentioned in the introduction. Business profits will be greater if business energy costs are reduced (all other factors held constant), and residential energy customers will have more disposable income to spend for non-energy purposes if their energy costs are reduced. Many energy saving measures are inexpensive and have a short payback period. Some require a larger capital investment than others. The local and regional economy can also benefit from the money spent on home or business improvement projects to increase energy efficiency.

This chapter identifies opportunities for County residents and businesses to use energy more wisely through conservation and efficiency programs. These ideas include:

- developing compact land use patterns,
- decreasing reliance on cars and encouraging more walking, biking, and riding the bus,
- constructing more energy efficient homes and buildings,
- ensuring that County facilities and operations are as energy efficient as possible,
- continuing to take advantage of energy saving opportunities in agricultural operations, and
- promoting recycling and reuse programs.

Regulatory Framework

Regulations at the local, regional, state and national level provide policy and regulation for energy resources and supply. Several applicable policies and legislation related to energy are outlined below.

NATIONAL

National Energy Policy

The components of National Energy Policy include:

- The Policy is a long-term, comprehensive strategy.
- The Policy will advance new, environmentally friendly technologies to increase energy supplies and encourage cleaner, more efficient energy use.
- The Policy seeks to raise the living standards of the American people, recognizing that to do so our country must fully integrate its energy, environmental, and economic policies.
- The National Energy Policy seeks to increase America's use of renewable and alternative energy. The Policy provides numerous recommendations to support the production and use of alternative and renewable energy including, but not limited to:
- To reevaluate access limitations to federal lands in order to increase renewable energy production, such as biomass, wind, geothermal and solar,
- Budget amendment to provide increased support for research and development of renewable energy resources.
- Conduct a review of current funding and historic performance of renewable energy and alternative energy research and development programs, and

- Expand tax credits to include landfill methane projects.

STATE

Global Warming Solutions Act of 2006 (AB 32)

Signed in September 2006, AB 32 requires that statewide greenhouse gas (GHG) emissions be reduced to 1990 levels (427 million metric tons of carbon dioxide equivalent) by the year 2020, an expected 29 percent reduction. This reduction will be accomplished through an enforceable statewide cap on GHG emissions.[1] To effectively implement the cap, AB 32 directs the California Air Resources Board to develop and implement regulations to reduce statewide GHG emissions from stationary sources.

California Building Standards Code, Title 24

Adopting green building standards requires an amendment to the California Building Standard Code (BSC). According to California State law, any city, County, or fire protection district may establish more restrictive building standards than those contained in the California Building Standards Code (California Code of Regulations, Title 24), if the amendment is reasonably necessary because of local climatic, geological, or topographical conditions [Health and Safety Code Section 18941.5(b)].

When making a local amendment, the law requires that a city or County do all of the following [Health and Safety Code Section 17958.7(a)]:

1) Expressly mark and identify each change to existing building standards.
2) Make an express finding that each change is reasonably necessary because of local climatic, geological, or topographical conditions.
3) File with the BSC a copy of each change and its related findings.

No city or County amendment is effective until the city or County files the change and its related findings with the BSC. The failure of a city or County to file its amendment with the BSC implies that the California Building Standards Code, without amendment, applies within that local jurisdiction.

California Code of Regulations, Title 20

Title 20, last amended in March 2007, includes regulations pertaining to the rules of practice and procedure and power plant site certification. The California Energy Commission has the statutory authority to site and license thermal power plants that are rated at 50 megawatts and larger.

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[1] California Air Resources Board, Staff Report California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, November 16, 2007.

SB 1078, SB 107, and Assembly Bill 1585

Originally, SB 1078 established a Renewable Portfolio Standard (RPS) program in 2002, with the goal of increasing to 20 percent by 2017 the percentage of the state's electricity that is sold to retail customers and derived from renewable resources.

Spurred by the 2003 Energy Action Plan adopted by the Energy Commission and the California Public Utilities Commission (CPUC), SB 107 accelerated and codified the target year to be 2010. Under SB 107, publicly owned utilities are required to report to the Energy Commission the resource mix they use to serve their customers using the categories defined as eligible for the RPS for the state's investor-owned utilities, electric providers, and community choice aggregators.

The 2004 Integrated Energy Policy Report (IEPR) Update recommended expanding the target to 33 percent by 2020, which was reinforced by the 2005 IEPR and 2006 IEPR Update.

Assembly Bill 1585 requires the Energy Commission to evaluate the feasibility of the 33 percent by 2020 renewable goal.

Assembly Bill 1969

Assembly Bill 1969 requires Investor Owned Utilities to set a tariff to purchase renewable generation from small facilities operated by public water and wastewater agencies. The purpose of AB 1969 is to bring in additional RPS-eligible energy from facilities that are too small to participate in utility RPS solicitations, either because they fail to meet minimum size requirements or because the process is too complex.

Assembly Bill 809

Affects the Renewable Portfolio Standard (RPS) eligibility of hydroelectric facilities by changing the definition of an "eligible renewable energy resource" to include conduit hydro of 30 megawatt or less under certain conditions and allows small hydro facilities with efficiency improvements that increase their capacity above 30 megawatts to retain their RPS eligibility, also under specific conditions.

Solar Water and Heating Efficiency Act of 2007

The Solar Water and Heating Efficiency Act of 2007 was passed to create a broad market for solar heating technologies by offering $250 million in rebates for the state's consumers over the next ten years that will be implemented by the Public Utilities Commission.

California's Bioenergy Action Plan

On August 23, 2005, the California Biomass Collaborative was reinvigorated by the Governor and in 2006 produced California's Bioenergy Action Plan. The Action Plan is an integrated and comprehensive state policy on biomass, which includes electricity, natural gas and petroleum substitution potential. The Action Plan outlines the substantial potential benefits of bioenergy. The actions contained in the Plan create the necessary institutional and regulatory changes that will substantially increase the production and use of biomass for energy in California.

California Solar Initiative

California has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017 as part of Governor Arnold Schwarzenegger's $3.3 Billion Million Solar Roofs Program, The California Public Utilities Commission (CPUC), through its California Solar Initiative, provides incentives for existing residential homes and existing and new commercial, industrial, and agricultural properties over the next decade. Additionally, the California Energy Commission is managing a 10-year, $400 million program to encourage solar electricity in new home construction through its New Solar Homes Partnership.

In August 2006, the Governor signed Senate Bill 1 (SB1), which directs the CPUC and the California Energy Commission to implement the California Solar Initiative program consistent with specific requirements and budget limits set forth in the legislation.

Climate Change[2]

Current atmospheric concentrations of carbon dioxide (CO_2), primarily from the burning of fossil fuels and land use change, are substantially higher than the natural range measured over the last 650,000 years (Intergovernmental Panel on Climate Change, Fourth Assessment Report, 2007). This has led to an unprecedented rate of global climate change that could have profound implications for San Luis Obispo County. It could also complicate regional attempts to achieve ozone ambient air quality standards, since warmer temperatures lead to increased formation of ozone. Climate change needs to be addressed holistically with policies that reduce greenhouse gas emissions stemming largely from burning fossil fuels for energy and transportation, while also preparing the County to adapt to a changing climate.

The goals and policies outlined in this chapter seek to reduce the County's reliance and use of fossil fuel based energy sources, which in turn reduce greenhouse gas and criteria air pollutants. The Air Quality Chapter contains specific goals, policies and implementation strategies aimed at mitigating and adapting to climate change.

Green Building

The Conservation Element of the San Luis Obispo County General Plan recognizes that sustainability must be an organizing principle for all County actions and programs, and that we

[2] The reader is encouraged to consult Appendix 1 Air Quality of this element for a detailed overview of climate change.

must always consider the interdependent goals of protecting the environment, promoting social equity, and achieving a healthy economy. A sustainable community is one that meets its existing needs without compromising the ability of future generations to meet their own needs.

Through this Green Building chapter of the Conservation Element, San Luis Obispo County is taking a proactive role in achieving sustainable development and mitigating climate change through promoting and encouraging wise resource use, energy efficiency, and healthy indoor environments for our future generations to enjoy.

Several of the County's Guiding Principles for Smart Growth are relevant to green building including:

Foster Distinctive, Attractive Communities with a Strong Sense of Place: The County will employ context-sensitive design techniques and encourage communities to incorporate smart growth design

Create a Range of Housing Opportunities and Choices: Communities should maximize "choices" in location, size, design, diversity, cost, and type of housing. The central goal of any smart growth plan is the quality of the neighborhoods where we live. They should be safe, convenient, attractive, and affordable

Take Advantage of Compact Building Design: The County will encourage communities to incorporate more compact building design as an alternative to conventional, land consumptive development.

Make Development Decisions Predictable, Fair and Cost Effective: For communities to be successful in implementing smart growth, both the private and public sector must embrace it. The County will seek ways to reduce complexities often encountered in the development review process and improve processing times and predictability.

Encourage Community and Stakeholder Collaboration: The County will support community and broad stakeholder collaboration.

The population of San Luis Obispo County has a growing interest in reducing the energy output of structures, conserving water, reducing emissions, and creating healthy places while supporting development and economic growth. While conventional design and construction methods focus on the design and construction of buildings that are structurally sound, they often ignore the potential impacts to the environment as well as the health and productivity of the occupants of buildings. Inefficient buildings can be expensive to operate and contribute to excessive resource consumption, waste generation, and pollution. By contrast, green building design, construction and operation techniques seek to address these negative impacts by employing methods and building materials that promote natural resource conservation, energy efficiency, and good indoor air quality.

GREEN BUILDING DEFINITION AND BRIEF BACKGROUND

Green building is an integrated framework of design, construction, operations, and demolition practices that encompasses the environmental, economic, and social impacts of buildings. Green building practices recognize the interdependence of the natural and built environments and seek to minimize the use of energy, water, and other natural resources and provide a healthy, productive indoor environment. Green building is a holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants, and the community. It includes the following practices and principles:

a. Designing for livable communities;
b. Using sun and site to the building's advantage for natural cooling, heating and daylight
c. Incorporating durable, salvaged, recycled, and sustainably harvested materials;
d. Insulating well and ventilating appropriately;
e. Reducing and recycling construction and demolition waste;
f. Using healthy products and building practices; and
g. Landscaping with native, drought resistant plants and water-efficient practices.

These green building principles and practices provide the following benefits:

Environmental benefits:

a. Improve air and water quality
b. Reduce solid waste
c. Conserve natural resources
d. Enhance and protect ecosystems and biodiversity

Health and community benefits:

a. Protect health of workers and residents
b. Enhance quality of life in our communities
c. Minimize strain on local infrastructure

Economic benefits:

a. Improve construction quality

b. Increase building longevity
c. Reduce utility, maintenance and infrastructure costs
d. Long-term economic efficiency

Green building design, construction, and operational techniques have become increasingly widespread. Many homeowners, businesses, and building professionals have voluntarily sought to incorporate green building techniques into their projects. A number of local and national systems have developed to serve as resources and guides to green building practices.

At the national level, the United States Green Building Council (USGBC, http://www.usgbc.org), developer of the Leadership in Energy and Environmental Design (LEED™) Green Building Rating System and Reference Guide, has become a leader in promoting and guiding green building. LEED is a third party certification program and the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. The LEED Professional Accreditation program is managed by the Green Building Certification Institute (GBCI). Currently, LEED certification programs exist for New Construction and Major Renovations, Existing Buildings: Operations & Maintenance, Commercial Interiors, Core & Shell, Schools (K-12), Retail, Healthcare, Homes, and Neighborhood Developments.

Locally, the California Central Coast Chapter or C^4 (http://www.usgbcc4.org/) of the USGBC supports its mission by serving as a regional conduit for sustainable design, facilitating collaboration and a unified voice for the tri-county Central California Coast region (Ventura, Santa Barbara, and San Luis Obispo) to preserve and improve a unique quality of life and to promote a healthy and prosperous environment. The core purpose of California Central Coast Chapter (C4) is:

- To create a regional network of green building professionals who are committed to sustainable design;
- To support and promote local green building organizations;
- To be a sustainable resource for local governments;
- To educate local building industry professionals and trades groups;
- To provide local college communities a direct connection to green building professionals;
- To engage the public and create awareness through education;

- To join with the national green building movement in all of its efforts.

Build It Green (http://www.builditgreen.org/) is California-based non-profit membership organization whose mission is to promote healthy, energy- and resource-efficient building practices in California. The organization's efforts are focused on increasing the supply of green homes in the state, raising consumer awareness about the benefits of building green, and providing a valuable resource to building industry professionals and homeowners. Formed in 2003, Build It Green™ is a joint effort of local and regionally focused public agencies, building industry professionals, manufacturers, and suppliers. GreenPoint Rated™ is a program of Build It Green and includes New Home Green Building Guidelines, Home Remodeling and Multifamily Green Building Guidelines. The Guidelines were developed through a partnership among local and state agencies, local developers, architects, contractors, and green building experts. A GreenPoint Rated™ home is graded on five categories: energy efficiency, resource conservation, indoor air quality, Water Conservation, and Community. The guidelines may supplement the LEED™ for Homes and Neighborhood Development rating systems.

SLO Green Build™ (http://www.slogreenbuild.org/) is a local non-profit organization that is working on green building issues in San Luis Obispo County. SLO Green Build is a non-profit group of architects, builders, community planners, and area residents who are committed to promoting green building practices in the Central Coast. The organization assists local governments, building professionals, and homeowners use sustainable building practices and materials in the design, construction, and remodel of buildings in the County. The organization also supports and helps to develop public policy which advocates for sustainable architecture and healthy communities. SLO Green Build's three primary goals are healthy communities, resource conservation, and energy efficiency. The organization promotes workshops and events, produces a quarterly publication, an online resource library, and provides resources and guidelines for green building programs. SLO Green Build created a SLO County Supplement to Build It Green's New Home Construction Green Building Guidelines to educate uses on general climatic conditions and passive building techniques suited for the county. SLO Green Build is supported by members who include private and public entities.

Major Issues

The current and projected construction and building challenges for San Luis Obispo County can be categorized into the following key issues. While the County cannot singularly solve all of them, outlining the problems that need to be solved allow the General Plan to sharpen its green building goals and policies to help improve global, regional, and local air quality for this and future generations.

NATIONAL

Buildings are the largest energy consuming and greenhouse gas emitting sector in the U.S. Buildings represent 39% of U.S. primary energy use (includes fuel input for production).[3] Buildings represent 70% of U.S electricity consumption. [4] Buildings are one of the heaviest consumers of natural resources and account for a significant portion of the greenhouse gas emissions that affect climate change. In the U.S., buildings account for 39% of all CO2 emissions.[5]

Over the next 30 years, 80% of the building stock in the U.S. will be either new or remodeled: 52 billion square feet will be torn down, 150 billion square feet of space will be renovated, and 150 billion square feet will be brand new. There is an opportunity to significantly reduce energy use and greenhouse gas emissions, while achieving cost savings in the buildings sector by 2040.[6]

STATE

The residential sector accounts for approximately 31% of the electricity consumed in California.[7] New development will need to accommodate the increase of building construction and the growth of the state's population, while ensuring that minimal impact on the natural environment. The state's population is expected to be 48,240,891 in 2030 (30% increase from 2007) and 59,507,876 in 2050 (60% increase from 2007).[8]

Renovations are expected to the existing building stock within the next 30 years. Approximately 80% of the existing building stock 275 billion square feet will be transformed. Renovations expected in the US include residences, places of business and industrial facilities and account for approximately 150 billion square feet (54 percent of the existing building stock.[9]

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[3] 2003 U.S. DOE Buildings Energy Data Book.

[4] 2003 U.S. DOE Buildings Energy Data Book.

[5] Source: EIA Annual Energy Review 2005. U.S. Energy Information Administration, U.S. Department of Energy.

[6] Mayors for Climate Protection, http://www.coolmayors.com/common/news/reports/detail.cfm?Classification=report&QID=3487&ClientID=11061&TopicID=0&ThisPage=3&subsection=buildings

[7] source to be confirmed

[8] Department of Finance, Population Projections by Race/Ethnicity, Gender and Age for California and it Counties 2000-2050, available online at: http://www.dof.ca.gov/html/DEMOGRAP/ReportsPapers/Projections/P3/documents/CALIFORNIA.XLS

[9] Integrated Waste Management Board, Sustainable (Green) Building: Residential Green Building. Available online at: http://209.85.175.104/search?q=cache:ZBY2GbO5SNwJ:www.ciwmb.ca.gov/GreenBuilding/Residential/+electricity+use+by+buildings+in+California+31%25&hl=en&ct=clnk&cd=3&gl=us

LOCAL

New development in the County will need to accommodate the County's projected population increase. San Luis Obispo County's population is expected to increase 21 percent by 2030 (from 262,594 to 316,613 in 2030).[10]

Existing conventional buildings in the county do not efficiently use natural resources such as water and energy. Green buildings can significantly reduce water and energy use. One-fifth of present energy consumption and up to 45 million tonnes of CO_2 per year could be saved by 2010 by applying more ambitious standards to new and existing buildings.[11] Inefficient water and energy use in buildings results in high cost utility bills. In typical commercial buildings in California, energy costs are a significant component of operating costs, representing between 10-15%.[12]

The production and transportation of construction materials typically involves the burning of fossil fuels and results in the emission of greenhouse gases. Current atmospheric concentrations of carbon dioxide (CO_2), the primary greenhouse gas, have led to an unprecedented rate of global climate change that could have profound implications for San Luis Obispo County.

Most construction debris is transported directly to local landfills. The construction of a 2,000 square foot home generates approximately 3 tons of waste.[13] Construction waste, alternatively, can often be reused and recycled, thereby reducing the amount of waste transported to landfills.

EXISTING CONDITIONS AND CHALLENGES

Building Sector Statistics

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[10] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2001 with 2000 Benchmark. Sacramento, California, May 2007; and, State of California, Department of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.

[11] United Nations Environment Programme, Press Release: Buildings Can Play a Key Role in Combating Climate Change, March 29, 2007. Available online at: http://www.unep.fr/pc/sbc/documents/unep_press_release_070329.pd

[12] Institute for Market Transformation, Recognition of Energy Costs and Energy Performance in Commercial Property Valuation, February 1999, Available online at: HYPERLINK "http://www.imt.org/PDF%20files/CA%20RGs%202-99.PDF" http://www.imt.org/PDF%20files/CA%20RGs%202-99.PDF . Accessed on March 27, 2008.

[13] Letter to the Green Building Committee from David Walls, Executive Director, Green Building Standards, May 15, 2007, Available online at: http://www.documents.dgs.ca.gov/bsc/documents/Green%20Build.%20Web%20Info.pdf

The built environment impacts our natural environment, economy, health, and productivity. Buildings are one of the largest consumers of natural resources and account for a significant portion of the greenhouse gas emissions that affect climate change. In the United States, buildings account for:

- 65% of electricity consumption
- 36% of energy use
- 30% of greenhouse gas emissions
- 30% of raw material use
- 30% of waste output
- 12% of potable water consumption.[14]

The current total U.S. building stock equals approximately 300 billion square feet. Every year in the U.S., approximately 1.75 billion square feet of buildings is torn down, 5 billion square feet are renovated, and 5 billion square feet are created.[15]

The building sector is expected to continue to grow; new and renovated construction is predicted to accommodate increasing population growth. By the year 2035, approximately three quarters (75 percent) of the total built environment will be either new or renovated.[16]

The California Department of Housing and Community Development predicts that if California's population continues to grow at its current rate, an average of 220,000 additional housing units will need to be constructed every year by 2020.[17]

Stakeholder Education and Buy-in

The green building industry is growing and expanding significantly with each passing year. By 2009, 80% of corporate America is expected to be engaged in green practices at least 16% of the time and 20% will be engaged 60% of the time.[18] By 2010, the McGraw Hill Green Building Smart Market Report (2006) estimates that approximately 10% of commercial construction

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[14] U.S. Green Building Council, http://www.usgbc.org/, accessed February 15, 2008

[15] Architecture 2030, The Building Sector: A Historic Opportunity, 2006-2008, Available online at: http://www.architecture2030.org/current_situation/hist_opportunity.html. Accessed on: March 28, 2008

[16] Architecture 2030, The Building Sector: A Historic Opportunity, 2006-2008, Available online at: http://www.architecture2030.org/current_situation/hist_opportunity.html. Accessed on: March 28, 2008

[17] California Department of Housing and Community Development, Raising the Roof – California Housing Development Projections and Constraints 1997-2020, May 200. http://www.hcd.ca.gov/hpd/hrc/rtr

[18] McGraw Hill Construction, Greening of Corporate America SmartMarket Report, 2006

starts are expected to be green. Nearly 3.2 billion square feet of commercial space are involved with the LEED™ Green Building Rating System.

The USGBC, as well as numerous other organizations, are gaining momentum and support for green building. The USGBC has 13,500 member organizations including corporations, governmental agencies, nonprofits, and others throughout the industry. Since 2000, USGBC's membership has increased ten-fold.[19] The USGBC offers numerous workshops and courses to achieve LEED™ accreditation, learn about LEED™ technical reviews, and green building application and implementation. Similarly, Build It Green provides resources, hosts events, and offers numerous certified green building professional training and workshops. Build it Green short-term goal is to facilitate the greening of 10,000 housing units by the end of 2008.

Architecture 2030, a non-profit, non-partisan, and independent organization, was established in 2002 and has created the 2030 Challenge.[20] Signatories to the 2030 Challenge agree to design and build buildings whose energy consumption is 50% of the regional average and to adopt a regimented fossil fuel standard to be carbon-neutral by 2030. To date, numerous organizations, jurisdictions, and firms have adopted the challenge, including the California Energy Commission, US House of Representatives Energy Bill, American Institute of Architects (AIA), U.S. Green Building Council (USGBC), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Architecture 2030, US Conference of Mayors, and more.

In addition, the U.S. Mayors Climate Protection Agreement includes over 750 mayors who have committed to reducing their GHG emissions 7% below 1990 levels by 2012. The partnership promotes green building practices and principles as a tool to reduce GHG emissions.

Regulatory Framework

STATE REQUIREMENTS

The goals, policies, and implementation programs in this chapter are consistent with and in support of the following state regulations and policies.

California Building Standards Code

California Code of Regulations (CCR), Title 24, is also known as the California Building Standards Code. Proposed state agency combined green building standards are scheduled for public review and rulemaking as the 2007 California Green Building Standards Code, CCR, Title 24, Part 11. The purpose of this code is to improve public health, safety and general welfare by

[19] U.S. Green Building Council, http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718, accessed February 15, 2008.

[20] Architecture 2030, The Building Sector: A Historic Opportunity, 2006-2008, Available online at: http://www.architecture2030.org/current_situation/hist_opportunity.html. Accessed on: March 28, 2008

enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: 1) planning and design; 2) energy efficiency; 3) water efficiency and conservation; 4) material conservation and resource efficiency; and 5) environmental air quality.

Adopting local green building standards requires an amendment to the California Building Standards Code (BSC). According to California State law, any city, county, or fire protection district may establish more restrictive building standards than those contained in the California Building Standards Code (California Code of Regulations, Title 24), if the amendment is reasonably necessary because of local climatic, geological, or topographical conditions [Health and Safety Code Section 18941.5(b)]. No city or county amendment is effective until the city or county files the change and its related findings with the BSC. The failure of a city or county to file its amendment with the BSC implies that the California Building Standards Code, without amendment, applies within that local jurisdiction.

California Energy Commission

Title 24, Part 6 provides the state's Energy Efficiency Standards for Residential and Non-Residential Buildings. Public Resources Code Section 25402.1(h) 2 and Section 10-106 of the Building Energy Efficiency Standards (Standards) establish a process which allows local adoption of energy standards that are more stringent than the statewide Standards. This process allows local governments to adopt and enforce energy standards before the statewide Standards effective date, require additional energy conservation measures, and/or set more stringent energy budgets. Local governments are required to apply to the California Energy Commission (CEC) for approval, documenting the supporting analysis for how the local government has determined that their proposed Standards will save more energy than the current statewide Standards and the basis of the local government's determination that the local standards are cost-effective. Once the Energy Commission staff has verified that the local standards will require buildings to use no more energy than the current statewide Standards and that the documentation requirements in Section 10-106 are met, the application is brought before the full Energy Commission for approval.

Executive Order S-20-04

Executive Order S-20-04, signed in December 2004, establishes the State's priority for energy and resource-efficient high performance buildings. The Order sets a goal of reducing energy use in state-owned buildings by 20% by 2015 (from a 2003 baseline) and encourages the private commercial sector to set the same goal. The Order also directs the compliance with the Green Building Action Plan, which details about the measures the state will take to meet these goals.

Among several tasks, the Order directs the California Energy Commission (CEC) to develop commissioning and retro-commissioning guidelines for commercial buildings.

California Solar Initiative (Million Solar Roofs Program)

As part of the Governor's Million Solar Roofs program, California has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017 - moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. At the direction of Governor Schwarzenegger, the California Public Utilities Commission (CPUC) approved the California Solar Initiative (CSI) on January 12, 2006, a $3.3 billion ten-year incentive program that aims to add solar panels to a million roofs across the state. The overall goal is to help build a self-sustaining photovoltaic, solar electricity market. On August 21, 2006, the Governor signed Senate Bill 1 (SB1), which directs the CPUC and the Energy Commission to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation. As of January 1, 2007, the $3.3 billion program consists of three components:

The California Public Utilities Commission, through its California Solar Initiative, provides incentives over the next decade for existing residential homes and existing and new commercial, industrial, and agricultural properties. The program is funded through revenues and collected from electric utility distribution rates. All electric customers of Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E) are eligible to apply for incentives. Ten percent of program funds are allocated for solar installations in low-income and affordable housing.

The California Energy Commission manages a 10-year, $400 million program to encourage solar in new home construction through its New Solar Homes Partnership.

Beginning January 2008, the Publicly Owned Utilities (POU) component of Senate Bill 1 requires each municipal utility to offer a solar incentive program to its customers. The POUs will be spending $784 million over 10 years, toward a goal of 660 MW.

Integrated Waste Management Act (AB 939)

In 1989, Assembly Bill 939, known as the Integrated Waste Management Act, was passed and the current California Integrated Waste Management Board (CIWMB, http://www.ciwmb.ca.gov/) was established. A disposal reporting system with CIWMB oversight was established, and facility and program planning was required. AB 939 mandates a reduction of waste being disposed: jurisdictions were required to meet diversion goals of 25% by 1995 and 50% by the year 2000. AB 939 also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. AB 939 requires counties to prepare a Countywide Integrated Waste Management Plan (CIWMP).

The San Luis Obispo County Integrated Waste Management Authority (IWMA) formed in 1994 to plan and implement regional solid waste and hazardous waste programs. Members include San Luis Obispo County and the Cities of Arroyo Grande, Atascadero, Grover Beach, Morro Bay, Paso Robles, Pismo Beach, San Luis Obispo and the Community Service Districts.

LOCAL REQUIREMENTS

County of San Luis Obispo Construction and Demolition Debris Recycling Ordinance

The Construction and Demolition Debris Recycling Ordinance (Section 8.12.455 of the County Code) applies to construction or renovation projects within the unincorporated County, including County sponsored projects, with a valuation of $50,000 or higher. In addition, all demolition projects equal to or greater than 1,000 square feet must also comply. The goal is to divert, by recycling or reuse 50% or more of all project-related construction and demolition debris.

CONSERVATION AND EFFICIENCY (Excerpted from the 1994 Energy Element)

This section identifies opportunities for county residents and businesses to use energy more wisely through conservation and efficiency programs. These ideas include:

- instituting smart growth principles,
- decreasing reliance on cars and encouraging more walking, biking, and riding the bus,
- constructing more energy efficient homes and buildings using green building technologies,
- ensuring that county facilities and operations are as energy efficient as possible,
- continuing to take advantage of energy saving opportunities in agricultural operations, and
- promoting recycling and reuse programs.

Most people have an intuitive understanding of the importance of energy conservation and energy—using less energy saves money—not only in costs associated with utility bills but also in other costs that are harder to quantify, such as environmental degradation from pollution or resource depletion. The benefits of using energy wisely include improved air and water quality, less production of greenhouse gases (carbon dioxide and others that may contribute to global warming), and increased environmental quality. The issues involving energy conservation and efficiency include: land use, transportation, new building construction, building retrofits, public facilities, agricultural practices, energy education, recycling and reuse, and related economic impacts of conservation and efficiency measures.

Benefits of Energy Conservation and Efficiency

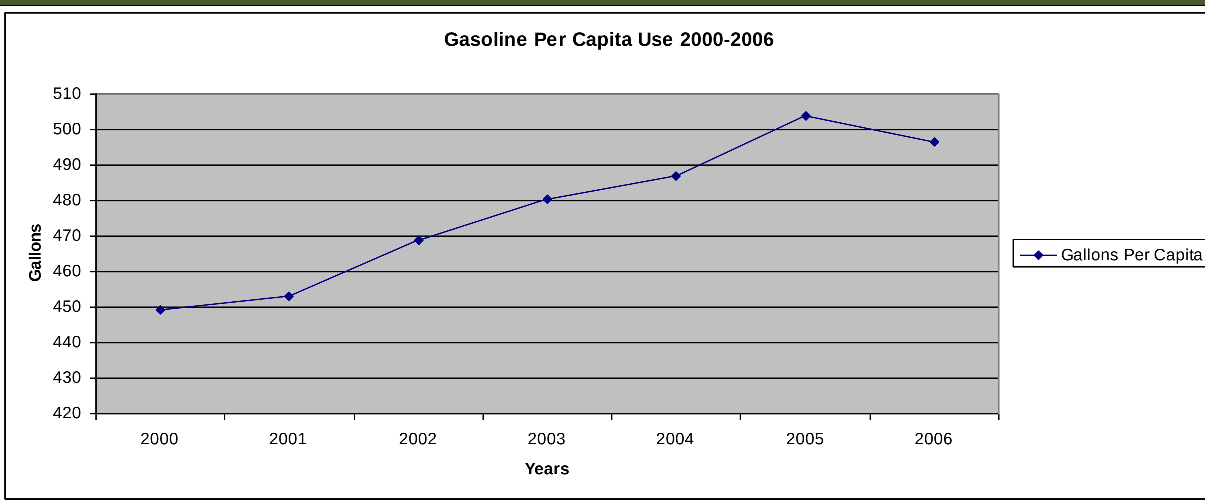
Energy efficiency and conservation reduces the need for additional power plants or other energy facilities that could cause undesirable environmental effects as mentioned in the introduction. Business profits will be greater if business energy costs are reduced (all other factors held constant), and residential energy customers will have more disposable income to spend for non-energy purposes if their energy costs are reduced. Many energy saving measures are inexpensive and have a short payback period. Some require a larger capital investment than others.

Land Use

Land use strategies for saving energy include: compact urban form, multi-modal transportation-oriented development, increased solar access, providing for mixed land uses, and energy conservation through landscaping.

As residents move into the unincorporated areas of the county, the location of new homes in relation to jobs and services will have a significant impact on energy use. The location of different land uses in relation to one another can obviously affect travel distances and the mode of transportation people are most likely to use (walking, bicycle, car, transit, etc.). Different land uses also generate varying amounts of traffic; a day care center will generate more trips than a single-family home. The graph below shows that from 1999 to 2006, per capita gasoline use in the county grew from 449 gallons to 496 gallons per person.

FIGURE A5-2
GASOLINE PER CAPITA USE



Source: Office of Transportation Economics, Division of Transportation Planning, Caltrans

The development model described above follows the eleven “Smart Growth Principles” adopted by the Board of Supervisors and referred to as Strategic Growth:

Strategic Growth Principles

1) Preserve open space, scenic natural beauty and sensitive environmental areas.

2) Strengthen and direct development towards existing communities.

3) Foster distinctive, attractive communities with a strong sense of place.
4) Create walkable neighborhoods and towns.
5) Provide a variety of transportation choices.
6) Create a range of housing opportunities and choices.
7) Encourage mixed land uses.
8) Take advantage of compact building design.
9) Make development decisions predictable, fair and cost-effective.
10) Encourage community and stakeholder collaboration.
11) Strengthen regional cooperation.

Compact Urban Form

Building compact housing (more homes on less land) and diverse housing (a mixture of single-family homes, duplexes, townhouses) can increase the energy efficiency of a community as well as help address issues related to housing, air quality, open space, farmland preservation, traffic congestion, etc.

A compact urban form provides urban services to concentrated areas of residences and commercial or industrial business. In general, compact development can be achieved by encouraging infill development more economically. Likewise, subdivisions that are adjacent to the existing community boundaries should be encouraged over those that are far from community centers.

Drive Less, Walk and Ride More. Compact urban form can increase opportunities for residents to complete shopping and other chores without driving or by driving shorter distances. People are most likely to walk rather than drive if their destination is within one-quarter mile (Calthorpe, 1992). If more people were to walk or ride bikes for short trips, gasoline use would decrease, air quality would improve, and less energy would be used to build and maintain parking lots. Concentrating the density of residential and commercial development can also facilitate the provision of transit services to an area by increasing convenience for households.

Locate Jobs and Housing. The home-to-work trip accounts for about one-third of all private vehicle trips in a typical urban area. In rural areas the ratio is even higher. The length and location of these trips is an important factor in determining the type of transportation alternatives available to the commuter and the quantity of air pollutants generated. There are two principal approaches to reduce the number of commute vehicle trips.

1) One solution is to locate jobs and housing in proximity to one another. There are some inherent problems in this approach. One flaw is that most family households have two

workers, and both workers may not find employment in the same community. Also, some people may choose a housing location distant from their job because factors other than proximity attract them. Locally, some people who work in San Luis Obispo choose to live in Atascadero because they prefer the climate and countryside of the north county. Housing costs in the county vary widely from community to community. Another challenge is to ensure that the jobs/wages and housing affordability are matched.

2) The second method of reducing commuter vehicle trips is to concentrate jobs in a few locations in the county. This makes it more cost effective to provide mass transit and carpooling to those areas. With faster, cheaper mass transit options, more people are likely to use the service.

The county continues to develop a mass transit system to meet the needs of a population that is located over a large geographic region. Because less expensive housing continues to be located in the northern and southern portions of the county while many of the jobs are located in the central portion of the county, many people commute relatively long distances to work. This leads to increased vehicle trips, gasoline consumption and air pollution. One goal of the Energy Chapter is to encourage residents to use transit systems and other energy efficient transportation options (see following discussion on transportation). By promoting a better balance between available jobs and housing, the total vehicle miles traveled can decrease.

Reduce Utility Service Lengths. Finally, compact urban form can decrease energy use by reducing the length and width of roads and/or utility service connections in new development. By reducing the size of lots in developed areas, the physical length of roads and utility service lines and the amount of energy used to construct the roads or lines (pipelines, electrical lines, etc.) are reduced. The gasoline used by Sheriff, police, fire, and other county services in such areas is also reduced.

Narrowing street widths reduces the amount of pavement used to construct the roadway, and it has the added benefit of reducing the energy used during the summer to cool buildings. Pavement surfaces act as solar heat collectors in the summer. This increases the air temperature near those surfaces and creates greater demand in nearby buildings for air conditioners, fans, coolers, etc.

Although the short-term energy savings may not be significant, land use planning techniques can produce major savings in long-term energy use as development and redevelopment continue. The real monetary savings will come in 10 or 20 years when county communities do not have to build a new sewer plant, enlarge a water distribution system to supply a remote rural subdivision, or add lanes to county roads and subsidize a bus system because of traffic congestion.

Compact development can also reduce pressures for the conversion of agricultural lands. Given the valuable agricultural lands found in San Luis Obispo County, the benefits of saving agricultural land in viable production are enormous.

The first Strategic Growth principle is to preserve open space, scenic natural beauty and sensitive environmental areas. These resources exist chiefly in the unincorporated rural areas of the county. Strategic Growth attempts to redirect development from these rural areas that support natural resources, agriculture and scenic areas and into urban areas. A more compact for of urban development will allow these resource areas to remain whole and mostly undisturbed. At the same time, a more compact form of development will reduce overall vehicle miles traveled (VMT) in the county and will conserve energy.

Alternative Transportation-Oriented Development

Development patterns that facilitate pedestrian, bicycle, and efficient transit can be effective in reducing energy use. One component is to provide for mixed land uses.

- 10% of residents use transit to commute if they live less than a 1/4 mile from a stop
- 4% of residents use transit to commute if they live 1/4 to 2 miles from a stop
- Less than 1% of residents use transit to commute if they live 2+ miles from a stop.

Provide for Mixed Land Use. In the days before widespread auto use, city dwellers often lived closer to where they worked, used public transportation, and bought groceries and conducted household business within their neighborhoods. With the advent of the street car system (and later the automobile), housing began to spread further from areas of employment and commercial services. As a means of reducing miles traveled, communities should allow a mixture of land uses that enable people to walk or bicycle to work or to purchase necessary household items at locations convenient to their neighborhood.

Mixed land use is also a strategy for achieving compactness in urban development. While conventional zoning typically results in the spatial separation of different land uses, mixed use recognizes that some land uses are functionally compatible with one another and need not be physically separated. A common form of mixed-use development is a ground level commercial use with residential uses above.

Compact urban form facilitates alternative transportation opportunities, but there are additional land use strategies that can be employed to further increase walking, biking, and transit use.

As mentioned above, people are most likely to walk rather than drive if their destination is within one-quarter mile. This means that land uses should be carefully planned to complement adjoining uses. For instance, schools, day care services, dry cleaners, and convenience stores can all be located near transit stops or near large residential concentrations.

Another example for designing communities is the Radburn concept which incorporates ideas of compact, limited sized towns with internal walkable greenbelts. The Radburn concept calls for integrated parks that are connected with a system of paths. A major purpose of this design is to decrease pedestrian conflicts with the automobile.

People are also more likely to walk or ride bicycles where bike paths or sidewalks are separated from streets. When physically possible and financially feasible, separate bike or pedestrian paths should be established away from busy streets and intersections.

Incorporating such features into a linear park are often very effective. The City of Davis, California is an example of a community with an extensive bicycle path system. A recent study of the resident's travel patterns found that 22 percent of the employed people surveyed typically ride their bike to work. 43 percent of students rode to school. In comparison, bicycle trips comprise less than 2 percent of travel in the Sacramento metropolitan region. The large use of bicycles in Davis illustrates the importance of safe facilities and the proximity of residential areas to commute destinations in encouraging higher rates of bicycle travel.

Pedestrians generally do not like walking between cars or crossing multiple-lane intersections; overhead or tunnel crossings can be used to further encourage walking near busy arterial roadways. For downtown streets, curb bulb-outs allow pedestrians to walk shorter distances in crossing streets. Walled residential communities actually encourage automobile use. Because there are no through-streets, pedestrians or bicyclists must take a circuitous route to get where they are going. Often, they will opt to take a car instead. These concepts are illustrated in the programs that follow this discussion.

Nationwide, 38 percent of all vehicle trips are for shopping or personal business. One half of these trips are less than five miles in distance. If the distance were shortened and half the trips were made on foot, total vehicle trips would lessen by over 5 percent.

One survey of suburban office workers found that about half left their building during the day. In an area with mixed-use, high-density development, 25 percent of trips were made on foot compared to 6 percent where services were not easily available. Using these figures, about 38 vehicle trips per day would be eliminated for a 100,000 square foot office building with 400 employees, if shops and services were within walking distance.

Increase Solar Access

Another way in which land use planning can reduce energy use is through subdivision designs that encourage solar access to buildings. Having sufficient solar access reduces the energy used for hot water heating and heating and/or cooling residences. Subdivision layouts should encourage lots with large southern exposures, which is the optimal siting for an energy efficient home. This topic will be discussed more in the section on Buildings and Energy Use.

Energy Conservation through Landscaping

Planting trees along streets reduces the heat absorbed by pavement and can therefore reduce the energy needed for cooling in adjacent buildings. Street trees also provide a more attractive environment for walking and bicycling and can increase property values.

Trees can not only help to cool the pavement outside homes and buildings, but can also be used to keep direct sun from entering buildings through windows (see the section on Building and Energy Use for more information). Plant leaves can block about 80 percent of the heat from summer sun that enters windows. The effective selection and placement of shade trees not only reduces carbon dioxide buildup, increases property value, and enhances community aesthetics, but shade trees also reduce air conditioning needs, especially in climates like the north county area which tend to be much greater. The use of deciduous shade trees provide further benefit in that sunlight will be able to reach the buildings in the wintertime, thereby reducing wintertime heating needs.

Transportation

According to the California Energy Commission (CEC), no other population in the world has embraced the automobile as passionately, nor is any other state defined as much by the car, as California. Roughly half of the energy Californians consume is for transportation. In 2006, Californians consumed an estimated 20 billion gallons of gasoline and diesel fuel on the state's roadways, an increase of nearly 50 percent over the last 20 years. Nearly 26 million registered vehicles operating in California produce about 40 percent of the state's greenhouse gas emissions.

Forty-eight percent of all the energy used in California is for transportation, and personal vehicles account for over 50 percent of all transportation energy use. Since 1973, transportation is the only energy use sector in which consumption has continued to grow in California (CEC, 2003). Energy conservation strategies for transportation attempt to decrease energy use through a variety of means.

The transportation programs discussed in this chapter can reduce vehicle fuel use by encouraging more people to walk or ride bicycles, use public transit, improve vehicle efficiency, use the railways rather than driving or trucking, use pipelines rather than boats, use telecommunication rather than driving or mail, reduce street widths, and plant trees. The overall objectives are to reduce the amount of fossil fuels that are burned and increase the efficiency of our transportation system.

Bicycles provide an energy efficient, clean, and inexpensive (relative to automobiles) form of transportation. Unfortunately many people do not use bicycles for transportation for several reasons, including but not limited to: 1) there may be no place to secure the bike when shopping or working, 2) streets are too narrow or dangerous for bicycles to share the roadway with automobiles, 3) there are not showers and/or lockers available to allow a cyclist to change clothes after a long ride, 4) inclement weather may make biking uncomfortable or dangerous, 5) some trips such as weekly shopping may require carrying amounts or sizes of objects that are difficult to handle on a bicycle, or 6) for age and health reasons. Because of the long distances between bedroom communities and employment areas in San Luis Obispo, it is unlikely that bicycles will replace a significant number of automobile trips. If new job opportunities become concentrated within existing county communities, more residents will be able to walk or ride bikes.

The County Bikeways Plan identifies needed bikeway routes, accessory facilities such as bike parking, educational programs, and potential funding sources. The plan describes existing conditions in the county, the classes of bikeways and route selection process, and how bikeways fit into the transportation system among other issues. The County Bikeways Plan is available from the county Public Works Department.

Public Transit

Public transit is often viewed as a key component in reducing vehicle trips in and among cities. Mass transit and carpooling require certain population densities before they become feasible. A density of 12 dwelling units per acre is considered the minimum necessary to support bus routes (Calthorpe, 1990). Although an extensive public transit system is not available to residents outside of the City of San Luis Obispo, the county should consider present and future transportation needs in all planning efforts. For example, Paso Robles recently started transit service to downtown and other shopping centers.

Public transit needs will increase over the next 20 years as population increases. In particular, increased traffic volumes on the Highway 101 corridor between Paso Robles and Arroyo Grande will probably generate sufficient demand to support a bus line with the City of San Luis Obispo as the main hub. Incentives that may increase transit ridership include;

- make more routes to various destinations available,
- lower fees and costs to use transit systems,
- promote public transit through marketing and education,
- develop a rider friendly system with understandable schedules, comfortable transit stops and clear signage, and
- provide transit subsidies through employers and public agencies.

The Regional Transportation Plan recognizes public transit as a link that enables individuals to travel using a variety of modes that minimize automobile dependence. A goal of the plan is to provide reasonable and accessible region-wide public transit services to meet the mobility needs of all residents for access to essential services, educational, recreational, and employment opportunities, and as a means to reduce air pollution, traffic congestion, parking problems, and fossil fuel use. Policies are focused on maintaining a minimum level of service; increasing convenience where feasible and cost effective; reducing air pollution, reducing cost where possible, and maximizing input from individuals, jurisdictions, and groups on all aspects of transit planning, evaluation, and service evaluation.

Vehicle Efficiency

Two critical aspects of vehicle efficiency that can be influenced by the county and the private sector include idling cars and older cars. Cars are least efficient when idling because they are consuming fuel at zero miles per gallon. Older and improperly maintained vehicles are not fuel efficient and pollute more than newer vehicles.

Alternative Fuels

Propane, methanol, ethanol, compressed natural gas, electric, and hydrogen powered cars are viable alternatives to traditional gasoline powered vehicles. New information about evolving fuel technologies will be available in the future. The following discussion highlights some of the features, advantages, and disadvantages of these vehicle technologies.

Propane. Propane is an alternative to gasoline for operating automobiles and trucks. It is cost effective to retrofit vehicles to enable them to use propane. Propane provides a travel range comparable to gasoline. It is more available and easier to handle than natural gas and reduces maintenance costs because it burns more efficiently.

Methanol. Often referred to as wood alcohol, methanol is commonly used as a blend of 85 percent methanol and 15 percent unleaded gasoline. Vehicles operating on methanol fuel can reduce emissions up to 50 percent relative to their gasoline counterparts. In addition, toxic emissions can be reduced by 50 percent (CEC, 1993).

Ethanol. Ethanol, or grain alcohol, is a high-octane fuel derived from corn and other biomass products. Ethanol is often used as a gasoline additive to boost octane. While this fuel has not been developed to the extent of methanol fuel, it can be produced from renewable resources, such as corn and other grains.

Compressed Natural Gas (CNG). Natural gas is the cleanest burning and currently least expensive fossil fuel for transportation. CNG vehicles can reduce carbon monoxide emissions by over 90 percent and organic gases by 35 to 45 percent. Natural gas is more readily available than other alterative fuels because of the extensive network for serving homes and businesses. Utilities are installing natural gas fueling stations in many parts of the state and several auto manufacturers are offering natural gas vehicles. The range for dedicated natural gas vehicles averages 200 miles (CEC, 1993).

Hydrogen. Hydrogen may also be an energy source for the future. It is a clean, efficient, plentiful alternative to carbon based fuels like oil and coal. Hydrogen can be made from several sources. Each molecule of water contains two atoms of hydrogen that can be extracted, stored, used as fuel and returned to the environment as pure water. Hydrogen can also be derived from natural gas and plant material. It can be used in internal combustion engines or combined with oxygen to power fuel cells to produce electricity. Barriers such as cost, safety, and lack of a distribution system are slowly being addressed through demonstration projects.

Electricity. Electric vehicles do not produce tailpipe emissions; they provide pollution reductions over gasoline vehicles even when the power plant emissions from generating electricity are considered. Electric vehicles are cost effective for short commutes, although long distance travel is still limited (about 60 miles). There are also some questions about the health effects of the electric and magnetic fields present in electric vehicles. Also, electric cars will increase the use of electricity. If electric cars create a large demand, this could lead to more powerplants being built.

Fuel Cells. Fuel cells are an experimental technology that uses a chemical process (similar to a battery) to produce energy. A fuel cell requires a continuous supply of hydrogen and oxygen. Hydrogen can be supplied either directly by an on-board hydrogen tank or indirectly by an on-board fossil fuel supply and reformer. A hydrogen fuel cell vehicle would have an energy efficiency about 160 percent greater than that of an internal combustion engine. For fuel cells powered by fossil fuel with on-board reformers, the only major emission would be carbon dioxide—at about 70 percent relative to gasoline powered cars. All emissions (both tailpipe and those used to create the hydrogen) could be eliminated if the hydrogen was generated from solar or wind energy.

Passenger and Commodity Railway Services

Trains provide a very energy efficient mode of transportation for both people and goods. The AMTRAK Coast Starlight provides stops in several cities including San Luis Obispo, Grover Beach and Paso Robles. Despite this relatively limited rail service, the Coast Starlight attracts heavy use from San Luis Obispo residents; an average of nearly 125 passengers board or depart on the two runs each day. A second daily train travels from San Luis Obispo to San Diego and back.

Local commodity movement on rails has declined because of an increasing emphasis on boat and truck shipping and centralized distribution facilities. Thus fewer and fewer industries continue to receive boxcar deliveries. In San Luis Obispo, trucks offer a faster and more flexible method of shipping goods, but trucks also consume more fuel and create greater demands on roadway improvements. The number of freight trains traveling through the county has remained fairly constant at two daily in each direction.

It should also be noted that some rail rights-of-way have been converted into trails. More information about this program is available from the Council of Governments.

Trucking Commodity Movement

In San Luis Obispo County, trucking movements account for 8 percent of the total vehicle traffic. Commodities carried by trucks cover a wide range of goods, with construction materials accounting for 36 percent and food and farm product accounting for 32 percent of the total (San Luis Obispo Council of Governments, 1993).

Streets

The construction of streets and the manufacturing of paving materials consume large amounts of land and energy. A narrower road will require less grading and less paving material and will leave more land open for residential development. (If separate bicycle lanes are desired in a roadway, the parking lanes should be made narrower or eliminated to accommodate a striped bicycle lane. This allows safe bicycle travel without increasing the road width significantly.) In hot climates, large amounts of pavement also increase the surrounding air temperature and create demand for additional energy use within nearby buildings for air conditioning (see Figure 3-6). Traffic calming measures in residential areas can decrease the speeds at which vehicles travel, reducing energy use and increasing safety. Using narrow roads and street trees can reduce the heat gain in homes from paved roads. In Santa Barbara, old toilets are recycled into chips for energy efficient paving material (CEC, 1992). To minimize the energy used in asphalt materials, tires or old asphalt can be recycled for use in new paving materials.

Telecommuting

Telecommuting allows people to minimize or eliminate the time/distance spent commuting to work. Types of telecommuting include:

- Home-based telecommuting involving employees who work at home and communicate with the main office by telephone, computer modem, and/or facsimile machine;
- Satellite business centers set up by a company to accommodate employees at a location closer to their homes than the main office. The satellite center is linked to the main office via telephones and computers, as well as video conferencing and long distance learning facilities; and
- Local/neighborhood telework centers which house telecommuters from more than one employer. Facilities can include computers, copy machines, telephones, secretarial services, meeting rooms, facsimile machines, and other equipment.

Employers that use large numbers of back-office clerical personnel would be the most likely to employ telecommuting or telework centers. Such employers could include California Polytechnic

State University, Cuesta College, the County of San Luis Obispo, the City of San Luis Obispo, Atascadero State Mental Hospital, the California Men's Colony, and Pacific Gas and Electric.

The evaluation of the costs and benefits of a California State telecommuting pilot project (200 participants) found that the program paid back its initial investment within three years. Benefits were significantly greater than the costs of training, phone/modem support, maintenance, and administration. Direct benefits included decreased sick leave, turnover, parking requirements, and needed office space.

ELECTRICITY GENERATION AND TRANSMISSION

This section covers electricity generation and transmission facilities in the county. The discussion is divided between facilities that operate on renewable fuel sources (such as solar, hydroelectric, wind, and biomass fuels) and those that operate on non-renewable fuels (such as uranium, oil, and gas). This is followed by a discussion of cogeneration facilities.

There are two utility-scale electricity generation facilities in San Luis Obispo County, the Morro Bay Power Plant and the Diablo Canyon Nuclear Power Plant. At the time of their construction, these power plants were sited and permitted by the state and federal governments. In the past, local governments have had little jurisdiction or ability to regulate the siting of large scale facilities. Two smaller gas and oil power plants in the county are classified as cogeneration facilities. A solar photovoltaic plant in the eastern portion of the county was dismantled ion the 1990’s. Currently, as of 2008, there are proposals for at least three new solar power plants in the Carizzo Plains.

GENERAL FACILITY SITING

Any power generation facility development will result in some disruption of the natural environment. There are some areas that the Coastal Commission has specifically identified as unsuitable for future power plant construction. There are some issues that are common to all electricity generation facilities. In particular, three issues often arise in the siting of generating facilities. These areas of concern are: compatibility with surrounding uses, site disturbance, and cooling water availability.

Compatibility with Surrounding Uses

Energy conversion power plants (facilities that use a natural resource such as gas, oil, or uranium and convert it to electricity) are generally industrial-type land uses. Such facilities may generate excessive heat, noise, and/or odors that can be offensive or hazardous to downwind populations. Conversion facilities should generally be located in areas suitable for industrial development and away from sensitive land uses such as residential, commercial, or recreational areas, and sensitive wildlife habitats.

Site Disturbance

Construction and operation of electricity production facilities necessarily disturb the sites they occupy. A common objection to facilities is the visual impact on the surrounding landscape. Excessive grading and land disturbance can result in erosion problems that are difficult to rectify. Loss of habitat or other wildlife impacts may be significant. Noise is sometimes a consideration as well.

Cooling Water

Some energy processes (solar thermal, biomass combustion, fossil fuel, uranium) convert heat into electricity by using steam or some other substance to turn a turbine. Cool water is typically needed to condense the steam and turn it back into water so that the cycle can be repeated. A reliable supply of cooling water is therefore a constraint on thermal facilities. Monitoring the impacts cooling water has on biological communities when it is returned to its source is an important activity. The exact amount of water use will depend on the type, size, and efficiency of the facility. Therefore, the availability of water and the relative merit of competing uses is an issue in the siting of thermal electric facilities.

THE FUTURE OF ELECTRICITY GENERATION

All electric utility providers are required by state law and the California Public Utilities Commission to maintain a reliable and least costly supply of electricity to the rate payers in their district. Many utility companies anticipate that the future of energy production will change from dependence on large centralized power plants to reliance on smaller, more localized producers. Instead of building large power plants, smaller units that meet the need of the locale or region will be installed. In this scenario, a variety of facilities and sources will likely be used, rather than relying on one technology. For example, the energy mix of the future could include solar systems, wind energy conversion systems, hydroelectric, biomass, cogeneration, advanced steam turbines, advanced gas turbines, and fuel cells.

This new approach of the future would require that utility providers work together with state and local regulatory authorities to:

- Consider a full range of resource alternatives, including, in preferential order:
  1) conservation and efficiency,
  2) renewable energy supply resources.
  3) cogeneration and last, and
  4) high efficiency fossil fuel facilities.
- Consider and monitor regional needs and plans in relation to regional and global environmental impacts;

- Evaluate resource alternatives on a consistent basis, quantifying features of cost, environmental impact, diversity, risk, reliability, and long-term economic benefit;
- Implement regulatory reforms such that a utility's resource plan is its least-cost course of action and is also its most profitable course of action. At a minimum, utilities' prudent investment in conservation and efficiency measures should be profitable, but not at the expense of public health and safety.
- Develop alternatives to traditional rate structures which permit utilities to have reasonable opportunities for profitability in a more competitive environment while continuing their resource planning programs.
- Write an action plan to ensure appropriate research and development expenditures, sustained orderly development of resource bases, and monitoring and evaluation protocols to check progress.
- Periodically evaluate the results in light of the action plan.

The future may bring a variety of electricity generating facilities that are smaller in scale and located closer to end users of power. Local agencies may be responsible for permitting and siting these facilities. By encouraging the development of renewable, local sources of energy, we can enhance the overall environmental and economic quality of the county. The following policies, guidelines, and programs will help prepare the county for dealing with a variety of different electricity projects.

Electric and Magnetic Fields

Wherever electricity is used, electric and magnetic fields are present. Because there is a relationship between electric and magnetic fields they are often termed electromagnetic fields (EMF). Wherever there is a flow of electricity, both electric and magnetic fields are created. Examples include appliances, lighting, and other electrical uses in homes, schools and work places. Transmission and distribution lines which transport electricity also produce both electric and magnetic fields.

Electric fields are created by voltage, and higher voltage produces stronger electric fields. An electric field exists near any line that carries electricity and any appliance that is plugged into an electrical outlet. Electric fields are measured in volts per meter (V/m). The intensity of electric fields is directly related to the amount of voltage flowing through a conductor and the distance from the source of the field. Electric fields can be shielded by objects and materials.

Magnetic fields result from current flowing through wires from one place to another. Magnetic fields are typically measured in gauss. Milliguass, one-thousandth of a gauss, is the measurement used most often when fields are evaluated. The strength of a magnetic field depends on the amount of current flowing through, and the configuration of, the conductor(s). A conductor can be a transmission line, an electric cord from an appliance, or any other device that conducts an electric current. Magnetic fields pass through most objects or materials, but their magnitude decreases rapidly with distance.

The health effects of electric and magnetic fields on humans are not clear. Some studies have suggested that an association between EMFs and certain cancers may exist. Other studies have shown that various cellular activities are affected by EMFs. The findings of many studies have been controversial, with no clear identification of a cause-and-effect relationship.

The question about the health affects caused by EMFs has yet to be conclusively answered. According to the California Department of Health Services, a number of research studies are underway to determine if EMFs pose health risks, and, if so, what aspect of the field is harmful. However, enough scientific information links them with health affects that taking measures to avoid exposure is warranted.

The present California Energy Commission approach to 60 Hz field control is to ensure that public exposures to fields from future transmission lines do not exceed those associated with the presence of existing lines. The present standard is to limit the strength of the electric field to 1.6 kilo volt per meter (kv/m) at the edge of the line right-of-way.

Renewable Fuels

This section discusses the technology, available resource, and siting issues associated with solar energy conversion systems, biomass combustion facilities, wind energy conversion system, and hydroelectric facilities. In general, the county favors the use of such resources over the use of fossil fuel facilities.

Solar Energy

When speaking of "solar energy technology", we are referring to the direct conversion of sunlight into usable energy. Sunlight can be converted to electricity, or used directly to heat water or space. Some issues associated with solar space lighting and water heating were discussed in the previous chapter on Buildings and Energy Use.

The two major types of solar energy technology that generate electricity are photovoltaic and solar-thermal facilities. Photovoltaic solar facilities directly convert sunlight into an electrical current at a low voltage. Photovoltaic solar cells absorb sunlight and converts it directly to electricity through the reaction of electrons within the cell. Electrical current can then be withdrawn from the cell and stored in batteries, used on-site, and/or fed into transmission lines (after being converted from direct current to alternating current in most cases).

Solar thermal technology first collects and concentrates solar energy and then converts the energy into electricity. Most commonly, a highly reflective surface is used to focus solar energy on a heat collecting pipe (called the "receiver"). A fluid circulates through the receiver, collecting the thermal energy and transferring it to the power block of the plant for the generation of electricity. If the fluid is water/steam, then the fluid is used to drive a turbine directly. If the fluid is a heat transfer material, such as oil or liquid sodium, then the fluid transfers its heat energy to water to make steam in a heat exchanger, called the steam generator. Methods used to concentrate sunlight include 1) parabolic dish mirrors, 3) mirrors arranged in parabolic troughs, or 3) distributed mirror array focused on central receiver system.

Solar energy boasts the largest resource potential of any energy source in the county. In particular, the Carrizo Plains is a unique solar. It is one of two potential locations in California that do not get coastal fog during the summer or ground fog during the winter. The only other area in California with greater solar potential is the Mojave Desert.

The amount of sunlight that could be collected and converted into energy is constrained only by the economics of building large energy conversion plants and the efficiency of such facilities. Even so, it appears that more than enough solar energy could be generated to satisfy the county's need for electricity.

Photovoltaic and passive solar systems are relatively small and extremely reliable, do not require cooling water, require little or no maintenance, and are located near the load they serve. This avoids transmission impacts, and site impacts are minimal. Water pumping, grid voltage support, and power for remote locations off the grid are examples of photovoltaic system use which may be appropriate for San Luis Obispo County. Passive solar applications and designs can be used on any new or existing structure.

The solar resource available in the Carrizo Plains gives San Luis Obispo County the opportunity to make a bold statement regarding the development of renewable energy facilities. The county may be able to accelerate that time line by providing clear guidelines, procedures, and possibly incentives for the development of such a facility. Likewise if photovoltaic-technology efficiencies improve, a large-scale photovoltaic facility may also be feasible on the Carrizo Plains.

The Carizzo Plains supports several rare or threatened species including the San Joaquin Kit Fox. Installation of large solar facilities could have a negative effect on the kit fox and its habitat. The most careful review of development applications is needed in this area due to the conflict with endangered resources.

Biomass Fuels

San Luis Obispo County has a sizable amount of biomass potential (2.9 trillion Btu/yr). There are two biomass facilities in the county as shown on Figure 4-4. These facilities are part of cogeneration systems and are discussed later in this report.

Biomass refers to various organic waste products from agricultural and industrial processes. When using biomass materials that would normally enter municipal landfills, the process is often called waste-to-energy conversion. The most simple biomass conversion facility is the typical fireplace, furnace, or wood-burning stove. The wood is burned to provide space heating. Although simple, and often aesthetically pleasing, this form of biomass conversion uses a fairly high-grade fuel source (dry wood) and can sometimes be an inefficient heating mechanism.

More complicated biomass thermal conversion techniques involve burning flammable materials to boil water and generate steam, which then drives steam turbine-generators to generate electricity. Waste products with higher moisture content, such as animal manure and wastewater treatment sludge, can often be used in modified steam boilers. Mass burn systems use minimal processing of the waste prior to incineration. Large-scale mass burn systems typically have capacities up to 3,000 tons per day of municipal solid waste. Small scale mass burn systems typically use less than 500 tons per day and are ideally sited to small communities of 25,000 to 250,000 people.

Another thermal conversion technique is gasification, also known as pyrolysis. Pyrolysis exposes a biomass source to high temperatures while limiting the amount of oxygen. A second method uses biological methods to create biogas. The municipal waste is placed in a chamber where anaerobic digestion (the bacterial digestion of organic materials in the absence of oxygen) produces biogas. (Liquefaction is another type of gasification where the final product is a liquid fuel instead of gas.) The biogas can then be 1) captured and used directly like natural gas, or 2) burned to drive steam turbines which then generate electricity.

When siting a biomass facility, collecting the fuel is the main issue of concern. To efficiently collect livestock manure for use as a biomass fuel, 50 to 80 percent of the animals must be confined within a relatively small area; dairy farms, feedlots, and chicken farms in the area may best meet this requirement. For example, the proposed chicken farm in the north county area and the feedlots at California Polytechnic State University for cattle, pigs, sheep, and chickens may be good candidates for biomass conversion facilities (Williams, personal communication). The biomass facilities may even benefit from a cogeneration facility.

Almost any sort of biomass can be burned to produce heat, steam, and electricity. The direct combustion of biomass however, results in pollutant emissions such as nitrogen oxides, reactive organic gases, and particulates. The problem may be particularly severe for facilities burning raw municipal wastes, which can contain toxic ash that must be safely disposed of.

Waste-to-energy facilities tend to be more expensive than some other forms of electricity generation, but they have the added benefit of extending the life of municipal landfills. Biomass may become a more attractive option for energy conversion in the future as state waste management standards take effect. AB 939 requires that 25 percent of wastes be diverted from municipal landfills by 1995 and 50 percent be diverted by the year 2000. The 25 percent reduction can probably be achieved through recycling and consumer education programs. To achieve the 50 percent reduction goal, the county will probably have to institute a composting or waste-to-energy conversion program. However, the requirement needs of the waste-to-energy facility should not allow burning wastes such as paper, newspaper, and cardboard.

Wind Energy

San Luis Obispo County has only a few areas suitable for large scale wind energy conversion system (WECS) development. Wind turbines consist of blades, rotor, transmission, electrical generator, and control system, all mounted on a tower. Wind causes the blades to rotate, generating mechanical energy that is converted to electrical energy by a generator. The blades of most wind turbines rotate in a vertical plane (horizontal axis), although some wind turbines rotate about a vertical axis. Most wind/electric turbines have either two or three blades made of fiberglass, laminated wood, or aluminum. These blades are mounted on tubular or lattice towers. Wind turbines may be connected to a utility grid system as single units or grouped into arrays.

There are numerous advantages to wind-generated power: the generators do not emit pollutants to the air or to water resources; water is not needed in the production cycle; and the machines are preassembled and can be installed relatively quickly.

Some individuals may elect to purchase a small-scale wind generator for private use. Wind energy could also be used for pumping water on a more widespread basis. Some individual applications may be successful in the areas with wind speeds of 11 miles per hour or faster. The monthly kilowatt hours on some generator models may be sufficient to power an agricultural pump or a home or small business.

At excellent sites, commercial wind generation has the potential to provide the lowest cost energy of all renewable resources (PG&E 1992). Unfortunately, there are no excellent sites in San Luis Obispo County, i.e., wind speeds averaging around 18 miles per hour. The only appropriate area for large-scale wind farm development is the coastal area between Point Buchon and Point San Luis. (In other locations with high wind speeds, the scenic values of the areas outweigh the possible benefits of wind power development.) There are still a number of constraints at this site:

- There are a number of archaeological sites that may limit the number of suitable locations for wind towers.
- Given the current state of wind energy conversion technology, the site is only moderately suitable for large-scale wind generator development.

If, as suspected, there is unidentified potential in the remote areas of the Paso Robles/Salinas Valley area, such locations may be more appropriate for WECS development. Aesthetics along the Highway 101 corridor will be an important consideration in permitting any wind towers.

If the technology improves to the point where large-scale wind farm development is practical, the county should carefully consider any large-scale wind energy conversion systems requests.

Hydroelectric Energy

Existing hydroelectric facilities on reservoirs include Lopez Lake, Lake Nacimiento, Whale Rock Reservoir, and Santa Margarita Lake. San Luis Obispo watercourses with hydroelectric potential include the Salinas River, Santa Margarita River, and San Luis Creek. Stenner Canyon is also the site of a facility. The state water project may include one hydroelectric facility near the base of the Cuesta Grade.

Hydroelectric facilities utilize the energy of moving water. Most facilities use a dam or diversion structure to control water so that, as the water falls, it turns a turbine. The mechanical energy associated with the movement of the turbine is then converted into electricity via a generator attached to the turbine. The water must have sufficient energy to move the turbine (called "hydrostatic head"). For this reason, most large-scale projects are located at a dam or reservoir where the hydrostatic head can be confined to a compact area. Smaller scale projects can be sited along streams or inside water pipelines coming down steep hillsides, where hydrostatic head is created by the natural change in elevation.

Impacts of hydroelectric projects are related to the construction of dams and the diversion of water from existing riparian corridors. In San Luis Obispo County, dams and diversions are primarily to augment water supplies, not energy. When energy can be captured incidentally (e.g. in-pipe systems) from the operation of water facilities, it has few, if any, additional impacts.

Such hydroelectric facilities may impact hydrology by: changing stream flows; changing the amount of groundwater recharge; affecting water turbidity (the amount of sediment in the water) and oxygen content; and altering water quality and quantity, thereby adversely impacting aquatic life. Hydroelectric facilities are generally located on steep, visible slopes to take advantage of hydrostatic head. This may require converting a free flowing natural stream landscape to an industrial-looking facility.

Geothermal

Historically, San Luis Obispo County has made direct use of geothermal energy from hot springs located near Paso Robles and Avila Beach. The county's geothermal energy could be used as a supply of low temperature heat in areas like Paso Robles. Such systems would have minimal impacts so long as the mineral content of waste water from the system is carefully evaluated. In some instances, geothermal fluids may have to be reinjected into the geothermal reservoir.

NON-RENEWABLE FUELS

This section discusses steam generating power plants, fuel cells, high efficiency combustion turbines, and hydrogen.

Steam Generating Power Plants

Steam generating power plants generally use oil, gas, coal, or nuclear fuels. (Coal facilities are unlikely in the county and are therefore excluded from this discussion.) It is the position of the county to discourage the use of non-renewable fuels and encourage energy efficiency, conservation, and the development of renewable energy resources.

Steam generating power plants convert heat into electricity by burning or otherwise releasing energy from the fuel to create heat which is then used to create steam. The steam is then used to turn a turbine which creates the electricity.

The two utility-level electricity generation facilities in San Luis Obispo County are the Morro Bay Power Plant and the Diablo Canyon Nuclear Power Plant.

Morro Bay Power Plant. The Morro Bay Power Plant is located in the City of Morro Bay and was constructed shortly after World War II to meet the increased demand for electricity caused by incoming California residents. There are a total of four generating units at the site, with a combined output of 1,002 MW. The first two units began producing electricity in 1955 and 1956 and have a maximum output of 163 MW each. The third and fourth units began to operate in 1962 and 1963, respectively. These two units have a maximum output of 338 MW each. The Morro Bay power plant primarily burns natural gas, although it can use fuel oil if necessary. At full capacity, the units use 146 million cubic feet of natural gas or 1.4 million gallons of oil per day. The plant now operates at only 5% capacity.

Up to 492 million gallons of water are pumped out of Morro Bay each day and used to cool the steam that drives the turbines. The water is constantly flowing and this once-through system creates a steady stream of heated water that enters Estero Bay north of Morro Rock. The Morro Bay Power Plant also has desalinization facilities to provide water for the steam generation cycle, with a capacity for purifying 324,000 gallons of water per day.

Diablo Canyon. Construction of the Diablo Canyon Power Plant began in 1967 and the plant began operating in 1986. It is currently (2006) the largest energy facility in the county with a production capacity of 2,160 MW.

The Diablo Canyon facility has two reactor vessels. Each vessel is inside a dome-shaped containment structure that stands 215 feet high and has a diameter of 147 feet. The facility uses a system of three water loops that do not come into direct contact with one another. The primary loop passes water through the reactor core to be heated. The water is under high enough pressure to prevent boiling, even though temperatures exceed 600 degrees. Before being recycled back through the reactor core, the water in the primary loop transfers its heat to the steam generator in the secondary loop. Here, water in the secondary loop is allowed to boil, creating steam. This steam is piped to the turbine-generator building, where it spins the turbine-generator to produce electricity. The steam is then cooled by the water in the condenser loop and recycled back through the steam generator. The condenser loop continually draws water from a small inlet cove and discharges into a larger cove once it has been circulated through the loop. The discharged water is slightly warmer than the surrounding ocean water.

To support the purified water needed for the primary and secondary loops, Diablo Canyon has a sophisticated desalinization system. The plant has the capacity to process 648,000 gallons of ultra-purified water per day for peak period use. Some of this water is used for general plant operations to support the employees at the plant. The saline solution remaining after desalinization is injected into the outfalls along with the ocean water used in the condenser loop.

As mentioned previously, steam generating power plants require large amounts of water for conversion into steam and for cooling the combustion or fission processes. Air emissions from fossil fuel plant operations, can present problems. Burning oil results in significant air pollution emissions; natural gas burns cleaner, but still emits some pollutants. San Luis Obispo County is a non-attainment area for ozone and particulate matter, and the siting of new and/or expanded facilities must take potential emissions into account. Development of new or expanding existing facilities could result in both short-term and long-term increases in air emissions.

Radioactive wastes from nuclear facilities present especially difficult disposal problems. Transporting such wastes over any distance increases the potential for accidents and radiation exposure. With regard to pollutants and waste management, the project must comply with all applicable federal, state, and local laws, ordinances, regulations, and standards for non-hazardous and hazardous waste. Currently, radioactive waste is stored at the power plant in the spent fuel storage pool. The water in the pool acts as a radiation shield and coolant. This is meant to be a temporary storage situation until a permanent disposal site is found and approved by the federal government. The DCPP recently received permission form the Nuclear Regulatory Commission to transfer radioactive waste from the spent fuel pool to above ground “dry casks”. These casks will be stored outdoors on a concrete pad above the power plant for an indeterminate period of time.

Finally, steam generating power plants are generally relatively large, industrial-type land uses that may be aesthetically unpleasant. For these reasons, such facilities should generally be located in areas suitable for industrial development and away from sensitive land uses such as residential, commercial, or recreational areas, and sensitive wildlife habitats.

Fuel Cells

Fuel cells operate much like a battery, by transforming chemical energy into electrical energy directly, without a combustion process. Fuel cells require a continuous supply of hydrogen and oxygen. The cells produce direct current, which then must be passed through an invertor to create alternating current. Fuel cells are not yet commercially available, but they are expected to be a viable technology in the near future. The expected efficiency of these systems is about 40 percent. Fuel cells supplied directly with hydrogen and oxygen would produce no emissions. When a fuel other than hydrogen is used (for example, methane or methanol can be used in conjunction with an on-board reformer), there will be carbon dioxide emissions, and there could be very low levels of hydrocarbons, carbon monoxide, and nitrogen oxide emissions.

Because fuel cells could have no harmful emissions, small units could be established in individual neighborhoods to directly service the surrounding area. This would minimize transmission facilities and the energy lost through long-distance energy transmission.

High Efficiency Combustion Turbines

New technologies provide more efficient means to generate electricity from fossil fuels through advanced combustion turbines, including steam injected gas turbines, reheat gas turbines, and chemically recuperated gas turbines. As they are perfected, these technology advances are expected to permit electricity generation efficiencies of 55 percent or higher, compared to older utility power plants that typically operate in the 30 to 34 percent efficiency range.

Steam Injected Gas Turbines. In this technology, steam is injected directly into the gas turbine along with the air and fuel. Heat from the combustion exhaust system is captured and used as part of the heat input, thereby increasing the efficiency of the combustion system. The steam-injected gas turbine has a typical efficiency of about 44 percent and nitrogen oxide emissions are 70 percent lower than in simple cycle gas turbines. These commercially available gas turbines can be used in cogeneration applications.

Reheat Gas Turbines. In this technology, two combustors are separated by a first-stage turbine wheel. Fuel is ignited in the upstream combustor to drive the turbine wheel. Hot gases leaving the first stage are reburned by self-ignition as additional fuel is injected into a second, downstream combustor. Combined, sequential combustion drives the remaining turbine stages. When coupled to a heat recovery steam generator and a steam turbine (i.e., in a combined cycle configuration), this commercially available system can achieve a net efficiency of 57 percent.

Chemically Recuperated Gas Turbine. In this technology, a chemically treated, hydrogen-rich fuel (reformate) is burned to produce power. The gas turbine exhaust energy is used both in the reformer and in the steam generator, thereby increasing the efficiency of the conversion process. When combined with the intercooling and reheat system, it is expected that efficiencies would be greater than 55 percent. The fuels inherently have very low nitrogen oxide and carbon monoxide concentrations, so pollutant emissions are greatly reduced.

Hydrogen

Hydrogen appears to be an extremely attractive fuel for the future. It can be made from plentiful, renewable resources such as sunlight and water, and it produces only water vapor and small amounts of nitrogen oxides when burned. Hydrogen's flexibility in form and function make it usable to meet any energy need—from combustion devices to fuel-cell electricity producers. But, the hydrogen concept still presents three challenges to the energy research and development community:

- Development of renewable production technologies that are economical and capable of industrial-level production.
- Development of storage techniques that are competitive with conventional fuels in terms of weight and volume.
- Broad introduction into a vital energy sector-preferably transportation (Melody, 1993).

Hydrogen gas can be produced from biomass by electrolyzing water using electricity from photovoltaics, solar thermal collectors, or wind generators. The hydrogen could then be used in place of natural gas to power cars, homes, offices, and factories.

Cogeneration

Cogeneration facilities are not a method of energy conversion, but rather a method of energy efficiency. Industrial applications of cogeneration facilities typically take one of two forms. They use the heat left over from the process of generating electricity for another purpose (called a topping cycle). For example, the excess heat left over from running a steam turbine could be used directly to manufacture glass. The second basic principle uses the heat left over from an industrial process, such as food processing, to generate electricity (called a bottoming cycle). Figure 4-9 diagrams the various cogeneration processes.

Sometimes both a topping and bottoming cycle can be sequentially combined (called a combined cycle) in an electricity generation facility. Waste heat from the primary generation process is sent through a second turbine to create additional electricity. Such facilities are most economical and efficient when the fuel source is one that would otherwise be wasted, such as gas captured from sewage treatment facilities.

There are three cogeneration facilities in San Luis Obispo. San Luis Obispo's California Polytechnic State University power plant is a cogeneration facility with a capacity of .35 MW. A converted diesel engine burns natural gas to drive a generator for electricity. Heat from the engine's exhaust system is channeled to a steam boiler and used for dormitory space heating and hot water heating (topping cycle). In Nipomo, Koch California Ltd. owns another cogeneration facility that can generate up to .30 MW. Koch uses a natural gas-powered generator to produce electricity which it then sells to PG&E as a Qualifying Facility. The cooling water is then used to heat greenhouses (topping cycle).

The third biomass cogeneration facility is owned and operated by the city of San Luis Obispo at the Water Reclamation Facility. The facility uses an anaerobic digester to create methane gas from sewage. The methane gas is then burned to generate electricity for the facility. The waste heat from the electricity generation is used to keep the anaerobic digester warm (Marks, personal communication). This is an exemplary use of a cogeneration facility, as it uses waste products for fuel.

The enhanced oil recovery operations in the county are also considered cogeneration facilities. The wells in the Price Canyon Oil Field are equipped with enhanced oil recovery systems. Enhanced oil recovery methods boost production levels by burning gas (sometimes associated gas) to create steam. The steam is then injected back into the well. The heat from the steam lowers the viscosity of the heavy crude so it will flow more easily. Because of the large energy use required to create the steam (which can be very expensive) and the limited increase in production levels, enhanced oil recovery is used on a limited basis (only when gas and oil prices make it profitable).

Facility Siting

The basic idea behind cogeneration facilities—shared energy use—means that such facilities are best located at the point which can use the waste heat, the electricity, or both. Large institutions, agriculture sites and enhanced oil recovery sites have the most potential in San Luis Obispo County. Because cogeneration facilities are most often added on to existing operations, the type and extent of potential impacts are dependent on the individual project and are not easily generalized.

However, in almost all cases, the facility will need to be tied into the utility grid to store or transmit electricity; therefore, the same types of impacts associated with transmission lines may occur. But, in many cases, cogeneration facilities can be installed with few new impacts beyond those associated with the original land use. Cogeneration facilities that are designed as an integral part of a new industrial plant or operation can also be designed to have no significant impacts beyond those normally associated with the industrial operation itself.

Most proposals for cogeneration facilities will probably generate less than 50 MW in San Luis Obispo County, and will therefore require no special state or federal permits. This means that the county will have the authority to permit all aspects of such facilities. In most cases, installation of cogeneration components at existing industrial, agricultural, or power generation facilities are generally categorically exempt from CEQA processing. This provides the county the opportunity to encourage cogeneration facilities by simplifying the review process.

Distributed or Small-scale Utility

The concept of a distributed utility is a departure from building large scale, centralized power plants and extensive transmission lines to deliver electricity. The idea is to have more, smaller power generating and storage facilities that are located near the end users. These types of facilities produce electricity closer to where it is needed, thereby deferring or avoiding the need for new or upgraded transmission and distribution lines.

Electric Transmission Lines

Electric power lines require right-of-way easements to cross over privately owned lands. Such easements are negotiated directly between project proponents and land owners. Although shorter routes are generally preferable from an environmental, engineering, and economic perspective, regulated utilities take other issues into consideration when selecting power line routes. These issues include geology, terrain, surrounding land uses, aesthetics, local policies, public roads, private access roads, owner's uses and concerns, and service to the public. Electric power lines should be located near energy loads in order to maintain system reliability and minimize drops in electric voltage which occur over extended sections of distribution lines.

Underground installation of transmission lines is technologically possible, but the excavation required for underground lines and associated transition stations may result in significant environmental impacts. Easement widths for underground transmission lines are generally larger and greater land use restrictions may be necessary for underground lines to ensure access when necessary.

Transition stations (typically half an acre) are required where underground lines connect to overhead lines to provide for safe transmission of the power between the lines. To date, most transmission and distribution lines are placed above-ground because it is significantly less expensive.

Substations include equipment that switches, changes, or regulates voltage in the electric transmission and distribution system. Located at major junctions throughout a utility system, they can increase (step-up) the voltage at which power is transmitted, or substations can decrease (step-down) voltage near load centers such as communities or large customers.

There are seven electrical transmission line corridors within San Luis Obispo County. Four of the lines transport electricity generated from the Morro Bay Power Plant. Two other transmission line corridors originate at the Diablo Canyon Power Plant. The remaining transmission line corridor originates in San Joaquin Valley and enters the Carrizo Plains near Soda Lake.

Power lines cause significant visual impacts. Property owners may feel that such lines and towers decrease real property values. Power lines may also interfere with agricultural operations by preventing creating hazards for aerial spraying. Additionally, agricultural production on land beneath power lines can be reduced if towers and poles interfere with the operation or maneuverability of farm cultivation equipment. However, the type of power line and towers used near agricultural areas can mitigate some of the impacts of new power line construction.

FOSSIL FUEL PRODUCTION

This chapter discusses fossil fuel facilities in the county, including oil and gas wells, separators, and refineries. Although some natural gas is pumped from local wells, this product is generally treated and transported with the crude oil resources.

Oil and Gas Wells Production and Processing

Surface exploratory methods bring in equipment for a short time, complete the exploratory drilling, and then remove the equipment. Therefore, most exploratory methods do not have a permanent impact on the change in land use. However, exploration methods can have significant, short-term impacts.

Permanent well sites are constructed by installing a pipe (called casing) in the well, and then pouring concrete between the casing and the well wall. If the oil or gas zone has sufficient pressure to be produced without pumping, a series of valves, attached to the tubing and casing will regulate the rate of oil or gas flow.

As gas and oil are extracted, conditions change within the oil reservoir and production levels generally start to decline. Enhanced oil recovery methods boost production levels by using pressure, heat, and/or chemicals. The most common enhanced oil recovery method used in California is to inject steam into the wells. The heat from the steam lowers the viscosity of the heavy crude so it will flow more easily.

A method of drilling that can minimize the impacts of production wells is called horizontal or extended reach drilling. Oil and gas reservoirs can be tapped by a bore hole that travels horizontally through the geologic formation instead of straight down. This can lead to fewer production wells being sited to produce the oil and gas. This technology has been proposed to produce oil and gas from both inland reservoirs and those located in nearshore coastal waters, from onshore production sites.

Once oil reaches the surface, it is pumped to a facility near the well that separates the oil, gas, and water. After separation, the crude oil is stored in nearby stock tanks and the gas is routed into lines leading to a gas plant for further processing. The water is either filtered and used for steam injection or water flooding, or it is pumped into a disposal well. In the past, oil production sumps were typically depressions in the ground used to separate oil and water or store produced fluids. In San Luis Obispo County, tanks or a protected sump must be used.

After the crude oil leaves the field separator, it is further dehydrated in order to reduce its water and sediment content to a maximum of one percent. The crude is then transported to refineries via truck, pipeline, or ocean tanker.

This topic is further discussed in the following section on transmission facilities. The refining process is usually accomplished by applying large amounts of heat to the crude oil. Crude oil, heavier gas liquids, or crude oil components are refined through a boiling or fractionating process that splits the product into liquids of different boiling ranges (or fractions) by distillations.

As the crude is boiled, those products with the lowest boiling rates are butanes (natural gas) which is generally sent to a gas processing plant for further refining. The second group of products to reach boiling point are called "light end" products and include gasoline and naphtha. (Light products, primarily gasoline, constitute more than 50 percent of the petroleum product consumed in California.) The next group of products to reach boiling point are distillates, such as kerosene, diesel, and jet fuel. (Distillates provide for about 30 percent of fossil fuel demand). The remaining substance are heavy products such as heavy gas oil and residual fuel, which can be used for asphalt and other specialties.

Siting and Operation of Facilities

The potential for siting new oil and gas facilities in San Luis Obispo County raises serious environmental and political issues. In general, siting criteria should address land use, air quality, sensitive biological resources, geologic hazards, and hazardous materials management. Other equally important considerations are hydrology, noise, cultural resources, and emergency services, but these issues are specific to the proposed site and use (rather than a question of general location) and are best addressed during project level review.

Land Use Conflicts. One of the key land use issues related to siting of new or expanded facilities is compatibility of the facility with adjacent uses. Compatibility should consider nuisance factors, such as noise, dust, odor, traffic, light and glare, and potential impacts to visual resources and aesthetics.

One way to minimize land use conflicts is to consolidate facilities allowing all producers to share pipelines, processing facilities, and (to a lesser extent) marine terminals. The facility owner must provide equal access and rates to all producers using the facility. It is even possible for producers to share a well field site or production and transportation equipment.

Air Quality. San Luis Obispo County is a non-attainment area for ozone and particulate matter, and the siting of new and/or expanded facilities must take potential emissions into account.

Development of new or expanding existing facilities could result in both short-term and long-term increases in air emissions.

Sensitive Biological Resources. San Luis Obispo County spans 96 miles of coastline and has many areas with important habitat, recreational, and agricultural resources; those areas include the lands surrounding Nipomo Dunes, the north coast areas, and the Morro Bay watershed (San Luis Obispo County, 1992). Both the county's onshore and offshore biological resources could be affected by oil and gas exploration, construction, and production activities, especially oil spills. Any new or expanded support facilities should be sited to avoid biologically sensitive areas.

Geologic Hazards. Geologic hazards in the county that could impact energy facilities include earthquakes, landslides, subsidence, erosion, and soil expansion. In general, facilities should be sited at least 200 feet away from active or potentially active faults and should avoid slopes of 20 percent or greater. Site-specific geotechnical studies and specially designed building foundations can be used to mitigate potential impacts associated with subsidence and expansive soils.

Hazardous Materials Management. Hazardous materials are used, stored, and/or produced by the petroleum industry. The local health department monitors the hazardous materials used and stored throughout the county. The Fossil Fuel Issues Working Paper provides a list of federal and state regulations applicable to fossil fuel facilities in San Luis Obispo County. Refinery Operations

Because of the proximity of residential development to the Santa Maria Refinery, refinery operations and air emissions are a highly visible and publicized problem. However, there is no practical way to deal with the issue of residential proximity (aside from improving plant emissions and safety) because relocating the facility or establishing a new one is probably infeasible.

Abandonment

San Luis Obispo County has numerous oil-related facilities, including storage facilities, oil pipelines, pump stations, and oil fields that are no longer in service, and other existing facilities will continue to be phased out, such as processing facilities and marine terminals. Older sites may have unsafe structures or concentrations of hazardous products on-site. Most permits prior to 1960 did not set forth proper and timely abandonment requirements at the termination of the operation. For new facilities, an abandonment plan should be considered as part of the application. The issue of abandoning and decommissioning facilities should be studied further. Future policy development should be based on an understanding of the various issues involved in abandoning facilities and coordination with other agencies.

TABLE A5-3 DECOMMISSIONED OIL FACILITIES

Marine Terminals	Oil Fields	Pipelines
Chevron Estero	Guadalupe oil field	Chevron Rio Bravo line
Morro Bay Power Plant		San Ardo line
US Navy (Estero)		Pump stations

Transporting Petroleum Products

Oil that has been produced (extracted from the ground) must then be transported to a refinery. The transportation options for petroleum products are either pipelines or marine terminals and tankers. Oil spills from tankers and marine vessels represent a sewage risk and significant harm to the marine environment; tanker accidents, tanker operations, and other vessel operations account for 45 percent of the total input of petroleum hydrocarbons going into the California marine environment (CCC, 1993). It should be noted that in 1993, the U.S. Navy was responsible for 82 of the 177 (46%) spill incidents in California (OSPR). Spills are most devastating when they leak directly into the marine environment. Oil spills can also occur as slow pipeline leaks into soils and groundwater.

Marine Terminals and Tankers

Marine terminals are used to load and/or unload crude oil or refined products onto, or off of, tankers. A terminal is made up of various components, including onshore tankage, pumping machinery, a network of pipelines and hoses, mooring systems, and oil spill response materials.

There were four marine terminals in San Luis Obispo County. Millions of barrels of petroleum materials are transferred through these facilities each year. At Estero Bay there were three operating marine terminals. Chevron operated two terminals to load crude and product, and the U.S. Navy had a terminal that was used to unload product.

Pipelines

Although pipelines pose less risk of spills than tankers, there are still significant impacts associated with pipeline development. The serious affects of a spill can be minimized by automatically shutting down the pipeline system, then promptly repairing the damage and cleaning up the spill. If this is done quickly, the spill should not reach underground aquifers or affect large amounts of surface water. The transportation of heavy crude oil is less hazardous to underground water supplies because the oil's viscosity inhibits it from soaking into the ground as quickly. Some of the most common causes of leaks are from pipe corrosion and accidental damage caused by excavating equipment.

Chevron (formerly Unocal) Pipeline System. Chevron pipelines run to the Santa Maria Refinery on the Nipomo Mesa the Sisquoc connection in Northern Santa Barbara County. From the refinery they run to the Avila Beach station, and continue through San Luis Obispo into the San Joaquin Valley. In addition, a natural gas pipeline system transports gas from the county to a facility in Santa Maria where the finished product is sent into the gas distribution network.

Celeron — All American Pipeline. Celeron Corporation in Houston, Texas owns and operates the All American Pipeline (AAPL). The AAPL extends from Santa Barbara County to refining facilities in Texas. The line originates in Las Flores Canyon, Santa Barbara, runs north to Gaviota and on to Sisquoc in Santa Maria, where Unocal recently constructed a pipeline connecting to their Santa Maria refinery. The All American Pipeline continues north to San Luis Obispo and heads east to Kern County. It travels parallel to the county line, with 37 miles of the line located in San Luis Obispo County. There are no pump stations or storage tanks sited in San Luis Obispo County associated with the pipeline.

Storage Facilities

A tank farm is a grouping of above ground storage tanks strategically placed for temporarily storing crude oil and refined or partially refined petroleum products. In the above facility descriptions tank farms are discussed as a part of a marine terminal or pump stations. Several other tank farms in the county are associated with oil fields or pipelines.

The San Luis Obispo tank farm is located adjacent to the City of San Luis Obispo and includes a pump station and abandoned facilities. The site is in remediation due to a large spill that occurred in 1927.

Natural Gas

The Southern California Gas Company's natural gas pipeline system serves most of the communities in the county. A significant portion of the rural population depends on propane service from San Luis Butane, Suburban Propane, Petrolane, Northern Energy, and Central Coast Propane. Pacific Gas and Electric brings gas through a 20-inch pipeline from Kettleman to run the Morro Power plant.

Southern California Gas Company. The Southern California Gas Company provides natural gas service to San Luis Obispo County. Transmission lines enter the county from the south and continue north, providing gas to the communities of Nipomo, Oceano, Arroyo Grande, Grover Beach, Pismo Beach, Shell Beach, and Avila Beach. The transmission lines branch off in Arroyo Grande; one line goes to the coast towards Pismo Beach and another line moves north to the City of San Luis Obispo. Near the airport the line branches off again this time west to Los Osos and Morro Bay. From this line a branch runs to Camp San Luis and Cuesta College.

A main transmission line moves along Highway 1, through Morro Bay, Cayucos, and ending in Cambria. At Toro Creek Road, a pipeline line heads east following Highway 41 up to Atascadero. Another line comes up from the San Luis Obispo following Highway 101. That line serves Santa Margarita, Garden Farms, and south Atascadero. It then continues north to Paso Robles, bringing gas to Templeton along the way. A line then runs west and connects with a Mobil gas line which serves the San Ardo oil field in Monterey County. A line runs northeast from Atascadero to parts of Creston and Shandon.

Pacific Gas and Electric. A 20-inch pipeline runs from the northeast portion of the county to the Morro Bay Power Plant. Along the way it serves some residents in Shandon. This pipeline originally provided gas to the former Unocal pump station at Shandon, but Chevron now uses its own pipeline to supply gas.

Gasoline and Diesel

The county gasoline and diesel supply is shipped in by either tanker or truck. (The only refinery in the county, Santa Maria Refinery, does not produce gasoline or diesel.) The gasoline and diesel sold in the county is distributed by truck shipments from refineries in Kern and Los Angeles Counties. Tanker shipments delivered to Unocal's Avila Beach tank farm occurred until 1995 when they were discontinued due to industry economics.

Introduction[1]

There are a wide variety of mineral resources found in San Luis Obispo County, although only a few minerals are presently being extracted commercially. Mining has played an important and colorful role in the county's history, including a brief gold rush at Pozo in the 1870's and the later discoveries of mercury in the Santa Lucia Range. In recent years, the mineral products of the county have included petroleum, natural gas, mercury, gypsum, sand and gravel, construction stone, and clay.

Local mines provide a significant contribution to the county's economy. However, a number of conservation problems and issues are involved with local mineral resources. First, there are the problems caused by old abandoned mines, which mar the scenery and cause pollution. Second, there are the issues related to mines now in operation, including pollution at the site as well as noise and dust from trucks on access roads. The question of allowing new mines and quarries is a basic issue now facing the county.

Historical Perspective

Although the annals of San Luis Obispo County history will tell about the dominance of an agrarian society and economy, it will tell little of the exploitation of its mineral resources. However, from the earliest days, settlers of this county have attempted to capitalize on the various mineral types as they were found to exist.

Although the first commercial enterprises were suspected to be carried out by the Spanish in their quest for silver and gold, coal was the object of the first actual mining company incorporated in the county. This was the San Simeon Coal Mining Company, which was organized in 1863. A short time later, there occurred a great demand for copper in munitions and the subsequent high prices during the Civil War initiated the opening of several copper mines in the county. During the same period of exploration, rich quicksilver-bearing ores were discovered in the mountains east of San Simeon. This discovery near the Josephine Mine set off a flurry of activity throughout that area. The founding of the Oceanic Mining Company followed in 1874 for the extraction of very rich cinnabar deposits east of Cambria. Although the coal and copper industries folded quickly, a number of quicksilver mines continue to operate.

As with the rest of California, this county also experienced a late 19th century gold rush, although proportionally very minor. A location in the La Panza Range was the object of this hunt to recover the fine gold placer deposits. These workings, however, were never of much economic value to the county, although there was again some activity during the 1930's.

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[1] The information in this appendix is excerpted from the 1974 Conservation Element.

During the 1870's, chromite, the second most important mineral in the county's past also came into production. The richest deposits were found at the mountainous headwaters of Chorro Creek, near San Luis Obispo. Since the market failed in chromite following World War I, there has only been intermittent activity of this mineral resource. Other past mining activities have included workings of the large bituminous sandstone deposits; the various construction stones, sands and gravels; and the extraction of oil. The principal developed mineral resources of San Luis Obispo County in recent years have been gypsum, clay, natural gas, petroleum, mercury, construction stone, sand, and gravel. Of these resources, sand and gravel remains a principal mineral resource in the county to this day.

Economic Contributions[2]

Even though there are a wide variety of mineral resources in the county, production in 2007 was valued at about $7 million. The contribution made by mining activities to the total county economy is relatively small. All mining activity accounts for only 1.3 percent of the basic employment in the county.

According to the California Department of Finance Labor Force and Employment Report (2006), total employment in the mineral resource industry in the county has increased from 3300 employees in 1993 to 7700 employees in 2005.

EMPLOYMENT IN SAN LUIS OBISPO COUNTY'S MINING INDUSTRY BY YEAR

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
3300	3500	4100	4200	4400	5000	6500	6100	6700	6800	6900	7200	7700

Employment in the mineral industry grew by 57% in 12 years. Local demand is the primary factor in the production of sand, gravel, and stone. This activity is directly related to growth trends and construction needs. Production has fluctuated in proportion to the economic activity in the county.

Reported payrolls for last year totaled $1.5 million. Additional, but undetermined, contributions to the county's economy are also made indirectly by the local provision of rock, sand, and gravel to the construction industry.

[2] This information is updated from the 1974 Conservation Element

CONSERVATION ISSUES

Consideration of surface mining in relation to comprehensive land use planning involves conflicting objectives. Sound planning seeks to: 1) make available mineral resources for industrial use; 2) conserve minerals; 3) protect residential areas from noise, dust, vibration, traffic, or esthetic impact; 4) reclaim worked-out mines for new land use that will fit a comprehensive plan; and 5) avoid excessive damage to environmental and scenic resources.

The community must somehow balance the objectives and conflicts to achieve a favorable plan for the public's general welfare. Strict economics are no longer the only consideration in planning and decision making. Many problems and conflicts must be considered when dealing with the impact of mineral exploration and energy production.

Land Use

A significant conflict which arises through the need for mineral extraction is competition between land uses. Prior to actual need for extraction of the mineral, there is the possibility of preemption of the site by other land uses. This suggests the need to define mineral preserves for selected resources at desirable locations. The County General Plan's EX combining designation identifies areas where mineral exist.

During the extraction process, there can be major problems created through subsidence at the site, landslides, waste disposal, and loss of scenic values. Definitive controls must be placed upon mining operations to reduce the impact of these disruptions.

After the mineral deposit has been exhausted, there remain the major disruptions created by the mining operations: the pit, mine shafts, or abandoned wells; the slag heaps, or mounds of overburden; and the large barren sterile area around the site. Prevention of these disruptions of the land and reversion of the land to a useful state require reclamation measures that are carried out through conditions for mining approval. Phasing schedules and bonding measures may also be applied. Imaginative planning can be used in making proposals for reclamation of abandoned sites, and these should be included as part of the original application.

LAND USE CONFLICTS

As with all types of industrial endeavors, conflicts with adjacent land uses may at times create serious problems for mining activities. Some of the difficulties originate from the nature of the extraction process, which may involve dust, noise, vibration, or odor problems for neighboring areas. Conflicts also arise if a source of air or water pollution exists as a result of the extraction process. Pollution in any form is a major issue, which can create far-reaching public reaction.

In addition to conflicts emanating from the site, problems may also be created along access routes. Dust, noise, and traffic problems along access routes are secondary conflicts, which also may be controlled through Conditional Use Permits. Proper siting of preserves and route selections, as well as control of adjoining land uses are other means of preventing conflicts.

Certain problems, such as visual impacts created during and after mining activities, are inherent in any mining operation, but their impacts are also regulated. Public and employee safety are other issues which arise in any industrial operation. These are for the most part administered by higher level agencies, although input by local entities is certainly considered.

Establishment of a mineral extraction operation can lead to pressures for associated land uses. The locations of resource-oriented industries are determined in the same manner as other types of land use, and are, in most cases, restricted to industrially zoned areas. In some cases an extractive operation requires certain processing or refining activities to be situated close at hand. In other cases, as with asphalt plants, the industry is located close to the resource. Pressures for establishing associated industries sometimes occur after an industrial use is established. This factor should be an additional consideration when land use decisions relating to natural resources are made.

Somewhat related to land use conflicts is the increasing demand for energy and fuels and the subsequent pressures for increased production. Consumption increases result in greater land use requirements devoted to production.

Regulatory Structure

STATE AND FEDERAL

All levels of government perform regulatory functions in regard to mining operations. The nature of the regulation includes such items as land use, taxation, employee safety, groundwater protection, and transportation. In addition to regulation, government also provides an advisory service, and acts as a clearinghouse for statistics and information. At the Federal level, the U.S. Bureau of Mines performs these services; and at the State level it is the State Division of Mines and Geology.

Standards and regulations are applied by the State Division of Industrial Safety, the Public Utilities Commission, and the State Division of Oil, Gas. Administration of public lands and regulation of mining activities on those lands is the responsibility of the U.S. Bureau of Land Management and the U.S. Forest Service.

COUNTY REGULATION

One of the means a county has of regulating mining practices and petroleum extractions is through the use of land use regulations. In general, a Conditional Use Permit is required to establish a mining operation in those land use categories in which mines and quarries are allowable. The County General Plan Land Use Element has established the EX (Energy and Extractive Area) combining to identify where[3]:

1) Minerals or petroleum extraction occurs or is proposed to occur;
2) The state geologist has designated a mineral resource area of statewide or regional significance.

According to Land Use Ordinance section 22.14.040, the purpose of this combining designation is to: protect significant resource extraction and energy production areas identified by the Land Use Element from encroachment by incompatible land uses that could hinder resource extraction or energy production operations, or land uses that would be adversely affected by extraction or energy production.

In addition to the EX designation, there is a companion EX1 designation for mineral extraction. According to Land Use Ordinance (LUO) section 22.14.050, the EX1 designation is used to identify areas of the county which the California Department of Conservation's Division of Mines and Geology has classified as containing or being highly likely to contain significant mineral deposits. The LUO also states that the purpose of the EX1 is to protect existing resource extraction operations from encroachment by incompatible land uses that could hinder resource extraction.

The industrial processing of mineral resources and construction materials is regulated by the Land Use Ordinance. Regardless of the use involved, the Conditional Use Permit process may control noise, vibration, setbacks, and aesthetic or visual impacts, among other possible conditions.

Air pollution regulations are enforced by the County Air Pollution Control District. This agency administers the State Air Quality Standards, monitors dust, and smoke, and requires the installation of preventative systems.

[3] Land Use Ordinance section 22.14.040

Introduction

Our county has an abundance of open space features, including majestic natural landmarks, outstanding scenic vistas, important wildlife habitats, lands with recreational opportunities and other valuable open space resources. These resources, along with the agricultural attributes described in the Agriculture Element, are essential to the future of this county.

Diverse open space resources provide a major attraction to visitors from around the world and make this county a special place to live. They are a defining characteristic of San Luis Obispo County. These resources include the unique 1,000,000 year old landmark volcanic peaks known as The Morros, stretching from Morro Rock to Islay Hill in San Luis Obispo; significant coastal wetlands, and rare coastal dune ecosystems; the oak woodlands of the Adelaida area; the stark beauty and endangered wildlife of the Carrizo Plains. These places are unique and worthy of protection for their intrinsic value. In addition, recreation and tourism that is based on the local open space resources contribute substantially to the local economy. The latest information from the California Trade and Commerce Agency indicates that travel expenditures in San Luis Obispo County amounted to approximately $1.84 billion in 2007.

San Luis Obispo County supports the protection, restoration and preservation of significant open space features which are irreplaceable resources for enjoyment by current and future generations. This is necessary in order to enjoy scenic beauty and recreation, discourage premature and unnecessary conversion of open space to urban uses, maintain public health and safety, and to maintain the economy.

This chapter provides direction for the protection of the critical and diverse open space resources in the unincorporated areas of the county. State planning law defines open space to include a wide range of resources, including open space for the protection of natural resources, the managed production of resources (which includes the agricultural lands discussed in the Agriculture Element), outdoor recreation, and the protection of public health and safety.

In this chapter, open space lands are defined as resources or features of the landscape with unique or sensitive habitat for plants and animals; recreational opportunities; distinctive scenic values; hazards that threaten public health and safety; or archaeological or historical sites. Because open space resources do not observe man-made boundaries, they occur on both public and private lands. Therefore, the goals and policies in this Open Space Element refer to the treatment of open space resources on public lands and on private non-agricultural lands. The reader should refer to the Agriculture Element for the treatment of open space resources located on agricultural lands.

The open space resources addressed in this Element often come under the purview of federal and state regulations, such as the federal Clean Water Act, and the federal and state

Endangered Species Acts. The goals, policies and implementation measures found in this chapter are intended to be compatible with, but not overlap or duplicate, these federal and state requirements.

It must also be clearly understood that the identification of areas having open space resources does not imply or condone public access onto those lands unless that access is voluntarily given by the land owner. Many of the open space resources are located on privately owned lands. Protection of the resources on those lands is encouraged to occur through voluntary actions by the land owner, and the policies and implementation measures in this plan also offer incentives to the owners to accomplish that voluntary protection.

What Are Open Space Lands?

California Government Code Section 65560 defines open space as follows:

> 65560. (a) "Local open-space plan" is the open-space element of a county or city general plan adopted by the board or council, either as the local open-space plan or as the interim local open-space plan adopted pursuant to Section 65563.
>
> (b) "Open-space land" is any parcel or area of land or water that is essentially unimproved and devoted to an open-space use as defined in this section, and that is designated on a local, regional or state open-space plan as any of the following:
>
> (1) Open space for the preservation of natural resources including, but not limited to, areas required for the preservation of plant and animal life, including habitat for fish and wildlife species; areas required for ecologic and other scientific study purposes; rivers, streams, bays and estuaries; and coastal beaches, lakeshores, banks of rivers and streams, and watershed lands.
>
> (2) Open space used for the managed production of resources, including but not limited to, forest lands, rangeland, agricultural lands and areas of economic importance for the production of food or fiber; areas required for recharge of groundwater basins; bays, estuaries, marshes, rivers and streams which are important for the management of commercial fisheries; and areas containing major mineral deposits, including those in short supply.
>
> (3) Open space for outdoor recreation, including but not limited to, areas of outstanding scenic, historic and cultural value; areas particularly suited for park and recreation purposes, including access to lakeshores, beaches, and rivers and streams; and areas which serve as links between major recreation and open-space

reservations, including utility easements, banks of rivers and streams, trails, and scenic highway corridors.

(4) Open space for public health and safety, including, but not limited to, areas which require special management or regulation because of hazardous or special conditions such as earthquake fault zones, unstable soil areas, flood plains, watersheds, areas presenting high fire risks, areas required for the protection of water quality and water reservoirs and areas required for the protection and enhancement of air quality.

(5) Open space in support of the mission of military installations that comprises areas adjacent to military installations, military training routes, and underlying restricted airspace that can provide additional buffer zones to military activities and complement the resource values of the military lands.

(6) Open space for the protection of places, features, and objects described in Sections 5097.9 and 5097.993 of the Public Resources Code.

While agriculture is considered a type of open space in state law, the County General Plan addresses agricultural resources separately in an Agricultural Element. Agricultural lands may have open space attributes, but are intensely managed and their open space values are often the result of the land being in agricultural production. Those agricultural lands containing open space resources are discussed in the Agriculture Element.

Open space lands can have some level of development occur on them while still serving as open space. It should not be expected that all lands determined to have open space values shall forever more remain undeveloped and untouched. To the contrary, the open space resources may be managed in a variety of ways ranging from a hands-off approach to a program of defined intervention to best preserve and protect the identified resource.

In San Luis Obispo County, open space limits urban sprawl, provides separation between communities and helps to define the identity of each community. It protects scenic vistas and areas that are hazardous for development. It provides opportunities for recreation, be it as large wilderness areas in remote parts of the county, or as small green spaces in the heart of a community.

The following is a description of the types of open space resources in this county. These general categories are those that are identified in State planning law when describing the types of open space to be considered in the preparation of an open space element.*

OPEN SPACE FOR THE PROTECTION OF NATURAL RESOURCES.

These can include areas for the preservation of plants and animals, streams, wetlands, and watershed lands, such as: oak woodland habitats in the Adelaida area of the north county, riparian corridors along coastal streams, and wetlands such as found in Black Lake Canyon on the Nipomo Mesa.

OPEN SPACE USED FOR THE MANAGED PRODUCTION OF RESOURCES.

These can include: forest lands, rangelands and other agricultural lands (discussed separately in the Agriculture Element), commercial fisheries along our coastline, areas containing significant mineral deposits such as found along the Salinas River, and areas that may contain a variety of uses but which are important for groundwater recharge.

OPEN SPACE FOR OUTDOOR RECREATION.

Recreational opportunities can range from minimal passive activities such as hiking, to more active local and state parks, recreation facilities such as golf courses, and areas of outstanding scenic, historic and cultural values such as found in the Carrizo Plains Reserve administered by the Bureau of Land Management.

OPEN SPACE FOR PROTECTION OF PUBLIC HEALTH AND SAFETY.

There are a variety of lands in the county that pose potential threats to public health and safety if improperly developed. These can include known earthquake fault zones, floodplains, areas of unstable soils and geologic instability, lands adjacent to water reservoirs or downstream of dams, and areas of high or extreme fire hazard. In most instances, all development cannot be prohibited outright on such lands, but these areas of risk can be identified and appropriate development standards established so as to minimize the risks to the maximum extent feasible.

The following section of this chapter provides an overview of the environmental features of the county.

Environmental Features

An understanding of the physical environment and the natural processes affecting it is an essential starting point in the development of this document. The land, in combination with other natural phenomena, dictates to a large extent the type of use and the intensity of development that is possible without doing irreparable damage to the natural environment. If attention is not paid to these issues, the land owner runs the risk of possible physical and economic loss to property and investment. This long-term loss may also affect the community at large as well as future generations.

This section of the document identifies and describes critical natural phenomena that affect land use. The processes that are discussed are generalized but do serve to point up the interrelationships between the natural environment and man's use of it. Also see chapter 2 for an overview of soils and hydrology.

PHYSICAL CHARACTERISTICS

Geomorphic Regions

San Luis Obispo County sits in a central position in the southern coast range complex. There are five mountain ranges generally oriented on a northwest-southeast axis: the Santa Lucia, Temblor, Caliente, La Panza and San Luis Ranges. None of the ranges are particularly high, although several of the peaks exceed 3000 feet elevation. Extensive sections of the ranges are quite rugged and have influenced the historical development of the county. This topography has been an effective barrier to transportation corridors and intensive development.

The San Luis Range divides the coastal plains and valleys at Point Buchon into a northern and southern section. The northern coastal plain consists primarily of a relatively narrow bench that backs up to the Santa Lucia Range. It is cut by numerous short stream valleys that empty into the Pacific Ocean. The north coastal sector makes its deepest inland penetration in the vicinity of the Chorro and Los Osos Valleys.

The southern section primarily consists of the Arroyo Grande Valley, an upland area of ancient dunes referred to as the Nipomo Mesa, and a portion of the Santa Maria River Valley. The two valleys are relatively small but do contain some of the best agricultural land in the county. The south coastal area is also characterized by an extensive dune area of recent origin along the coast.

The Salinas River dominates a huge drainage basin in the northern section of the county that is bordered on the west by the Santa Lucia Range and on the east by the Temblor Range. The basin is characterized by vast low undulating hill land and valleys that generally drain to the north to Monterey County through an extensive network of tributaries. Urban development is concentrated along the edge of the Salinas River floodplain. Westerly tributaries to the Salinas River gradually transform from low hill land into the precipitous Santa Lucia Mountains. The Nacimiento River is the largest of the Salinas River tributaries within the county.

The Carrizo Plain is an entirely enclosed interior drainage basin. All drainage terminates in Soda Lake, a highly mineralized water body with a fluctuating water level. Toward the outer periphery of the basin the soil is less contaminated with mineral salts and, therefore, better for agriculture. The plains are the most arid region of the county, but extensive agricultural pursuits are present.

The Cuyama Valley drainage basin lies along the southeastern and southcentral portion of the county and about 45 percent of the entire basin is in the county. The basin is drained by the Cayuma River and its tributaries. Since this river cuts across the La Panza and Santa Lucia complexes, a good portion of the valley is a narrow ribbon meandering through rugged terrain. However, where the valley widens in the southeast, there are extensive agricultural activities.

Geology

San Luis Obispo County is located within the Coast Range physiographic province. The county is generally divided into three geologic provinces that are separated by two major northwest-trending faults. The northeast province is bounded on the southwest by the San Andreas fault zone, and is underlain at depth by a complex basement of folded and faulted Franciscan rocks of Jurassic age. Sedimentary rocks of Cretaceous to Late Tertiary age are commonly exposed at the surface in this province and are extensively folded and faulted. Pleistocene and recent age sediments are offset along the San Andreas Fault.

The central province is bounded on the northeast by the San Andreas fault zone and on the southwest by three segments of the Rinconada Fault System. This province is underlain by Cretaceous and Jurassic-age granitic basement rock. The basement has structurally been relatively stable throughout geologic history. The younger sedimentary cover has not been deformed.

The southwest province, like the northeast fault block, is underlain by a Jurassic-age Franciscan basement. Cretaceous to Late Tertiary sedimentary rocks are exposed at the surface. The rock units in this province have been folded and faulted, but the complexity of structural deformation decreases with depth.

Seismicity

There are a number of faults throughout the county. The San Andreas Fault, located along the easterly edge of the county, is classified as active and is capable of producing a maximum credible earthquake of 8.0 to 8.5 magnitude, with ground displacement as great as 20 to 30 feet. This fault is expected to be the primary source of strong ground shaking in the county. Of the faults in the county, this fault exhibits the highest levels of seismic activity.

The Nacimiento Fault is also considered to be seismically active. This is based on the high concentration of earthquake epicenters along this fault, rather than geologic evidence of recent movement. The Nacimeinto Fault would also be a source of strong ground shaking in thecounty. The maximum probable earthquake is approximately 7.0 to 7.5 with a recurrence interval of 5,000 to 12,000 years.

The Rinconada Fault is seismically active, also. This fault has been associated with several historic seismic events that measured less than 5.0 on the Richter Scale and is a probable source for small to moderate earthquakes. This fault is considered to pose less of a threat than the San Simeon Hosgri, San Andreas, or Nacimiento Faults.

The offshore Hosgri Fault is also considered seismically active. Along the north shore of the county, this fault appears to be associated with the onshore San Simeon Fault. This combined system of the San Simeon-Hosgri Fault is believed to have the potential for seismic events as high as 7.5 on the Richter Scale and could pose a serious threat to the coastal areas of the county.

The Los Osos Fault runs along the base of the Irish Hills in the Los Osos Valley. This fault has the potential for seismic events as high as 6.75 on the Richter Scale and poses a significant threat to the area in the vicinity of San Luis Obispo and Los Osos.

There are a number of lesser faults throughout the county that are probably inactive and are considered to pose little or no likely threat to the county. These include the San Juan, La Panza, East Huasna and West Huasna faults.

Of all the fault systems, three have been designated Special Study Zones by the California Division of Mines and Geology. These are the San Andreas Fault, the onshore San Simeon Fault, and the Los Osos Fault. Structure for human occupancy are not to be constructed over these designated active faults without county review and approval as specified in the Land Use Ordinance.

Landslides and Other Geologic Hazards

Landslides generally occur as a result of broad geologic, topographic, or climatic factors. The natural processes that trigger landslides most frequently involve an increase in stress that finally exceeds the shear strength of the earth materials. These processes include crustal movements, erosion, weathering, and finally the activities of man on the landscape. Landslides can be traced to the nature of the parent rock and the natural processes affecting it. Inherently weak rock, and rock subject to weakness with an increase in water content, are most prone to landslide. This includes fine grained sedimentary rocks, weathered bedrock, and rocks such as serpentine and schist.

Other geologic hazards include subsidence, liquefaction, tsunamis, and seiches. Ground subsidence has been identified in areas of recent stream alluvium and bay muds. These types of areas also have other associated hazards such as storm surge and flooding.

The potential for seiches (seismically induced waves in a closed body of water such as one of the reservoirs) is low in San Luis Obispo County. Along the coast, a potential tsunami (tidal wave) would not be expected to exceed the tidal range. However, a hazard could occur if a tsunami occurred at the same time as a high tide.

Additional information on geology, seismicity, landslides and other geologic hazards can be found in the Safety Element of the county general plan.

Slope Characteristics

Steep slopes are a limiting factor for almost all types of land use. They also have a pronounced effect on other natural conditions such as the type and amount of vegetation, the propensity toward soil erosion, and the rate of surface water runoff.

The Natural Resources Conservation Service provides a general description of how slopes can affect land uses. In general, agricultural crops experience moderate limitations when slopes exceed 10 percent, however, there are some crops that can be effectively produced on steeper slopes of 30 percent or more. Depending on soil characteristics, grassland used for grazing purposes may have moderate limitations above 30 percent. Slopes above 50 percent place a severe limitation on grazing, although appropriate management practices can reduce impacts. Development requiring road cuts, building pads and septic systems are best suited to slopes under 20 percent. Major problems, including the unsightly appearance of scarred hillsides and streams chocked with sediment and eroded debris, increase with steeper slopes.

The prevalence of rolling or mountainous terrain places approximately 60 percent of the county into the slope range of 30 percent or greater. Another 23 percent occupies slopes ranging from 10 to 30 percent, leaving only about 17 percent of the total county land area with level to gently sloping terrain on slopes of less than 10 percent.

With so little gentle land, there is oftentimes considerable competition for land on slopes less than 15 percent. This can be a major land use problem if it results in an inefficient use of land resources. This is particularly the case when the best agricultural land lying within fertile valley deltas is sacrificed in favor of urban expansion.

Open Space Issues

One of the tasks of the Rural Settlement Study Phase I Report was to evaluate the potential environmental effects of historical development activities as well as the projections of the general plan. This was done, in part, by comparing development activity to those areas of the county covered by Sensitive Resource Area (SRA) combining designations. The report also looked at a number of other resources, both natural and cultural, including: public ownership such as forests and parks; the Highway 101 viewshed corridor; the habitat of rare plant and animal species; surface water (lakes); and oak woodlands. The location of these resources, in addition to the agricultural and sensitive resource areas, were then mapped to see if there was a concentrated pattern of important natural resources within the county and what effects rural development might have had on those resources.

Several important findings came out of that evaluation, including:

- about 30 percent of the areas where two or more of these resources were found to exist have been affected by development;
- the relatively low level of impact which has occurred can be attributed to the county's underlying topography; most of the resources are found in the mountainous terrain that has historically experienced less development pressure but that can change as development moves into the more rural locations;
- subdivision of the land through parcel and tract maps will have the greatest continuing effect on the environmental resources of the rural areas;
- the rural character of the county will be increasingly affected by the smaller lot sizes resulting from new land divisions; and
- the pattern of subdivisions moving into the rural areas containing these resources will lead to increasing conflicts.
- What are the Issues Affecting Open Space Lands?
- Population growth creates pressure to convert lands containing open space resources to non-open space uses.

Lands with open space resources are experiencing increased pressure for development that can be detrimental to the resources due to grading and land alteration that result in alterations of biosystems and destruction of habitat.

Increased population in the rural areas increases the conflicts between humans and the natural systems.

Suburban and rural residential development increases the level of human activity in rural areas. This can cause serious damage to or loss of habitat that is necessary for the long-term protection of plant and animal species. The introduction of domestic pets can be particularly harmful to wildlife. Increased development also brings the introduction of invasive non-native plant species into the rural landscape.

Rural development fragments habitat.

As habitat is fractured and reduced in size, wildlife's ability to survive is reduced. The displacement of wildlife can lead to increased competition for the basic necessities of life: food, cover, water and space. In the long run, habitat fragmentation will result in a decline in the diversity and number of species.

Land use decisions often treat conservation and economics as two mutually exclusive considerations.

Decisions about the open space resources that may be located on a given piece of land are often made when there is a crisis - significant monetary resources have already been invested in the property but the open space resources have already been seriously degraded. The consequences of crisis-driven conservation efforts can often be comparable to those of actually exhausting the resources that are trying to be conserved. A new decision making process needs to be implemented that manages land simultaneously as an ecological system and as an economic resource.

Although the county contains an abundance of open space, it is not evenly distributed, or it may not be easily accessible where multiple uses could be made of the resource.

Over 25 percent of the county land areas is under some form of public ownership. While there may be multiple uses of those publicly owned areas, much of that land can be considered to be open space.

A majority of our population lives in the relatively urbanized coastal areas and along the Highway 101 corridor and must often travel some distances to enjoy the large open areas. The County Park and Recreation Master Plan has identified existing and future shortages of recreational land in several areas throughout the county, but especially in or near these urban corridors.

Publicly owned lands may provide several open space functions such as recreation and protection of habitat, watershed and scenic resources, but those can often be competing functions. The competition between those uses may also spill over to adjacent privately owned lands. This will require careful planning and coordination between public agencies and private land owners to ensure that conflicts are avoided or minimized as much as possible.

Why Protect Open Space?

Open space should be protected because:

- Open space lands contribute to a high quality of life and make our communities more livable.

Our lives are enriched by experiencing nature in an undeveloped state, within both urban and rural areas. As population increases and more people come to the county to experience its recreational and tourism opportunities, the more challenging it becomes to try to maintain the open space that draws them here.

- Open space protects environmental resources such as important ecosystems and natural communities, and rare and endangered species of plants and animals.

As population increases, there is ever-increasing pressure to convert open space lands to non-open space uses. With this conversion comes the loss of habitat, which in turn brings a decline in the number and diversity of species. Protecting open space habitats now can reduce the need to argue over protection of rare or endangered species later.

- Open space retains land that could be made available for future production of resources.

Many open space areas are also rich in resources that can meet the needs of future generations. Production of those resources is important to San Luis Obispo County, as well as on a statewide basis. There are open space areas that contain mineral and aggregate resources. The challenge is to make wise use of those resources while keeping the important open space attributes.

- Open space defines the identity of our communities and protects the rural character of our county.

The open areas that surround many of our communities provide visual relief from continuous urbanization, prevent urban sprawl and create the character of the county's landscape that makes it special to residents and visitors.

- Open space provides a buffer between conflicting land uses.

Open space areas help define the difference between urban and rural areas. It also provides separation between uses that might be incompatible, thereby allowing incompatible uses to coexist.

- Open space protects public health and safety by identifying lands, such as floodplains and unstable slopes, that may be hazardous for development.

Maintaining open space on lands that are hazardous for development, such as floodplains and unstable slopes, protects the health, safety and welfare of both new and existing residents. It also avoids public costs of paying for property and other damage resulting from disasters such as floods, fires, landslides and earthquakes.

- Open space protects the natural scenic beauty of the county.

Scenic and sensitive features, such as the Morros, the Morro Bay estaury and wetlands, the coastal dune systems, the vast open expanses of the Carrizo Planning Natural Area, or the ecologically significant coastal streams all contribute to the high scenic quality of the county. These areas give strong definition to the overall character of the county, thereby adding to the quality of life enjoyed by residents and visitors alike. Protection of scenic resources also encourages the growth of the recreation and tourism industries, which are important components of the county economy.

- Open space provides opportunities for educational and scientific research, including the possible discovery of new medicines, or the development of new management strategies or technologies to better preserve our resources for future generations.

Natural systems have provided the basis for many of the medicines on which mankind depends. Preservation of our natural systems provides the opportunities for future discoveries. As we study the resources, we hope we can find better ways to preserve them, while still making appropriate use of the resources. Loss of our open space resources eliminates of reduces our options for the future.

- Open space preserves the history and heritage of our county.

Preserving open space can mean protecting archaeological, cultural and historic resources such as sacred sites used by Native Americans for thousands of years.

It is not possible to have a single solution to such a wide-ranging list of issues affecting open space resources. And in many instances, the solutions may not be only local. Just as is the case for agricultural issues, many of the issues affecting open space resources may only be resolved through policies at the state and national level. However, it is important that the county have a clear statement of it open space land use policies in order to protect and conserve these resources for the future.

References

San Luis Obispo County Department of Planning and Building. 1998. Agriculture and Open Space Element of the General Plan. San Luis Obispo, CA.

Soils play a major role in county watersheds through capturing, storing, and filtering of water, supporting vegetation, and producing valuable food and fiber crops. Soils are also directly linked to the future of agriculture and the environment, and hence to the vitality of our local economy. The various soil types have differing productivity, and therefore justify differing levels of protection, as identified in **Table A8-1**.

TABLE A8-1
IMPORTANT AGRICULTURAL SOILS OF SAN LUIS OBISPO COUNTY

COASTAL SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
102	Arnold loamy sand, 5 to 15%		X		
104	Baywood fine sand, 2 to 9%			X	
111	Camarillo sandy loam	X			X
112	Camarillo loam, drained	X			
113	Capistrano sandy loam, 2-5%	X			
114	Capistrano sandy loam, 5-9%	X			
115	Chamise shaly loam, 9 to 15%			X	
116	Chamise shaly loam, 15 to 30%			X	
117	Chamise shaly sandy clay loam, 5 to 9%			X	
120	Concepcion loam, 2 to 5%		X		
121	Concepcion loam, 5 to 9%		X		
122	Concepcion loam, 9 to 15%			X	
124	Corralitos sand, 0 to 2%		X		
125	Corralitos sand, 2 to 15%		X		
126	Corralitos variant loamy sand		X		
127	Cropley clay, 0 to 2%	X			X
128	Cropley clay, 2 to 9%	X			X
129	Diablo clay, 5 to 9%	X			X
130	Diablo and Cibo clays, 9 to 15%		X		X
131	Diablo and Cibo clays, 15 to 30%			X	X
133	Diablo-Lodo complex, 15 to 50%				X
135	Elder sandy loam, 2 to 5%	X			X

COASTAL SOIL SURVEY AREA					
Symbol	Soil Name	Prime Farmland	Farmland of Statewide Importance	Other Productive Soils	Highly Productive Rangeland Soils
136	Elder sandy loam, 5 to 9%	X			X
137	Elder sandy loam, 9 to 15%	X[e]		X	X
138	Elder sandy loam, occasionally flooded, 0 to 2%	X			X
139	Elder sandy loam, occasionally flooded, 2 to 9%	X			X
140	Garey sandy loam, 2 to 9%	X			X
143	Gazos-Lodo clay loams, 15 to 30%				X
158	Los Osos loam, 5 to 9%		X		
159	Los Osos loam, 9 to 15%			X	
160	Los Osos loam, 15 to 30%			X	
162	Los Osos-Diablo complex, 5 to 9%		X		X
163	Los Osos-Diablo complex, 9 to 15%			X	X
164	Los Osos-Diablo complex, 15 to 30%			X	X
168	Los Osos variant clay loam, 15 to 50%				X
169	Marimel sandy clay loam, occasionally flooded	X			X
170	Marimel silty clay loam, drained	X			
173	Mocho fine sandy loam	X			
174	Mocho loam	X			
175	Mocho silty clay loam	X			
176	Mocho variant fine sandy loam	X			
177	Nacimiento silty clay loam, 15 to 30%			X	X
180	Nacimiento-Calodo complex, 15 to 30%				X
184	Oceano sand, 0 to 9%		X		
185	Oceano sand, 9 to 30%			X	
186	Perkins fine sandy loam, 2 to 9%	X			
192	Psamments and Fluvents, occasionally flooded			X	

COASTAL SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
193	Psamments and Fluvents, wet			X	
196	Salinas loam, 0 to 2%	X			X
197	Salinas silty clay loam, 0 to 2%	X			X
198	Salinas silty clay loam, 2 to 9%	X			X
208	Still gravelly loam, 9 to 15%	X[e]	X		
209	Still gravelly sandy clay loam, 0 to 2%	X			
210	Still gravelly sandy clay loam, 2 to 9%	X			
212	Suey silt loam, 2 to 9%	X[e]	X		X
213	Suey silt loam, 9 to 15%			X	X
214	Suey silt loam, 15 to 30%			X	X
216	Tierra sandy loam, 2 to 9%		X		
217	Tierra loam, 9 to 15%			X	
219	Tujunga loamy sand, 0 to 2%	X			
224	Zaca clay, 9 to 15%		X		X
225	Zaca clay, 15 to 30%			X	X

PASO ROBLES SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
100	Arbuckle fine sandy loam, 0 to 2%	X			
101	Arbuckle fine sandy loam, 2 to 9%	X			
102	Arbuckle-Positas complex, 9 to 15%	X[e]		X	
103	Arbuckle-Positas complex, 15 to 30%			X	
106	Arbuckle-San Ysidro complex, 2 to 9%	X[e]	X		
109	Ayar and Diablo soils, 9 to 15%			X	X
110	Ayar and Diablo soils, 15 to 30%			X	X

PASO ROBLES SOIL SURVEY AREA					
Symbol	Soil Name	Prime Farmland	Farmland of Statewide Importance	Other Productive Soils	Highly Productive Rangeland Soils
114	Balcom-Nacimiento association, 9-30%			X	
116	Botella sandy loam, 2 to 9%	X			
119	Camarillo silty clay loam, partially drained		X		
122	Capay silty clay		X		
123	Capay silty clay, occasionally flooded		X		
124	Chanac loam, 9 to 30%	X[e]		X	
130	Clear Lake clay, drained	X			
131	Concepcion sandy loam, 2 to 9%			X	
132	Cropley clay, 0 to 2%	X			
133	Cropley clay, 2 to 9%	X			
134	Dibble clay loam, 9 to 15%			X	
135	Dibble clay loam, 15 to 30%			X	
138	Elder loam, 0 to 2%	X			
139	Elder loam, 2 to 9%	X			
140	Elder loam, 0 to 5%, flooded	X			X
142	Gaviota-San Andreas association, 15-30%				X
144	Gazos shaly clay loam, 9 to 30%			X	
147	Hanford and Greenfield soils, 0 to 2%	X			
148	Hanford and Greenfield soils, 2 to 9%	X[e]	X		
149	Hanford and Greenfield gravelly sandy loams, 0 to 2%	X			
150	Hanford and Greenfield gravelly sandy loams, 2 to 9%	X			
152	Linne-Calodo complex, 9 to 30%			X	
155	Linne-Diablo complex, 9 to 15%		X		
157	Lockwood shaly loam, 0 to 2%	X			
158	Lockwood shaly loam, 2 to 9%		X		
159	Lockwood-Concepcion complex, 2 to 9%		X		

PASO ROBLES SOIL SURVEY AREA					
Symbol	Soil Name	Prime Farmland	Farmland of Statewide Importance	Other Productive Soils	Highly Productive Rangeland Soils
160	Lockwood-Concepcion complex, 9 to 15%			X	
166	Metz loamy sand, 0 to 5%		X		
167	Metz-Tujunga complex, occasionally flooded, 0 to 5%			X	
169	Millsholm-Dibble complex, 15 to 30%				X
173	Mocho clay loam, 0 to 2%	X			
174	Mocho clay loam, 2 to 9%	X			
175	Nacimiento silty clay loam, 9 to 30%			X	
177	Nacimiento-Ayar complex, 9 to 30%			X	X
179	Nacimiento-Los Osos complex, 9 to 30%			X	
182	Oceano loamy sand, 2 to 9%	X			
183	Pico fine sandy loam, 0 to 2%	X			
184	Pico fine sandy loam, 2 to 9%	X			
186	Polonio clay loam, 2 to 9%	X[e]	X		
187	Rincon clay loam, 0 to 2%	X			X
188	Rincon clay loam, 2 to 9%	X			X
189	Rincon clay loam, 9 to 15%			X	X
191	Ryer clay loam, 2 to 9%	X			X
192	San Andreas sandy loam, 15 to 30%				X
193	San Andreas-Arujo complex, 9 to 15%		X		X
194	San Emigdio fine sandy loam, 0 to 2%	X			
195	San Emigdio fine sandy loam, 2 to 9%	X			
196	San Ysidro sandy loam, 2 to 9%			X	
197	San Ysidro loam, 0 to 2%		X		
198	Santa Lucia-Lopez complex, 15 to 50%			X	
200	Sesame sandy loam, 9 to 30%			X	

PASO ROBLES SOIL SURVEY AREA					
Symbol	Soil Name	Prime Farmland	Farmland of Statewide Importance	Other Productive Soils	Highly Productive Rangeland Soils
205	Sorrento clay loam, 0 to 2%	X			
206	Sorrento clay loam, 2 to 9%	X			
207	Still gravelly loam, 0 to 2%	X			
208	Still clay loam, 0 to 2%	X			
209	Still clay loam, 2 to 9%	X			

CARIZZO SOIL SURVEY AREA					
Symbol	Soil Name	Prime Farmland	Farmland of Statewide Importance	Other Productive Soils	Highly Productive Rangeland Soils
101	Balcom-Nacimiento complex, 15 to 30%				X
103	Balcom-Nacimiento complex, 9 to 15%				X
109	Capay clay, 0 to 2%	X			X
110	Capay clay, 2 to 9%	X			X
114	Calleguas-Nacimiento complex, 9 to 30%				X
129	Kilmer-Hillbrick complex, 9 to 15%				X
130	Kilmer-Hillbrick complex, 15 to 50%				X
140	Choice silty clay, 15 to 30%				X
149	San Emigdio sandy loam, 0 to 2%	X			
150	San Emigdio sandy loam, 2 to 9%	X[e]	X		
154	San Emigdio loam, 0 to 2%	X			
155	San Emigdio loam, 2 to 9%	X[e]	X		
159	Sorrento loam, 0 to 2%	X			
160	Sorrento loam, 2 to 9%	X			
169	Polonio loam, 0 to 2%	X			X
170	Polonio clay loam, 2 to 9%	X[e]	X		X
173	Polonio gravelly loam, 2 to 9%	X			X

CARIZZO SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
174	Polonio-Thomhill complex, 0 to 2%	X			X
175	Polonio-Thomhill complex, 2 to 9%	X			X
179	Padres sandy loam, 0 to 2%	X			X
180	Padres sandy loam, 2 to 9%	X			X
182	Oceano loamy sand, 2 to 9%	X			
190	Reward channery loam, 15 to 30%				X
200	Aramburu very channery clay loam, 15 to 30%				X
230	Padres-Wasioja complex, 2 to 9%		X		X
251	Nacimiento clay loam, 15 to 30%				X
261	Aido clay, 15 to 30%				X
270	Ayar silty clay, 5 to 9%		X		X
271	Ayar clay, 15 to 30%				X
274	Ayar-Hillbrick-Aido complex, 15 to 30%				X
280	Seaback-Panoza-Jenks complex, 9 to 15%				X
281	Seaback-Panoza-Jenks complex, 15 to 30%				X
290	San Timoteo-San Andreas-Bellyspring complex, 15 to 30%				X
301	Arbuckle sandy loam, 2 to 9%	X[e]	X		X
302	Arbuckle sandy loam, 9 to 15 %	X[e]		X	X
303	Arbuckle sandy loam, 15 to 30%			X	
310	Yeguas-Pinspring complex, 0 to 2%	X			X
311	Yeguas-Pinspring complex, 2 to 5%	X			X
321	Thomhill loam, 2 to 5%	X			X
330	Jenks clay loam, 2 to 9%		X		X
450	Botella loam, 2 to 9%	X			X
470	Botella sandy loam, 2 to 9%	X			

CARIZZO SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
474	Elder sandy loam, 0 to 2%	X			
475	Elder sandy loam, 2 to 9%	X			
480	Metz loamy sand, 0 to 5%	X			
490	Wasioja loam, 0 to 2%	X			X
491	Wasioja sandy loam, 2 to 5%	X			X
495	Wasioja-Polonio complex, 2 to 5%	X			X
497	Wasioja-Pinspring-Yeguas complex, 2 to 5%	X			X
561	Chanac loam, 9 to 30%	X[e]	X		X
906	Xerofluvents, 0 to 2%	X			

NORTHERN SANTA BARBARA (SAN LUIS OBISPO COUNTY PORTION) SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
CuA	Corralitos loamy sand, 0 to 2%	X			*
EmC	Elder loam, 2 to 9%	X			*
MnA	Metz loamy sand, 0 to 2%	X			*
MnC	Metz loamy sand, 2 to 9%	X			*
MnC2	Metz loamy sand, 2 to 9%, eroded	X			*
MoA	Metz loamy sand, overflow, 0 to 2%	X			*
Mt	Mocho sandy loam, sandy substratum, overflow	X			*
Mu	Mocho fine sandy loam	X			*
PcA	Panoche sandy loam, 0 to 2%	X			*
PcC	Panoche sandy loam, 2 to 9%	X			*
PdA	Panoche sandy loam, overflow, 0 to 2%	X			*
PdB	Panoche sandy loam, overflow, 2 to 5%	X			*

NORTHERN SANTA BARBARA (SAN LUIS OBISPO COUNTY PORTION) SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
PeA	Panoche loam, 0 to 2%	X			*
PeC	Panoche loam, 2 to 9%	X			*
PfA	Panoche loam, overflow, 0 to 2%	X			*
PnC	Pleasanton sandy loam, 2 to 9%	X			*
PrA	Pleasanton very fine sandy loam, 0 to 2%	X			*
PsD	Pleasanton gravelly very fine sandy loam, 9 to 15%		X		*
StA	Sorrento sandy loam, 0 to 2%	X			*
StC	Sorrento sandy loam, 2 to 9%	X			*
Sx	Stutzville loamy sand		X		*
Sy	Stutzville sandy loam		X		*
Sz	Stutzville loam		X		*
Szb	Stutzville silty clay loam		X		*
Szc	Stutzville silty clay loam, strongly saline			X	*
WaC	Wasioja fine sandy loam, 5 to 9%	X[e]	X		*

LOS PADRES SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
102pr	Arbuckle-Positas complex, 9 to 15%	X[e]		X	
133pr	Cropley clay, 2 to 9%	X			
147pr	Hanford and Greenfield soils, 0 to 2%	X			
148pr	Hanford and Greenfield soils, 2 to 9%	X[e]	X		
166pr	Metz loamy sand, 0 to 5%		X		
167pr	Metz-Tujunga complex, occasionally flooded, 0 to 5%			X	

LOS PADRES SOIL SURVEY AREA					
Symbol	**Soil Name**	**Prime Farmland**	**Farmland of Statewide Importance**	**Other Productive Soils**	**Highly Productive Rangeland Soils**
173pr	Mocho clay loam, 0 to 2%	X			
188pr	Rincon clay loam, 2 to 9%	X			X
207pr	Still gravelly loam, 0 to 2%	X			
208pr	Still clay loam, 0 to 2%	X			
209pr	Still clay loam, 2 to 9%	X			
301cp	Arbuckle sandy loam, 2 to 9%	X^e	X		X
302cp	Arbuckle sandy loam, 9 to 15 %	X^e		X	X
303cp	Arbuckle sandy loam, 15 to 30%			X	
470cp	Botella sandy loam, 2 to 9%	X			
475cp	Elder sandy loam, 2 to 9%	X			

Table Notes:

*Information on Highly Productive Rangeland Soils not available for the Northern Santa Barbara Soil Survey Area.

X^e - Map units for soils under the heading of Prime Farmland marked a “X^e” meet the definition of prime agricultural land (California Government Code 51201(c)) based only upon a rating of 80 to 100 or an ”Excellent” rating in the California Revised Storie Index.

Abbreviations used as follows:

pr = Paso Robles Soil Survey

cp = Carrizo Plain Soil Survey

Introduction

Hollister Peak

Visual resources within San Luis Obispo County are scenic areas that are important aspects of the quality of life for residents and visitors. Varied topography and relatively intact native vegetation are "signature" backdrops to human activities. Features such as mountain ranges and stands of oaks create natural beauty and a "sense of place" that define the county as a unique, high-quality environment.

Spectacular visual resources include vistas of steep mountain ranges, the Pacific Ocean shoreline and landmark volcanic peaks. More common features such as rolling hills, open meadows, riparian corridors, wetland areas, and forested areas are also scenic. Traditional rural development and agriculture also contribute to scenic value. . They present a "working landscape" that maintains rural character.

Visual character is a sensitive resource which the County has a compelling interest to protect, because:

- It helps give a "sense of place" to residents,
- Residents value and take pride in an intact scenic character, and
- A high-quality visual environment enhances tourism, real estate values, and economic growth

Visual resources are easily viewed landscape scenes that are valued for their natural or agricultural features and vegetation, including hills, mountains and rock outrocks.

Visual resources are also defined by the view opportunities that people enjoy from a variety of locations, such as but not limited to:

- **Viewpoints** – parks, plazas, beaches, streets, trails, private property
- **Vista points** – specialized viewing areas near roads and highways
- **Scenic roads and highways** – corridors that provide viewing opportunities

TYPES OF VISUAL RESOURCES

SCENIC LANDMARKS AND VIEWS

Visual resources are often spectacular, steep mountain ranges, the Pacific Ocean shoreline or volcanic peaks. Some outstanding features, such as peaks and coastal views, are so beautiful and dramatic that they have an iconic status as landmarks. These icons of the landscape may be miles long but only visible to the traveling public for a few seconds. Or, like Morro Rock, they may be visible to entire communities. They are especially sensitive to impairment by development. Cooperation and partnerships are essential between land owners, County government and land conservation organizations to conserve and enhance views of these resources.

SCENIC LANDSCAPES

Landscapes such as rolling hills and low ridgelines, open meadows, riparian corridors, wetlands and forested areas provide valued scenery.

Scenic Landscape Regions have signature landscapes that are distinctly different due to combinations of topography, vegetation, and land uses such as agriculture. Views of the steep, grassy hills near Shandon are different from the rolling, wooded hills in the Templeton area. These typical landscapes provide visual definitions of the place in which they occur, which are sensitive to residents and visitors. Their sensitivity to alteration from development is less than that of landmarks and the scenic corridors along major roads and highways. However, guidance is needed to encourage development to fit within these local “vernacular” resources.

Shandon region

Templeton region

Coastal Visual Resources have high value and are protected by the California Coastal Act through the county Coastal Plan Policies and Local Coastal Program.

Community Separators maintain rural identity between communities and distinguish between communities' identities along roads and highways. Development, subdivision and zoning controls should be applied to avoid higher densities and urbanization of these areas.

Scenic Corridors are visible from popular or well-traveled roads or highways, where visual resources are particularly sensitive to impairment by inappropriately designed development. Development, subdivision and zoning controls are applied to locate and design projects well away from roadways and as unobtrusively as possible.

BUILT ENVIRONMENTS

Built environments create a sense of place that contributes to the local identity of San Luis Obispo County. People generally value new urban development that reflects historical traditions. They also seem to favor development that is subordinate to the landscape, instead of dominating it.

- Traditional rural development and agriculture contributes to scenic value and often fits in with the natural landscape. Today they present a "working landscape" that maintains a rural character or image.
- The visual character within communities is also largely defined by the historical layout, pattern and styles of development. Residents value the historical character, scale and densities of their communities. New development should be compatible with these characteristics.

ASSESSING VISUAL RESOURCES

A primary difference between visual resources and other physical resources is that their importance is subjective, depending on cultural values about beauty, character and history. The following terms are key concepts that are commonly used to assess visual resources. The more that landscape scenes are consistent with these concepts (in any combination), the more valued they usually are to the public and therefore sensitive to alteration.

- **Vividness** - The visual impression received from *contrasting* landscape elements as they combine to form a *striking and distinctive* visual pattern
- **Intactness** - The *integrity* of visual order in the *natural and human* built landscape, and the extent to which the natural landscape is free from visual *encroachment*

- **Unity** - The current *internal consistency and harmony* of landscape features that has resulted from past actions, or put another way, the degree to which the visual resources of the landscape *join together* to form a coherent, harmonious visual pattern
- **Visual Access** - The physical conditions under which viewing is possible, in terms of location, breadth and timing of a view. Visual access is also defined by the view opportunities that people enjoy from a variety of locations, such as, but not limited to:
    - ◇ **Viewpoints –** public parks, plazas, beaches, trails, and private property
    - ◇ **Vista points –** specialized viewing areas near roads and highways
    - ◇ **Roads and highways –** corridors that provide viewing opportunities
    - ◇ **Communities –** viewing of landmarks and highly valued landscapes from within communities

Visual Sensitivity

Certain uses are considered more sensitive to visual change than others. The most sensitive to visual change include scenic roadways and view corridors and recreational areas. State and County-designated scenic corridors are considered sensitive because many people use these routes that are identified as areas of outstanding scenic quality. Scenic quality is also important for recreational users enjoying activities such as bicycling, boating, hiking and picnicking.

VISUAL RESOURCE ISSUES

Effects of Development. Adverse changes to the landscape, such as grading, vegetation removal and inappropriate development, may become distracting to the point that they compete for attention with other features in view. They may impair or even block scenic views or make them inaccessible. Development may create low-quality landscapes, where incongruous buildings or grading dominate attention, or it may alter natural patterns to the point of incoherence or disharmony. However, careful attention to siting projects discreetly, using low-profile designs and vegetative screening, can blend development within the landscape.

Effects of Land Management. Decisions are made daily on how to manage activities such as agriculture, mining, forestry, fire prevention, and grading. While the intent of these decisions may be well-founded, their execution may harm visual resources. Activities that are typically not regulated as development can impair the scenic values of a natural, rural landscape.

TYPES OF SCENIC REGULATIONS

Regulation of Development

Regulation of development is one method of implementing policies to protect visual resources (others are land conservation easements and agreements). Several kinds of regulations are used by the County, including the following:

- **The California Environmental Quality Act (CEQA)** requires that proposed discretionary projects (for which a public hearing is required) be reviewed to identify their potential impacts to visual resources, among others. An initial study of potential impacts is conducted to assess the quality of the visual resources surrounding the proposed project and its potential disruption, intrusion, or contribution to a cumulative reduction of the resource's value. A determination is made whether potentially significant impacts may occur, and mitigation measures are proposed to reduce visual impacts to insignificance, or alternatives to the project are identified if significant impacts cannot be reduced to insignificance with suitable mitigation measures. These measures are considered in the discretionary review of a project, and they may be required as changes to an approved project.
- **Sensitive Resource Areas (SRA)** are highly scenic areas that have been identified as important visual resources, related to communities, rural areas and viewpoints as well as roads and highways. Sensitive Resource Areas are designated in the General Plan and as a zoning overlay by the Board of Supervisors. The overlay zoning includes requirements for new development applications, except non-structural agricultural uses and one single-family dwelling per lot of record, to be designed to protect the existing resources.
- **Highway Corridor Design Standards (HCDS)** are in the County Land Use Ordinance for mapped areas of visual resources along and/or near most of Highway 101. They are regulations that apply requirements for sensitive, low-profile residential development only.
- **Coastal Plan Policies** protect visual and scenic resources within the Coastal Zone. They apply to general development and subdivisions within scenic vistas and sensitive habitats, to protect views to and along the ocean, and to minimize the visibility of development from public view corridors. They also protect the compatibility of development within small-scale neighborhoods and special coastal communities.
- **Land Use Ordinance and Coastal Zone Land Use Ordinance** include standards that apply to setbacks, heights, signage, exterior lighting, undergrounding of on-site utilities, and other common project features, Some areas are addressed by specific ordinance standards that require compatibility with a particular landscape or neighborhood.

- **Community Design Plans** apply within almost all of the unincorporated urban areas or communities, with the exceptions of Los Osos, Creston and Shandon. Design plans include background information, planning goals, and standards and/or guidelines that encourage residential and non-residential development to be compatible with existing development and achieve their goals. Design plans are adopted as part of the Land Use or Coastal Zone Land Use Ordinance and apply as standards.

Guidelines and Standards

The following list includes the kinds of guidelines or standards that should be considered in regulating development to protect visual resources:

Visual Analysis. Preparation of a visual analysis by a licensed architect, a licensed landscape architect or other qualified person should be done to determine the scenic quality and sensitivity of the site to development, and potential issues to be addressed by development.

Site Design. Structures should be sited and designed to take maximum advantage of existing topography and vegetation in order to screen them from public roads and places such as parks or lakes. Proposed structures should be located so that they do not silhouette against the sky on any prominent ridgelines.

Setback. Where possible, residential buildings, residential accessory structures, and agricultural accessory structures should be set back 100 - 300 feet from the edge of the right-of-way of the scenic road. If there is no feasible development area outside of this setback, the project should be located on the rear half of the property and provide a landscaping screen of moderately fast-growing, drought-tolerant plant material to provide 80 percent view coverage at plant maturity at the building site (not along the public road).

Clustering. To the extent feasible, structures should be clustered on each parcel within existing built areas and/or near existing natural features such as tree groupings or the toe of slopes. On hills and ridges, highly visible open areas should be avoided; structures that project above the ridge or silhouette against the sky as viewed from public roads should be avoided; and driveways should be substantially screened from view where practical.

Grading. Grading, cuts, fills and development should be avoided on hills and ridges that are visible from public roads or places, or minimized where avoidance is not possible. Where feasible, contours of the finished surface should blend with adjacent natural terrain to achieve a consistent grade and natural appearance.

Tree Preservation. Building sites and roadways should be sited to preserve significant existing tree stands and significant oak trees. The removal of trees and other mature vegetation for development or fire protection purposes should be avoided, or minimized where avoidance is not possible,. Special care should be given to avoid the removal of large “specimen” trees, tree groupings, and windbreaks that add historical character.

Landscaping. Development projects should use natural landforms and vegetation to screen development. Where that cannot be done, it is preferred to screen development with native vegetation that is compatible with the scenic resource being protected and which does not obstruct public vistas. A landscaping plan should be prepared by a licensed architect, licensed landscape architect, or other qualified person. Landscape screening should exist or be planted so that there will be at least 50 percent screening at plant maturity, continuing for the life of structures that are visible from Highway One. The landscape screening should consist of native or low water-using vegetation (no invasive species) that is fire resistant. Screening or backdrop vegetation should be located and planted in conformance with CDF requirements for fire safety. The landscape screening should maximize use of evergreen trees and large-growing shrubs that have shapes similar to existing vegetation. At least 50 percent of the plant materials should consist of fast-growing species that will provide a landscape screen while the slower-growing species mature. The required landscape screening should be reasonably maintained for the life of the structure.

Structure design. Minimize building height and mass by using low-profile design that may include partially sinking structures below grade. Minimize the visibility of structures by using colors that blend with colors of the surrounding environment. When structures silhouette against the sky on prominent ridgelines as viewed from scenic roads, include hip roofs with a pitch that causes the building to appear to recede from public view.

Building exterior. Building exteriors should use non-reflective materials. Exterior siding should be stucco, masonry, brick, wood or wood-appearing materials, or other natural appearing materials. Other siding materials may be used if they are found to be in harmony with the surrounding natural environment.

Colors. Use colors that are taken from and that blend with the natural landscape. (OSP25a4)

Utilities. Minimize the visibility of utilities from public view corridors and the County should require that utilities are placed underground where feasible.

Signs. New development projects should minimize signs, especially freestanding signs, and locate them so they do not interfere with vistas from scenic corridors. The County should secure removal of non-conforming signs within scenic corridors as part of the review of discretionary development projects wherever feasible. Information and direction signs should be designed to be simple, easy-to-read and harmonize with surrounding elements.

Open space preservation. To protect significant visual resources, open space preservation is a compatible measure to support the approval of new development. Within a critical viewshed or SRA (for visual protection), land divisions, Minor Use Permits or Development Plans (excluding any agricultural accessory building) should include an agreement with the county to maintain in open space use those scenic portions of the site within the Critical Viewshed or SRA (for visual protection) that are not intended for development. Guarantee of open space preservation may be in the form of public purchase, agreements, easements controls or other appropriate instrument, provided that such guarantee agreements are not to grant public access unless acceptable to the property owner.

ROADWAY DESIGN

County and State road and highway development projects can greatly affect the visual quality on and near scenic roadways. Scenic Corridor studies and designations should guide all County and State road and highway development projects. In the absence of a designated Scenic Corridor, the following interim guidelines should apply to projects on any of the candidate Scenic Corridor roadways.

1) **Road Alignment.** Design and alignment of a Scenic Corridor roadway should include preservation and enhancement of scenic resources, as well as considerations of safety and capacity.

2) **Environmental Review.** Where standard roadway design or roadway realignment would significantly degrade a scenic feature or preclude visual access to a scenic feature, design alternatives should be considered through preparation of an environmental impact report.

Scenic corridor -
2008 Highway 101 design

3) **Character Defining Features.** Design characteristics such as curves, changes of direction and topography that provide identity to individual Scenic Corridors should be preserved to the maximum extent feasible.

4) **Grading.** Grading for new cuts or fills should avoid significant impacts to scenic resources if possible or be minimized. Angular cuts and fills should be avoided to the maximum extent feasible. All grading should be contoured to match with the surrounding terrain. Maximum effort should be made to balance cut and fill on-site.

5) **Planting / Landscaping.**

   a. The County or applicable public agency should use extensive California native and/or drought tolerant landscaping to screen existing public facilities within scenic corridors. (OSP25 Implementation no. 3)

   b. Fire-resistant native plants and trees should be utilized in any roadside landscaping along Scenic Corridor roadways.

   c. Where previous plant material has been washed away or destroyed (due to excessive rainfall, fire, grading, etc.) erosion-controlling plants should be planted to prevent erosion and mud/land slides, and hillsides and slopes should either be hydro-seeded or terraced and then planted with native fire-resistant plants.

   d. Outstanding specimens of existing trees and plants located within the public right-of-way of a Scenic Corridor should be retained to the maximum extent feasible within the same public right-of-way.

   e. Low-growing ground cover and/or shrubs should be utilized as parkway planting along Scenic Corridors in order to avoid blocking a desirable view of a scenic feature. Plant material size at maturity, as well as overall scale of plants within the landscaped area, should be carefully studied during site analysis and design.

6) **Signs.** The only signs that should be permitted within the public right-of-way of a Scenic Corridor or on private property near it are traffic, informational, and identification signs.

   a. Off-site outdoor advertising is prohibited in the public right-of-way of, and on publicly-owned land within five hundred feet of the center line of, a Scenic Highway.

   b. Discretionary land use approvals involving parcels zoned for non-residential use located within five hundred feet of the center line of a Scenic Highway should comply with the sign requirements of the Commercial Retail land use category.

   c. Designated Scenic Highways should have first priority for removal of nonconforming billboards or signs. Such priority extends to properties located along, or within five hundred feet of the center line of, designated Scenic Highways.

7) **Public Utilities.** To the maximum extent feasible, all new or relocated electric, communication, and other public utility distribution facilities within five hundred feet of the center line of a Scenic Highway should be placed underground. Where undergrounding of such utilities is not feasible, all such new or relocated utilities should be screened to minimize their visibility from a Scenic Highway.

Introduction

The purpose of this appendix is to document and compare existing water availability, quality, and usage in San Luis Obispo County. Key issues in water resources are identified, including the capacity of existing sources and transmission infrastructure and possible shortfalls in water supply now or in the future. Issues related to water quality and stormwater management are also discussed. The appendix also provides and overview of existing local, federal, and state regulation of water resources.

Setting

The history of California has long been shaped by water. The need for water to serve growing populations, productive farms and ranches, and other industries has led to intricate feats of water engineering and complicated laws and regulations governing this precious resource. Entering the new century, the need to refine current practices with regard to water has become apparent. At the state level, policymakers are looking to address emerging challenges, such as the potential reduction in storage capacity with diminishing Sierra snow pack and higher temperatures making surface storage facilities less desirable. The need to reduce water transmission distances is also gaining recognition on the statewide level, as the connection between water transmission, energy use, and land use is increasingly clear. With anticipated population growth statewide, all Californians are facing water supply crises, with Central Californians particularly at risk of losing existing water supply to seawater intrusion and the corresponding groundwater overdraft, sedimentation, and nitrate and heavy metal contamination. Having recently secured additional supply and storage and transmission capacity with the Nacimiento Water Project, San Luis Obispo County has taken steps to secure water for the immediate future. However, additional steps will be necessary in the long term—beyond the import of water from other regions. Moving toward a sustainable water future will require a change in the way San Luis Obispo County residents live and work alongside this resource.

Regulatory Framework

Regulation and management of water supply, quality, use, and associated resources occurs through a combination of federal, state, and local regulations, policies, and programs. The following overview of the regulatory framework identifies responsibilities and minimum requirements for key water resource issues. This summary provides an explanation of the context in which water resources are managed, beginning with local management regimes and expanding outward to encompass state and federal regulations.

LOCAL MANAGEMENT OF WATER RESOURCES

San Luis Obispo Flood Control and Water Conservation District

The San Luis Obispo County Flood Control and Water Conservation District (District) was established in 1945 and is governed by the County's Board of Supervisors. The District's boundaries are coterminous with the county's. The District functions similar to a regional water management agency, engaged in water planning and implementation of specific projects and programs. The District holds the County's contract with the State Department of Water Resources for State Water Project service and owns major waterworks facilities such as the Lopez Water Project and the newly constructed Nacimiento Water Pipeline. District water planning is funded by general property tax allocations (sometimes augmented with grant funding), and projects and programs are funded by specific fees/assessments, charges, and/or special taxes when benefiting entities are in specific areas or participate via contracts.

San Luis Obispo County Division of Public Works

The County Department of Public Works (DPW) functions as staff to both the County and the District, and it oversees the administration and operation of water and wastewater wholesale facilities and long-term master water planning for the County. This includes the issuance of will-serves for water and sewer service for residents in County Service Areas (CSAs), which are specific unincorporated urban/rural residential areas in the county. Primary DPW water resources projects and programs include the Los Osos Wastewater Project, the Lopez Water Project, the Nacimiento Water Pipeline Project, the County's Stormwater Management Program, water quality monitoring, and water resources data collection and long-term planning.

San Luis Obispo County Water Resource Advisory Committee

The San Luis Obispo County Water Resource Advisory Committee (WRAC) is an advisory body whose members are appointed by the Board of Supervisors to review and submit recommendations on water resource projects and policies in the region. Each incorporated city, water-serving independent special district, resource conservation district, private water agency, state agency, and agricultural and environmental entity within the District is invited to participate on the WRAC. Currently, 24 local agencies and organizations are actively participating on the WRAC. For over 50 years, WRAC hearings have been the primary forum for the regional review of water resource issues and details.

San Luis Obispo Integrated Regional Water Management Plan

The San Luis Region's Integrated Regional Water Management Plan (IRWMP) integrates all of the programs, plans, and projects which relate to the region's water supply, water quality, ecosystem preservation and restoration, groundwater monitoring and management, and flood management. The District, in cooperation with the WRAC, has developed the IRWMP for the region coterminous with the county boundary. The IRWMP was adopted in 2005 and was updated in July 2007. The IRWMP uses these areas as an organizing principle to identify strategies to integrate management of water resources that will result in the greatest benefit, for example, integrating groundwater recharge and ecosystem preservation and restoration with flood control and stormwater management projects to minimize impact of urbanization on water resources due to such activities as the replacement of the natural landscape with pavement and other impervious surfaces.

General Plan

The San Luis Obispo County General Plan includes water resource policies in the Land Use Element, the Agriculture and Open Space Element, and the Conservation Element. The Land Use Element outlines the objectives and procedures of the County's Resource Management System, which provides the policy framework to tie growth management to resource capacity, including water resource capacity. The 1974 Environment Plan and the 1998 Agriculture and Open Space Element included complementary policies which aim to encourage water conservation, groundwater recharge, and protection of riparian corridors on agricultural and open space lands. The Conservation Element is contained in the County's 1974 Environment Plan. Within the Conservation Element, the topics of water conservation, groundwater management, water resource development, water pollution control, stream, lake and marsh protection, and flood control are addressed. While the 1974 Conservation Element provides policy direction to protect the county's water resources, the policy recommendations did not hold up to the test of implementation. More specificity in policy language, paired with implementation recommendations, is needed to achieve water resource management goals.

This Conservation and Open Space Element supersedes the Environment Plan, including the Conservation Element, and the Open Space section of the former Agriculture and Open Space Element. The County's Resource Management System is addressed in the Water Demand and Consumption section of this appendix.

County Codes

The County's construction and building codes implement state building standards and in certain instances, exceed the state's minimum requirements to achieve water conservation in specific areas of the county.

Title 8

Title 8 requires retrofit of plumbing fixtures upon sale of residential, commercial and all other buildings in the Los Osos Groundwater Basin and the Nipomo Mesa Water Conservation Area. The intent is to reduce the amount of water being used by residential, commercial and other uses located in the Los Osos Groundwater Basin through retrofitting existing plumbing fixtures with low water consumption plumbing fixtures in existing homes, businesses and institutional buildings upon the sale of any such structure that uses water from the Los Osos Groundwater

Basin. All properties sold in Los Osos must replace older, high water-using toilets and showerheads with 1.28 or less gallons per flush (gpf) High Efficiency Toilets (HETs) and 2.5 or less gallon per minute (gpm) showerheads. Existing toilets rated at 1.6 gpf are exempt and may remain in the structure.

Title 19 Building and Construction

Title 19 requires new development in Los Osos to use low water consumption plumbing fixtures and requires new development to retrofit existing structures so that new development does not use "new" water. Prior to issuance of a construction permit for a new structure with plumbing fixtures that uses water from the Los Osos Groundwater Basin, the developer of such new structure shall retrofit plumbing fixtures in existing structures within the Los Osos Groundwater Basin. All new development in the Los Osos Groundwater Basin must retrofit enough existing homes and businesses to save twice the amount of water the new development would use, including installation of the following fixtures or mechanisms:

a. Toilets rated at no more than 1.28 gallons per flush (HET);
b. Showerheads rated at no more than 2.5 gallons per minute;
c. Bathroom sink aerators with a volume of no more than 1.0 gallons per minute;
d. Hot water circulation systems for master bathrooms and kitchens if the furthest plumbing fixture unit in these rooms is greater than twenty (20) pipe - feet from the hot water heater;
e. Commercial structures shall use waterless urinals;
f. New residences shall be plumbed for grey-water systems pursuant to Chapter 16 of the Uniform Plumbing Code.

Titles 22 and 23 – Land Use Ordinances (Inland and Coastal)

The county's land use ordinances include landscape installation and planting standards intended to provide areas which can absorb rainfall to assist in reducing storm water runoff, control erosion, preserve natural resources, promote, preserve and enhance native plant species, and recognize the need to use water resources as efficiently as possible. In addition, the goals of the standards are to:

1) Establish a procedure for designing, installing and maintaining water efficient landscapes; and
2) Establish provisions for water management practices and limit the waste of water; and
3) Educate and provide guidelines to property owners in choosing planting materials, efficient irrigation systems, soil management and appropriate maintenance to create landscapes that are both attractive and water conserving.

Existing Conditions

WATER SOURCES

San Luis Obispo County obtains nearly 80% of its water supply from groundwater. Only 2% of the county's supply comes from imported water and the remaining 17% of water supply is surface waters. The county's 30 groundwater basins include:

- Arroyo de la Cruz Valley
- Arroyo Grande Valley
- Big Spring Area
- Carrizo Plain
- Cayucos Valley
- Cholame Valley
- Chorro Valley
- Cuyama Valley
- Huasna Valley
- Los Osos Valley
- Morro Valley
- Old Valley
- Piedras Blancas Point
- Pismo Creek Valley
- Point Buchon
- Paso Robles Creek
- Pozo Valley
- Rafael Valley
- Rinconada Valley
- Salinas Valley- Paso Robles Sub-basin
- San Carpoforo Valley
- San Luis Obispo Valley
- San Simeon Point
- San Simeon Valley
- Santa Maria River Valley
- Santa Rosa Valley
- Tierra Redonda Mountain
- Toro Valley
- Villa Valley

In the late 1980s, a drought brought increased awareness of groundwater issues in the county. Due to a lack of surface water supplies at the time, the county was forced to rely more heavily on groundwater supplies, drawing attention to the risks associated with this choice of water supply, particularly in coastal areas. Many of the county's coastal communities are facing existing or potential seawater intrusion in their groundwater sources. This issue is particularly acute in the Los Osos Valley, Cambria, and the Nipomo area.

There are nine major watersheds fully or partially contained in San Luis Obispo County and twelve water planning areas (WPAs) in the county's 3,304 square miles. The water planning areas are:

- North Coast
- Cayucos
- Los Osos/Morro Bay
- San Luis Obispo/Avila
- Five Cities
- Nipomo Mesa
- Cuyama
- California Valley
- Salinas
- Creston
- Shandon
- Nacimiento

Additionally, the county is home to seven city wastewater service areas, nine community service districts (CSDs), six county service areas (CSAs), two sanitation districts, and 30 groundwater basins. Many of the county's communities have existing regulatory limits on growth, due to the limited water supply. The recent decision (2004) to implement the Nacimiento Water Project and to initiate the Nipomo Supplemental Water Project has greatly improved the ability of the county's water supply to meet projected demand over the next 20 years. At this point, the Nacimiento Water Project is under construction and working towards completion by 2010.

WATER QUALITY

Most of San Luis Obispo County's water quality is good and possibly better than many other areas of the state. However, the region also faces water quality challenges, such as wastewater compliance challenges, groundwater pollution from septic systems and other activities, and seawater intrusion. **Table A10-1** provides a summary of the county's water quality issues by Water Planning Area.

TABLE A10-1
QUALITY OF WATER RESOURCES

Water Planning Area	Surface Source Water	Groundwater	Reclaimed	Imported	Desalted
North Coast	No 303(d) listed waterbodies	MTBE Chlorides	N/A	N/A	N/A
Cayucos	No 303(d) listed waterbodies	TDS Range (346-2,462 mg/L)	N/A	N/A	N/A
Los Osos/Morro Bay	Morro Bay, Los Osos Creek, and Chorro Creek are 303(d) listed for sediment, pathogens, and nutrients. Morro Bay is also listed for metals. Chumash Creek, Dairy Creek, and Warden Creek are listed for fecal coliform and low dissolved oxygen. Los Osos Creek is also listed for low dissolved oxygen. Pennington Creek, San Bernardo Creek, San Luisito Creek, and Walters Creek are listed for fecal coliform.	Seawater Intrusion	N/A	State Water Project (SWP) is the primary supply source for Morro Bay.	Morro Bay uses desalination as a backup supply source
SLO/Avila	San Luis Obispo Creek is 303(d) listed for pathogens, nutrients, and priority organics.	MTBE	City of SLO Dairy Creek Golf Course used for irrigation only.	Avila Beach has a SWP allocation for a secondary use.	N/A
Five Cities	No 303(d) listed waterbodies	MTBE Nitrate as NO_3	N/A	Pismo Beach has a SWP allocation for secondary use.	N/A

Water Planning Area	Surface Source Water	Groundwater	Reclaimed	Imported	Desalted
Nipomo Mesa	Nipomo Creek is 303(d) listed for fecal coliform. Oso Flaco Creek is listed for fecal coliform and nitrate. Oso Flaco Lake is listed for nitrate. Santa Maria River is listed for fecal coliform and nitrate.	Nitrate as NO_3 TDS Range (346-2,462 mg/L)	N/A	N/A	N/A
Cautama	No 303(d) listed waterbodies	TDS Range (206-3,905 mg/L) DWR notes a critical overdraft condition in Cuyama Basin.	N/A	N/A	N/A
California Valley	No 303(d) listed waterbodies	TDS (range not reported) Soda Lake Sub-basin useable mineral quality.	N/A	N/A	N/A
Salinas	The Salinas River is 303(d) listed for sodium and chloride. Atascadero Creek is 303(d) listed for fecal coliform and low dissolved oxygen.	TDS Range (165-3,868 mg/L) Chlorides Nitrate as NO_3 MTBE	N/A	N/A	N/A

Water Planning Area	Surface Source Water	Groundwater	Reclaimed	Imported	Desalted
Creston	No 303(d) listed waterbodies	Increasing TDS and chlorides reported.	N/A	N/A	N/A
Shandon	Cholame Creek is 303(d) listed for boron.	Sulfate reported. Chlorides	N/A	SWP allocation not used	N/A
Nacimiento	Las Tablas Creek and Nacimiento Reservoir are 303(d) listed for metals.		N/A	N/A	N/A

Source: IRWMP 2007

Salinity and hardness are water quality issues which are most frequently encountered in the county. The most acute water quality issue may be found in the community of Los Osos, which has been subject to seawater intrusion for a number of years. The seawater intrusion has been estimated as migrating 100 feet per year, and the Los Osos CSD is currently studying and monitoring the intrusion and developing a management program.

Seawater intrusion in the coastal basin containing Grover Beach, Arroyo Grande, and Pismo Beach is currently covered by a 2002 agreement in which 220 acre-feet (AF) per year of basin yield is allocated for protection against intrusion. The Nipomo area has also been identified as at risk for seawater intrusion. Monitoring groundwater quality in select coastal wells in this area has occurred for the last several years. Additional water quality monitoring at coastal sites is necessary to fully understand the extent of saltwater intrusion in these areas.

Other water quality issues of concern in the county are sedimentation, nitrate contamination, heavy metal contamination, and oil contamination. In 2006, the County completed a Stormwater Management Plan in response to United States Environmental Protection Agency (EPA) requirements. While not technically a regional SWMP, the plan is coordinated with other local municipal efforts. The SWMP outlines existing issues and identifies Best Management Practices for stormwater. A Stormwater Management Program is currently under way, providing opportunities for water conservation at the countywide level.

WATER DELIVERY

Non-local water resources are transmitted to San Luis Obispo County via the Coastal Branch of the State Water Project. The transmission infrastructure is owned by the Department of Water Resources and is operated and maintained by the Central Coast Water Authority. Once inside the county, the water is distributed via County-operated infrastructure.

The County-operated water delivery system is overseen by County Public Works and is funded in part by various county service areas. Other water delivery operators include community service districts or private water companies.

In 2004, there were 170 public water systems serving 247,213 people in San Luis Obispo County. Of these systems, seven are considered large systems, serving a population of 10,001 to 100,000 people. The seven large systems in the county are:

- California Mens Colony
- Morro Bay Water Department
- San Luis Obispo Water Department
- Paso Robles Water Department

- Grover Beach Water Department
- Arroyo Grande Water Department
- Atascadero Mutual Water Company

Between 1979 and 1997, more than 9,000 domestic wells were constructed in San Luis Obispo County.

WATER DEMAND AND CONSUMPTION

Demand for water in the county in 2005 can be attributed to agriculture (58%), urban uses (32%), and other rural uses (13%). Table 4.2 shows existing supply, anticipated demand, and resulting balance or deficiency.

The San Luis County Department of Planning and Building administers a Resource Management System which evaluates demands and issues alert levels (Levels of Severity) to identify the level of projected resource deficiency. The three levels of severity for water supply are:

- *Level of Severity I:* When projected water demand over the next 9 years equals or exceeds the estimated dependable supply.
- *Level of Severity II:* When projected water demand over the next 7 years equals or exceeds the estimated dependable supply.
- *Level of Severity III*: When the existing water demand equals or exceeds the dependable supply.

The County is in the process of updating the Resource Management System alert levels. Recently, Los Osos and Nipomo Mesa have been certified as Level of Severity III. With this certification level, the County Board of Supervisors have directed County staff to address these alert levels in numerous ways, including implementing water conservation measures, exploring groundwater management ordinance development, and exploring restricting development until additional supplies are located. The Paso Robles area has recently been identified as Level of Severity I. Resource Capacity Studies (RCS) for Paso Robles and Santa Margarita are in progress at this time (November 2008).

Because the County currently has an excess of supply from their existing State Water Project contract, they are considering groundwater banking in the Paso Robles Groundwater Basin due to its proximity of the Paso Robles Groundwater Basin to the State Water Project infrastructure. Such activities may change the Resource Management System alert level of the Paso Robles area and other areas of the county in the future.

Nacimiento Water Project

Recent efforts to resolve water supply issues in San Luis Obispo County include the Nacimiento Water Project. The project will provide for the conveyance of 15,750 AF of water per year from the existing reservoir to communities. The pipeline will provide opportunities for future groundwater banking and conjunctive use programs through intersection with two other regional surface water supplies. Currently, only 61% of the water project's supply is under contract, leaving a remaining 39% for future needs.

TABLE A10-2
WATER SUPPLY VS. DEMAND BY WATER PLANNING AREA

Water Planning Area	Supply (AF)	Demand (AF)	Balance (AF) [Deficiency]
North Coast	10,401	Urban: 2,770 Agriculture: 540 Rural: 790	6,300
Cayucos	3,415	Urban: 750 Agriculture: 820 Rural: 680	1,170
Los Osos/Morro Bay	8,962	Urban: 6,930 Agriculture: 7,490 Rural: 780	[6,240]
SLO/Avila	13,973	Urban: 14,490 Agriculture: 6,060 Rural: 1,100	[7,680]
Five Cities	19,997	Urban: 11,990 Agriculture: 16,230 Rural: 3,940	[12,160]
Nipomo Mesa	41,300	Urban: 5,030 Agriculture: 31,770 Rural: 5,940	[1,440]
Cuyama	8,000	Urban: 0 Agriculture: 20,520 Rural: 490	[13,010]
California Valley	600	Urban: 0 Agriculture: 210 Rural: 1,090	[700]

Water Planning Area	Supply (AF)	Demand (AF)	Balance (AF) [Deficiency]
Salinas	51,693	Urban: 41,120 Agriculture: 31,820 Rural: 7,440	[28,690]
Creston	48,263	Urban: 0 Agriculture: 5,750 Rural: 6,230	36,280
Shandon	48,138	Urban: 0 Agriculture: 27,190 Rural: 1,070	19,880
Nacimiento	1,200	Urban: 0 Agriculture: 0 Rural: 3,020	[1,820]

Source: IRWMP, page B 40

Water Conservation

Water conservation efforts are under way in numerous communities such as Paso Robles, San Luis Obispo, Templeton, and Atascadero. These communities have joined together to form *Partners in Water Conservation.* Additionally, the cities of Morro Bay and San Luis Obispo have implemented tiered water rate structures which have greatly reduced water use. In 1990 the Board of Supervisors adopted a water policy prepared and recommended by the WRAC which envisioned implementation of greater water conservation programs and measures. A number of the county's water purveyors are already implementing some of these measures.

As part of County efforts to address Resource Management System alert levels in the Los Osos and Nipomo Mesa areas, the County is exploring the implementation of additional water conservation measures. These measures are focused on water retrofit programs for new development, remodels, and renovations aiming to increase water conservation over the long term.

Flood Control

The San Luis Obispo County Flood Control and Water Conservation District has recently completed studies for the communities of Cambria, Cayucos, Nipomo, Oceana, San Miguel, and Santa Margarita. These communities have been identified as critical areas for flood control. Flooding in these areas is primarily the result of lack of infrastructure, such as inadequate channel and culvert capacities, but is also attributable to loss and restriction of the floodplain due to development and high peak runoff.

STATE REGULATIONS AND POLICIES

California Water Rights

Surface Water Rights

Surface water rights are administered through the State Water Resources Control Board (SWRCB). Two main types of water rights exist in California law: riparian and appropriative.

Riparian Rights

Riparian water rights are associated with property adjacent to a watercourse. Owners of such properties are allowed to use naturally flowing water from the watercourse (i.e., not including any artificial or augmented flows) for reasonable and beneficial uses. The riparian right only applies to use of water from the watercourse on the portion of the subject property that drains to the watercourse in question, and riparian water rights cannot be stored or transferred off of this portion of the property. Lands severed from a riparian parcel (e.g., land subdivision) do not continue to have riparian rights. No permit is required from the SWRCB to establish or maintain a riparian water right; however, a Statement of Diversion is required to be reported to the SWRCB. This statement provides the water right holder with documented standing in disagreements regarding priorities and supply cutbacks during a shortage. Riparian rights are generally senior to appropriative rights (discussed below), and unlike an appropriative right, are not lost (forfeited) by non-use. Riparian right holders do not have priorities with respect to one another, and each holder has a right to a reasonable share of the total riparian water available.

Appropriative Rights

Appropriative rights are water rights granted for diversions (and transfers) of water to non-riparian land (lands not adjacent to a watercourse) for reasonable and beneficial uses, including storage. Appropriative rights are subject to a seniority system, commonly referred to as “first in time, first in right,” where the appropriative right holder with the longest standing right has first priority to water in a shortage. Appropriative water rights must be perfected (legitimized), and non-use results in loss of the appropriated right. There are two types of appropriative rights: pre-1914 and post-1914. Executive Order 11988 (*Floodplain Management*) addresses floodplain issues related to public safety, conservation, and economics. Riparian water rights are associated with property adjacent to a watercourse.

- Pre-1914 Appropriative Rights. California’s current permit system of appropriative water rights was established in 1914. Appropriative water rights established prior to 1914 are not subject to the permitting authority of the SWRCB, and hence do not need approvals from the SWRCB for transfers or changes in place or purpose of use. Changes in the point of diversion, however, remain subject to SWRCB approval.
- Post-1914 Appropriative Rights. Since 1914, appropriative rights have been subject to the permitting authority of the state. Today, SWRCB issues and administers these

permits, which specify the quantity, place, and purpose of use, as well as the point of diversion. SWRCB approval is required for any changes to the above, as well as for water transfers, and the agency may attach conditions to its permits and approvals to protect other water rights holders and public trust resources (e.g., fish and wildlife).

Dam Safety and Operation

Dam safety in California is administered by the Department of Water Resources, Division of Safety of Dams (DSOD). DSOD reviews plans and specifications for the construction of new dams or for the enlargement, alteration, repair, or removal of existing dams, as well as performs inspections during dam construction and operation. A water rights permit from the SWRCB is required prior to filing an application to the DSOD to construct a dam.

Groundwater Rights

Groundwater rights in California are similar to surface water rights; however, no permit system or comprehensive regulatory method exists. The exception is groundwater deemed to be part of a subterranean stream or underflow that is hydraulically connected to a surface water body. In such cases, the source is classified as surface water and remains subject to the permitting authority of the SWRCB. Groundwater law is primarily expressed through previous legal decisions, and disputes among groundwater users are usually settled through judicial actions or adjudications. There are two main types of groundwater rights: overlying and appropriative.

Overlying Rights

Overlying rights apply to parcels that overlie a groundwater basin. Overlying rights are analogous to riparian rights for surface water. Overlying users do not have priorities with respect to one another, and each holder has a right to a reasonable share of the total groundwater supply available. Overlying rights may be active or dormant and are generally senior to appropriative rights (defined below). Note that water devoted to public uses (e.g., municipal water supply systems) is considered in most cases to be an appropriative use, rather than an overlying use, regardless of the location of the water use with respect to the aquifer.

Appropriative Rights

Appropriative rights apply to groundwater extractions used on lands that do not overlie the aquifer in question. Appropriate rights are analogous to appropriative rights for surface water. Appropriative rights are protected by the construction and use of a well, and putting the pumped water to reasonable and beneficial use. These rights are subject to a seniority system, where the appropriative right holder with the longest standing right has first priority to groundwater in a condition of shortage.

Groundwater Quality

Groundwater quality is regulated through the federal Clean Water Act and State Porter-Cologne Act and administered by the U.S. Environmental Protection Agency, the SWRCB, and local Regional Water Quality Control Boards (RWQCBs). The RWQCBs and California Department of Health Services administer standards for installation, use, and abandonment of wells and septic systems to ensure that drinking water standards and other water quality criteria are met and beneficial uses of the aquifer are maintained.

Relevant State Legislation

SB 221 (Kuehl, Chapter 642, Statutes of 2001)—Certification of Sufficient Water Supply

Senate Bill 221 requires local agencies to provide written verification that sufficient water supply is available before approving plans for new development.

SB 610 (Costa, Chapter 643, Statutes of 2001)—Water Supply Planning

Senate Bill 610 requires additional information to be included as part of an urban water management plan if groundwater is identified as a source of water available to the supplier. It requires an urban water supplier to include in the plan a description of all water supply projects and programs that may be undertaken to meet total projected water use. In response to SB 221 and SB 610, DWR prepared *The State Water Project Delivery Reliability Report* to assist the SWP contractors in assessment of the adequacy of the SWP component of their overall water supplies. DWR has also published a guidebook on how cities and counties can comply with Senate Bills 221 and 610.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, passed in 1969, articulates the federal CWA (see "Clean Water Act" in the Federal Regulations section) for California. It established the SWRCB and divided the state into nine regions, each overseen by an RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs, which are responsible for implementing CWA Sections 401, 402, and 303(d). In general, the SWRCB manages statewide regulation of water quality, while the RWQCBs focus exclusively on water quality within their regions. San Luis Obispo County is in Region 3, which is administered by the Central Coast Regional Water Quality Control Board.

Basin Plans and Water Quality Objectives

The Porter-Cologne Act provides for the development and periodic review of water quality control plans (basin plans) that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons why the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Basin plans are primarily implemented by using the National Pollution Discharge Elimination System (NPDES) permitting system and the issuance of waste discharge requirements (WDRs) to regulate waste discharges so that water quality objectives are met (see discussion of the NPDES system in the "Clean Water Act" section in the Federal Regulations section. Basin plans are updated every 3 years and provide the technical basis for determining waste discharge requirements and taking regulatory enforcement actions if deemed necessary.

Site-Specific Water Quality Objectives

Due to site-specific variations in water chemistry, the toxicity of a contaminant to aquatic life may deviate from adopted water quality objectives in a particular water body. As a result, various water bodies may require more or less protection to achieve optimal water quality. For this reason, the SWRCB and EPA allow site-specific water quality objectives. At this time in California, the only way to obtain a site-specific water quality objective is through an amendment to the relevant basin plan. Site-specific water quality objectives adjust the adopted water quality objective to account for over- or under-protectiveness based on site-specific information and federal and state scientific guidance. Three EPA-published procedures and a number of other procedures allowed by EPA can be used to establish these site-specific objectives. Of these procedures, the most common is the Water-Effect Ratio (WER) Procedure (U.S. Environmental Protection Agency 1994, 2001), which adjusts objectives to account for a site's water chemistry. The WER is the ratio of the toxicity of a chemical in site water to the chemical's toxicity in laboratory water, based on established standards for lab water.

As mentioned above, site-specific water quality objectives may be granted through the basin plan amendment process, which tends to be a time-consuming proposition. The SWRCB is currently considering whether to extend this authority to individual NPDES permits. In either case, a process exists whereby a site-specific water quality objective may be sought to allow for a higher discharge limit than would otherwise be possible.

Waste Discharge Requirements

It is the responsibility of the Water Boards to preserve and enhance the quality of the state's waters through the development of water quality control plans and the issuance of waste discharge requirements. The Porter-Cologne Act provides for the issuance of WDRs. This requirement is very similar to the NPDES program under the federal Clean Water Act (CWA), and in most cases, the two processes are combined by the RWQCBs. However, the Porter-Cologne Act definition of discharge is somewhat broader than the CWA; in addition, waters of the state include certain water bodies that are not waters of the United States. As a result, certain discharges are solely regulated under the Porter-Cologne Act. The SWRCB has adopted general WDRs for land application of biosolids, discharges to isolated wetlands, and land discharge of groundwater or surface water from cleanup of petroleum pollution.

The SWRCB establishes policies and regulations that help protect and restore the water quality in California, coordinates with and supports Regional Water Board efforts, and reviews Regional Water Board actions. The RWQCBs monitor and enforce state and federal plans, policies, and regulations. Each Regional Water Board makes critical water quality decisions for its region. In addition to issuing WDRs, these decisions include setting standards, determining compliance with WDRs, and taking appropriate enforcement actions.

The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits:

- General Construction Permit. Most construction projects that disturb 1 acre of land or more are required to obtain coverage through an NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a public notice of intent (NOI) to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP includes a site map and a description of proposed construction activities, along with demonstration of compliance with relevant local ordinances and regulations, and an overview of the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. The permit holder is further required to conduct monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.
- General Caltrans Permit. Projects constructed in California Department of Transportation (Caltrans) facilities or rights-of-way must comply with the requirements of Caltrans' statewide NPDES permit, which has requirements similar to those of the General Construction Permit.
- General Industrial Permit. Stormwater discharges from industrial facilities are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities excluding Construction Activities (General Industrial Permit). The regulations defining discharges of stormwater associated with industrial activities identify 11 categories of industrial activities that require permit coverage. Authorization for continued and future stormwater discharge under the General Industrial Permit requires each facility operator to submit an NOI. All stormwater discharges from industrial sites must meet all applicable provisions of Sections 301 and 402 of CWA.

For example, discharges from an industrial site must not cause or contribute to a violation of any applicable water quality standards, which include all federal receiving water standards and all state standards under the region's basin plan, the guiding policy document adopted by the governing RWQCB and approved by the SWRCB. These provisions require control of pollutant discharges using the best available technology (BAT) that is economically achievable and the best conventional pollutant control technology (BCT) to prevent and reduce pollutants and to meet CWA water quality standards. The General Industrial Permit generally requires facility operators to do the following:

- Eliminate unauthorized non-stormwater discharges.
- Develop, retain on site, and implement a SWPPP to identify sources of pollution and to prescribe BMPs to reduce or prevent pollutant discharges and authorized non-stormwater discharges.
- Perform monitoring of stormwater discharges and authorized non-stormwater discharges from industrial facilities (e.g., storm drains leaving the facility).

Areas of industrial activity where surface runoff must be controlled and treated include all storage areas and storage tanks, shipping and receiving areas, fueling areas, vehicle and equipment storage/maintenance areas, material handling and processing areas, waste treatment and disposal areas, dust- or particulate-generating areas, cleaning and rinsing areas, and all other areas of industrial activity that are potential pollutant sources. Any changes to the industrial site or activity require an update of the SWPPP and may necessitate the implementation of new control measures.

Other General Permits

The SWRCB has adopted several other general permits under the NPDES program, including permits for the discharges of aquatic pesticides for vector and aquatic weed control.

Municipal Stormwater Permits

The Municipal Storm Water Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). MS4 permits were issued in two phases. Under Phase I, which started in 1990, the Regional Water Quality Control Boards have adopted NPDES General Permit stormwater permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. These permits are reissued as the permits expire. As part of Phase II, the State Water Resources Control Board adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities, including non-traditional small

MS4s, which are governmental facilities such as military bases, public campuses, and prison and hospital complexes.

The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the Clean Water Act. The management programs specify what best management practices will be used to address certain program areas. The program areas include public education and outreach, illicit discharge detection and elimination, construction and post-construction, and good housekeeping for municipal operations. In general, medium and large municipalities are required to conduct chemical monitoring, though small municipalities are not.

Individual NPDES Permits

All point source discharges to waters of the United States not covered by a general permit are required to apply for an individual NPDES permit with the RWQCB. The RWQCB then issues waste discharge requirements and monitoring provisions to ensure compliance with CWA standards.

Considerations in Granting NPDES Permits

Under the NPDES permit process, the SWRCB or RWQCB has the authority to identify mixing zones and grant corresponding dilution credits in establishing and determining compliance with effluent limitations. A *mixing zone* is an area of the receiving water within which water quality criteria may be exceeded, as long as the criteria are met at the boundary of the mixing zone. A *dilution credit* may be granted when the receiving water has a substantial volume of water with which to dilute the effluent. It is expressed as a ratio of receiving water to effluent (for example, 20:1, or 20 parts receiving water to 1 part effluent) and effectively reduces the concentration of contaminants when determining whether water quality criteria can be met.

The allowance of mixing zones and dilution credits is discretionary and is determined on a case-by-case basis. Factors considered include variations in the receiving water flow or volume, aquatic toxicity, and human health criteria and objectives. Mixing zones may not be allowed at or near any drinking water intake and are prohibited from the following activities, although other limitations may also apply.

- Compromising the integrity of the entire water body.
- Causing acutely toxic conditions to aquatic life passing through the mixing zone or restricting the passage of aquatic life.
- Producing objectionable color, odor, taste, or turbidity.
- Dominating the receiving water body.

The RWQCB or SWRCB will deny or limit a mixing zone and dilution credit as necessary to protect the beneficial use of state waters.

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

The State Implementation Program (SIP) (State Water Resources Control Board 2000) established new standards for a variety of toxic pollutants. This state policy for water quality control applies to discharges of toxic pollutants into California's inland surface waters, enclosed bays, and estuaries, subject to regulation under the Porter-Cologne Act and the federal CWA. Such regulation may occur through the issuance of NPDES permits, the issuance or waiver of WDRs, or other regulatory approaches.

The goal of the SIP is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency. The SIP is a tool to be used in conjunction with watershed management approaches and, where appropriate, the development of TMDLs to ensure that water quality standards are met and the beneficial uses are protected.

The SIP establishes implementation provisions for priority pollutant criteria promulgated by the EPA through the National Toxics Rule and the California Toxics Rule (CTR), and for priority pollutant objectives established by the RWQCBs in their respective basin plans. The CTR promulgates the following criteria:

- Ambient aquatic life criteria for 23 priority toxics.
- Ambient human health criteria for 57 priority toxics.
- A compliance schedule provision that authorizes the state to issue schedules of compliance for new or revised NPDES permit limits based on the federal criteria when certain conditions are met.

The state must use these criteria together with the state's existing water quality standards when controlling pollution in inland surface waters, enclosed bays, and estuaries. California's RWQCBs are currently considering whether to include CTR standards in their basin plans as a streamlining measure.

Drinking Water Standards

Title 22 of the California Code of Regulations (CCR) outlines drinking water standards in the State of California. Maximum contaminant levels (MCLs) for various contaminants are identified and are made enforceable regulatory standards under the federal Safe Drinking Water Act. MCL standards must be met by all public drinking water systems to which they apply. Primary MCLs can be found in 22 CCR Sections 64431–64444. Specific regulations for lead and copper are in

22 CCR Section 64670 et seq. Secondary MCLs that address the taste, odor, and appearance of drinking water are found in 22 CCR Section 64449. Site-specific water quality objectives adjust the adopted water quality objective to account for over- or under-protectiveness based on site-specific information and federal and state scientific guidance.

Reclaimed Water Standards

Title 22 of the California Code of Regulations (CCR) outlines reclaimed water standards in the State of California, and reclaimed water is primarily regulated by the California Department of Health Services (DHS), in coordination with the RWQCBs. DHS has produced *The Purple Book*, which contains California health laws related to reuse of disinfected tertiary recycled water. Disinfected tertiary recycled water is defined as filtered and subsequently disinfected wastewater that exhibits extremely low levels of coliform bacteria and turbidity. The following are allowable uses for disinfected tertiary recycled water:

- Food crops, including all edible root crops, where the recycled water encounters the edible portion of the crop.
- Parks and playgrounds, schoolyards, residential landscaping, and unrestricted access golf courses.
- Industrial cooling that involves the use of a cooling tower.
- Flushing toilets and urinals, priming drain traps, industrial process water that may come into contact with workers, structural firefighting, decorative fountains, commercial laundries, consolidation of backfill around potable water pipelines, car washes.
- Any other irrigation use not prohibited.

The following limitations and requirements apply:

- Irrigation within 50 feet of any domestic water supply well is prohibited unless certain conditions are met.
- Surface impoundments of tertiary treated disinfected effluent within 100 feet of any domestic water supply well are prohibited.
- All irrigation runoff shall be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.
- Spray, mist, or runoff from reuse shall not contaminate dwellings, outdoor eating areas, food handling facilities, and drinking water fountains.
- No cross connections with domestic water systems are allowed. Proposed irrigation systems utilizing wastewater must be entirely separate from irrigation systems using domestic supplies, and all pipes used for water recycling must be colored purple or

utilize another marking system that clearly distinguishes recycled water from potable water.

- Disinfected tertiary recycled water shall be sampled at least once daily for total coliform and continuously for turbidity using a continuous turbidity meter.
- All use areas where recycled water is used that are accessible to the public shall be posted with signs that indicate that recycled water is in use.
- Backflow prevention devices are required such that effluent does not reach potable supplies or otherwise expose humans.

Disinfected tertiary treated effluent may be used for groundwater recharge of domestic water supply aquifers by surface spreading provided the effluent is of a quality that fully protects human health at all times. For groundwater recharge projects, DHS make recommendations to the RWQCB based on the relevant aspects of the project, including effluent quality and quantity, spreading area operations, soil characteristics, hydrogeology, residence time, and distance to withdrawal.

California Fish and Game Code Sections 1601–1607

Under Sections 1601–1607 of the California Fish and Game Code, the California Department of Fish and Game (DFG) regulates projects that affect the flow, channel, or banks of rivers, streams, and lakes. Sections 1601 and 1603 require public agencies and private individuals, respectively, to notify and enter into a streambed or lakebed alteration agreement with DFG before beginning construction of a project that will have either of the following results:

- Divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake.
- Use materials from a streambed. Section 1601 contains addition prohibitions against the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

Sections 1601–1607 may apply to any work undertaken within the 100-year floodplain of any body of water or its tributaries, including intermittent stream channels. In general, however, it is construed as applying to work within the active floodplain and/or associated riparian habitat of a wash, stream, or lake that provides benefit to fish and wildlife. Sections 1601–1607 typically do not apply to drainages that lack a defined bed and banks, such as swales, or to very small bodies of water and wetlands such as vernal pools.

General Plan Guidelines (2003)

The 2003 General Plan Guidelines for the State of California provide requirements for the elements in the General Plan. Water resources are included in the requirements for conservation elements. The term *water resources* must be clarified and the following topics are to be addressed:

- Water supply/conservation regarding water management plans and coordinated land use planning,
- Water quality/impaired water bodies,
- Water and its hydraulic force,
- Rivers and other waters,
- Harbors (please note that this is oriented toward public access and transportation of goods/services and is covered in the Local Coastal Program).

State Regulation of Groundwater

California water law does not provide a mandate for comprehensive groundwater management, nor does it provide a regulatory process for groundwater withdrawals. None of San Luis Obispo County's groundwater basins are currently regulated under groundwater ordinances, although there is potential for future management.

FEDERAL REGULATIONS AND POLICIES

Federal water policy is implemented by numerous agencies, including the Environmental Protection Agency, the Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Bureau of Reclamation, the Federal Emergency Management Agency, and the Department of Interior.

Safe Drinking Water Act (SDWA)

Congress passed the Safe Drinking Water Act (SDWA) in 1974 to protect public health by regulating the nation's public drinking water supply. Congress amended the law in 1986 and 1996 and required many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. (SDWA does not regulate private wells that serve fewer than 25 individuals.) SDWA authorizes the United States Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. EPA, states, and water systems then work together to make sure that these standards are met. Originally, SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. The 1996 amendments greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. This approach ensures the quality of drinking water by protecting it from source to tap. SDWA applies to every public water system in the United States.

Groundwater

There are no applicable federal policies regulating groundwater in San Luis Obispo County. In California, the State Regional Water Quality Control Boards set beneficial uses and water quality objectives for groundwater, usually consistent with Title 22 of the California drinking water standards.

Floodplains

Federal Flood Insurance Program

Congress, alarmed by increasing costs of disaster relief, passed the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The intent of these acts is to reduce the need for large publicly funded flood control structures and disaster relief by restricting development on floodplains. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development on floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. FIRMs delineate flood hazard zones in the community.

Executive Order 11988

Executive Order 11988 (*Floodplain Management*) addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to do the following:

- Avoid incompatible floodplain development.
- Be consistent with the standards and criteria of the NFIP.
- Restore and preserve natural and beneficial floodplain values.

Surface Water

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation is a water management agency established in 1902 to manage water in the western United States. The Bureau of Reclamation is primarily known for the role it has played in dam building and hydroelectric power generation. The Bureau of Reclamation is the largest water wholesaler in the country, serving 31 million people. San Luis Obispo County is located in the Bureau of Reclamation’s Mid-Pacific Region.

Clean Water Act

The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation’s surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all pollutant discharges into the nation’s waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following paragraphs provide additional detail on specific sections of the CWA.

CWA Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. A definition of waters of the United States as relevant to San Luis Obispo County includes the following:

- Navigable waters which are waters currently used, used in the past, or potentially used for interstate or foreign commerce, as well as waters for which the use, degradation, or destruction could affect interstate or foreign commerce;
- All tidally influenced waters; and
- Tributaries to, and adjacent wetlands of, the above two categories.

In general, most intermittent and perennial water bodies are considered waters of the United States unless they are isolated (e.g., vernal pools). Project proponents must obtain a permit from the United States Army Corp of Engineers (Corps) for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity. Before any actions are carried out, a delineation of waters of the United States must completed, following Corps protocols (Environmental Laboratory 1987), to determine whether the project area encompasses wetlands or other waters of the United States that qualify for protection under the CWA. These waters may include areas within the ordinary high water mark of a stream, including non-perennial streams (streams that do not flow year-round) with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned or modified.

Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 Code of Federal Regulations [CFR] 328.3, 40 CFR 230.3). The Corps provides authorization through regional and nationwide general permits and individual permits, depending on project size and characteristics. Individual Section 404 permits may only be issued for the least environmentally damaging practicable project alternative. That is, authorization of a proposed discharge is prohibited if there is a more practicable alternative that would have less adverse impacts and lacks other significant adverse consequences. Wetlands are areas inundated or saturated by surface or ground water often enough to support wetland vegetation.

CWA Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. All projects that have a federal component and may affect the quality of the state's waters (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

CWA Permits for Point and Nonpoint Source Discharges

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states. In California, the State Water Resources Control Board is authorized by the EPA to oversee the NPDES program through the RWQCBs (see related discussion under "Porter-Cologne Water Quality Control Act" above). The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters.

Total Maximum Daily Loads

Under CWA Section 303(d) and California's Porter-Cologne Water Quality Control Act of 1969 (discussed above), the State of California is required to establish beneficial uses of state waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes the Total Maximum Daily Load (TMDL) process to assist in guiding the application of state water quality standards, requiring the states to identify waters whose water quality is "impaired" (affected by the presence of pollutants or contaminants) and to establish a TMDL or the maximum quantity of a particular contaminant that a waterbody can assimilate without experiencing adverse effects on the beneficial use identified. TMDLs are generally stakeholder driven processes that involve investigation of sources and their loading (pollution input), make load allocations, and identify an implementation plan and schedule.

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