

# SAN LUIS OBISPO

## Countywide

### **2005 Baseline Greenhouse Gas Emissions Inventory**

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*Prepared for:*



SAN LUIS OBISPO COUNTY AIR POLLUTION CONTROL DISTRICT

*Prepared by:*



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November 2010



# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

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## 1. Introduction

In October 2008, the San Luis Obispo Air County Pollution Control District Board of Directors made a commitment to calculate San Luis Obispo County's contribution to global climate change by facilitating the development of Greenhouse Gas Emissions (GHG) Inventories (Inventory) in the cities within their jurisdiction which had not yet initiated them<sup>1</sup>, and through the development of a Countywide Inventory. This Countywide Inventory identifies the cumulative greenhouse gas emissions within both the incorporated and unincorporated areas of the county and the major sources of those emissions, and provides a baseline against which future progress can be measured. Specifically, this Inventory does the following:

- Calculates GHGs from countywide<sup>2</sup> activities within the geo-political boundaries of San Luis Obispo County, including both incorporated and unincorporated areas in the calendar year 2005;
- Identifies the major sources of greenhouse gas emissions from countywide sources;
- Provides decision-makers and the community with adequate information to inform policy decisions on a regional basis; and
- Forecasts how emissions will grow in the community if no behavioral changes are made.

The 2005 Countywide baseline GHG Inventory represents a key step in the Air Pollution Control District's (APCD) efforts to improve air quality, enhance environmental sustainability, and ensure the safety and comfort of its San Luis Obispo's residents for generations to come. In addition, this Inventory allows the APCD to quantitatively track and take credit for the numerous efforts related to energy efficiency and the mitigation of global climate change that are occurring throughout the County.

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<sup>1</sup> Peer review and technical assistance was provided to the City of San Luis Obispo, who initiated a Green House Gas Inventory in January 2008. The City of San Luis Obispo also utilized a 2005 baseline year. San Luis Obispo County initiated their Greenhouse Gas Inventory in 2008, utilizing 2006 for the baseline year.

<sup>2</sup> "Countywide" refers to all activities within the geo-political boundaries of San Luis Obispo County, including incorporated and unincorporated areas, from businesses, industrial processes, residents, vehicles, and government operations.

## 2. Methodology

The San Luis Obispo County APCD and the represented jurisdictions chose the year 2005 as the baseline year for the Inventory due to the availability of reliable data. The State uses 1990 as a baseline year to remain consistent with the Kyoto Protocol and because it has well-kept records of transportation trends and energy consumption. 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.

This Inventory uses a forecast year of 2020 to be consistent with the State's GHG inventory forecast year and AB 32, California's Global Warming Solution Act, target, both of which reference 2020.<sup>3</sup> A second forecast year of 2030 was chosen for consistency with many of the municipalities' general plan build outs.

This Inventory will provide the basis for future policy development, the quantification of emissions reductions associated with proposed measures, and the establishment of an informed emissions reduction target. The methodology for estimating emissions is guided by ICLEI – Local Governments for Sustainability, the California, Air Resource Board (CARB) and the California Climate Registry.

### DATA COLLECTION AND METHODOLOGY

Creating the community emissions inventory required the collection of information from a variety of sources. Sources for community data included the Pacific Gas and Electric Company (PG&E), Southern California Gas (SoCal Gas), Cal Trans, San Luis Obispo Integrated Waste Management Authority (SLO IWMA), San Luis Obispo County, the APCD, and the California Department of Resources Recycling and Recovery (CalRecycle). This Inventory relied on activity data from the 2005 calendar year, with the exception of aircraft take-off and landing data from the APCD, which 2007 data as a proxy year.

For community activities, emissions sources are categorized by scope. Scopes identify where emissions originate and what entity retains regulatory control and the ability to implement efficiency measures. The scopes are illustrated in **Figure 2-1** and defined as follows:

- **Scope 1.** Direct emissions caused by activities in San Luis Obispo County in 2005 and emitted within San Luis Obispo County. Examples of Scope 1 sources include the combustion of fuels such as gasoline and natural gas.

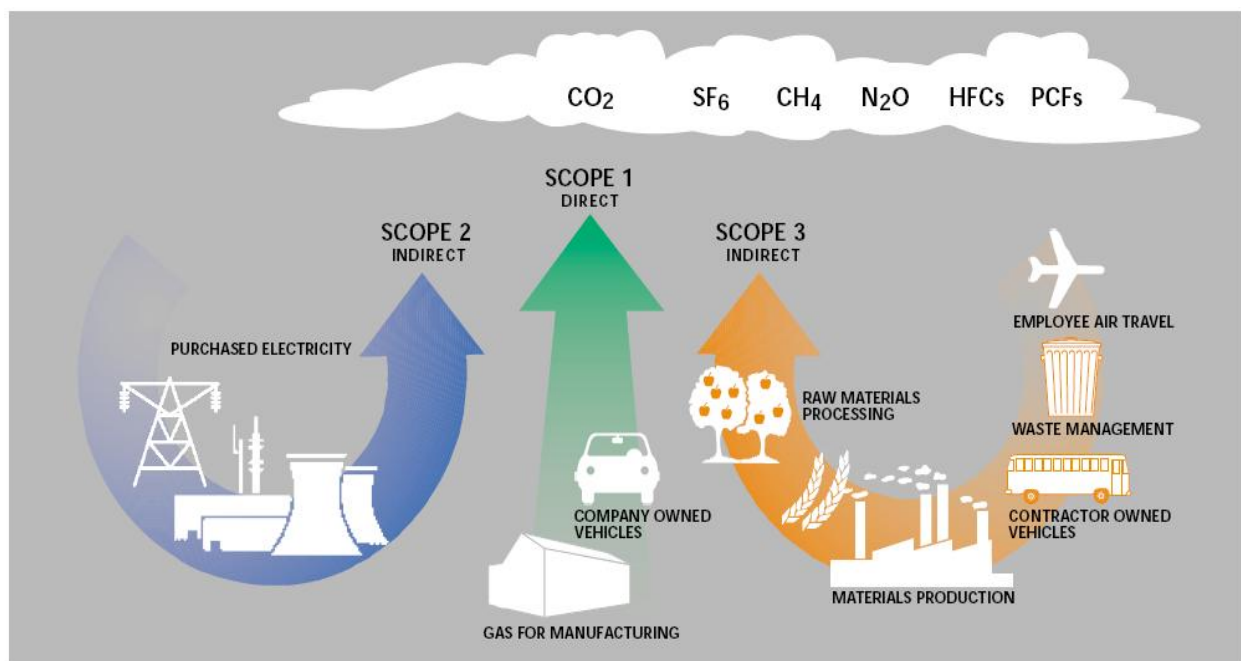
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<sup>3</sup> California Greenhouse Gas Inventory, <http://www.arb.ca.gov/cc/inventory/inventory.htm>.

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- **Scope 2.** Indirect emissions caused by activities within San Luis Obispo County in 2005 but emitted outside of the county. Examples of Scope 2 sources include electricity generated outside of the community and used within the community. These emissions should be included in the countywide 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 community. An example of Scope 3 is methane emissions from solid waste generated in the community in 2005 yet released over the lifetime of the waste.

**FIGURE 2-1: GHG EMISSIONS 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.

## DATA SOURCES

Details on the activities represented in the Inventory are provided in **Table 2-1** below. The table summarizes activity data units, data sources, and emissions scopes for each sector. Refer to Appendix B for additional descriptions of detailed CACP outputs, emissions coefficients, assumptions, and data sources that were used to calculate countywide emissions.

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

**TABLE 2-1: DATA SOURCES FOR COUNTYWIDE ANALYSIS, 2005**

Sector	Information	Unit of Measurement	Emissions Scope	Activity Data Source
Residential	Electricity consumption	kWh	Scope 2	PG&E
	Natural gas consumption	Therms	Scope 1	PG&E Southern California Gas
Commercial and Industrial	Electricity consumption	kWh	Scope 2	PG&E
	Natural gas consumption	Therms	Scope 1	PG&E Southern California Gas
Transportation	Local road VMT	Annual average VMT	Scope 1	Cal Trans HPMS data
	Highway and interstate VMT for SLO County	Annual average VMT	Scope 1	Cal Trans HPMS data
Solid Waste	Solid waste tonnage sent to landfill from activities in county.	Short tons	Scope 3	San Luis Obispo Integrated Waste Management Board
Off-Road Equipment	Emissions from off-road equipment and vehicles	Tons/year of N <sub>2</sub> O, CO <sub>2</sub> , and CH <sub>4</sub>	Scope 3	California Air Resources Board OFFROAD2007 model
Agriculture	Emissions from cattle and sheep.	Head of cattle	Scope 3	County Crop Report
	Emissions from fertilizer use.	Pounds of nitrogen	Scope 3	County Crop Report
Aircraft	Emissions in the Landing and Take-off Operations (LTO) zone.	Grams of N <sub>2</sub> O, CO <sub>2</sub> , and CH <sub>4</sub>	Scope 3	APCD Aircraft Operations Study

## DATA LIMITATIONS

The Inventory was developed with the best-available tools, data, and methodology; however, as with any GHG inventory, there are limitations to representing all sources of emissions in a jurisdiction. The main factors that limit GHG inventories include (1) data availability, (2) privacy

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

laws, and (3) a lack of a reasonable methodology. The following sections highlight emissions that cannot be included in a GHG inventory due to the factors listed above.

## **DATA AVAILABILITY**

Lack of available data prevented the calculation of emissions from the following sources for the following reasons:

- Rail – The federal government does not release information regarding the efficiency, fuel consumption, or mileage of locomotives traveling through San Luis Obispo County.
- Propane use – Propane is essentially 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.
- Refrigerants – Similar to propane, above, the amount of fugitive refrigerant emissions cannot be calculated because sales are not tracked.

## **PRIVACY LAWS**

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.

Point source and process emissions from private and public sources, including industrial uses, water and wastewater systems, and more, are also excluded from this inventory do to proprietary nature of operational data.

## **LACK OF A REASONABLE METHODOLOGY**

A lack of a reasonable methodology prevents estimation of life-cycle emissions for the community. Life-cycle emissions are emissions associated with the production and disposal of items consumed by a community (i.e., “cradle-to-grave”). For instance, a life-cycle assessment of vehicle emissions would include those from designing, extracting raw materials, producing, delivering, and disposing of each car in the county. However the majority of these life-cycle emissions occur outside the geographical boundary of this Inventory. This analysis only captures how much that car is driven in the county consistent with standard protocol.

Review of similar Inventories, including the California Greenhouse Gas Inventory prepared by the California Air Resources Board (CARB), indicates that those sources not included in the Inventory for the reasons stated above comprise less than 5.0% of total emissions in the county. Once CARB adopts a Communitywide Protocol it is likely that methodology and accessibility to

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

data will improve. The emissions identified in this report are primarily GHGs that the community has directly caused and has the ability to reduce through implementation of conservation actions, a climate action plan, or corresponding efforts.

## EMISSIONS METHODOLOGY

GHG emissions are calculated by multiplying the amount of activity by the amount of emissions resulting from each unit of activity. For example, if a community consumed 1 million kilowatt-hour (kWh) of electricity and each kWh of electricity results in 0.0004 metric tons (MT) of CO<sub>2</sub>, the CO<sub>2</sub> emissions calculation would be as follows:

$$1 \text{ million kWh} * .0004 \text{ MTCO}_2/\text{kWh} = 400 \text{ MTCO}_2$$

The amount of emissions per unit of activity is commonly known as an emissions coefficient or emissions factor. The countywide inventory uses activity data and coefficients for the three primary GHGs (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) according to the type and nature of the activity. Activity data is typically provided as energy or water consumed, vehicle miles traveled, or waste generated. The coefficients used for calculating emissions from each activity follow international inventory standards and are utility-, county-, or California-specific, when available.

The three main GHG emissions (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) are converted to equivalent carbon dioxide units, or CO<sub>2</sub>e. Equalizing the three main GHG emissions as CO<sub>2</sub>e allows for the consideration of different GHGs in comparable terms. For example, methane (CH<sub>4</sub>) is 21 times more powerful than carbon dioxide on a per weight basis in its capacity to trap heat, so one metric ton of methane emissions is converted to 21 metric tons of carbon dioxide equivalents.<sup>4</sup>

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<sup>4</sup> 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. Countywide GHG Inventory Results

San Luis Obispo County contains primarily residential, commercial, and agricultural land uses. In the 2005 baseline year, there were approximately 260,727 people, 100,700 jobs, and approximately 102,696 households in both incorporated and unincorporated areas.<sup>5</sup> The following section provides an overview of the emissions caused by activities within the geopolitical boundary of the county and analyzes the emissions in terms of scope, sector, source, and population.

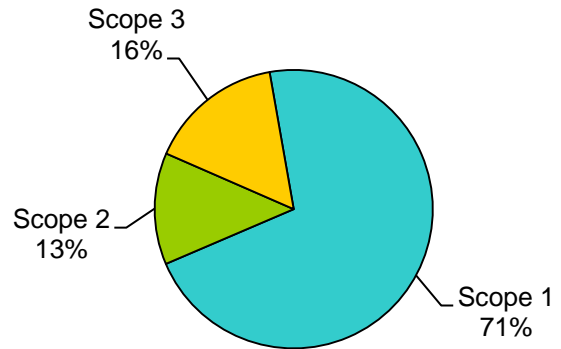
### COUNTYWIDE EMISSIONS BY SCOPE

This Inventory includes Scope 1, Scope 2, and Scope 3 sources from the following sectors, consistent with the California Air Resources Board protocol: residential, commercial/industrial, transportation, waste, off-road equipment, agriculture, and aircraft.

Including all sectors and scopes, approximately 2.37 million metric tons of CO<sub>2</sub>e were emitted in the county in 2005. As shown in **Figure 3-1** and **Table 3-1**, the majority of community GHG emissions were Scope 1 (71.2%), with Scope 3 (15.6%) and Scope 2 (13.2%) constituting the remainder.

The largest portion of Scope 1 emissions came from the transportation sector. These emissions qualify as Scope 1 because they involve the direct combustion of fuel. The second largest source of Scope 1 emissions was residential natural gas use. Commercial and Industrial uses generated the largest percentage of Scope 2 emissions. The majority of Scope 3 emissions are from off-road vehicles and equipment and agriculture, with waste and aircraft emissions contributing the remainder.

**FIGURE 3-1: 2005 COMMUNITY GHG EMISSIONS BY SCOPE**



<sup>5</sup> Population and job data calculated from the ERA Report prepared for the San Luis Obispo Council of Governments, July 2006 revision. Household data calculated through US census data.

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

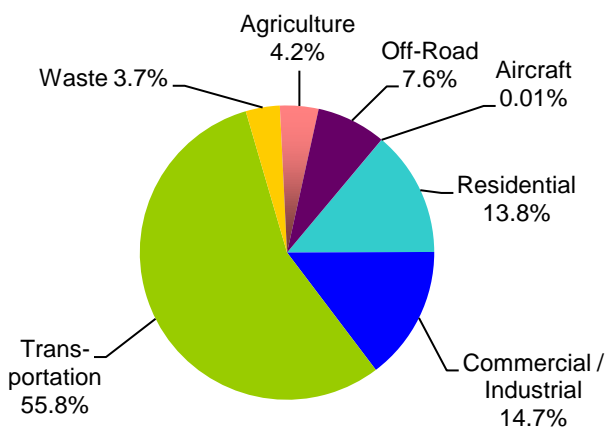
**TABLE 3-1: COMMUNITY GHG EMISSIONS PER SECTOR PER SCOPE  
(METRIC TONS OF CO<sub>2</sub>E)**

Sector	Scope 1	Scope 2	Scope 3	Total
Residential	183,421	144,438	---	327,859
Commercial/Industrial	181,532	168,150all	---	349,682
Transportation	1,322,578	---	---	1,322,578
Waste	---	---	88,777	88,777
Agriculture	---	---	100,470	100,470
Off-Road Equipment	---	---	181,267	181,267
Aircraft	---	---	252	252
<b>TOTAL</b>	<b>1,687,531</b>	<b>312,588</b>	<b>370,766</b>	<b>2,370,885</b>
Percentage of Total CO <sub>2</sub> e	71.2%	13.2%	15.6%	100.0%

## COUNTYWIDE EMISSIONS BY SECTOR

As noted above, the community emitted approximately 2.37 million metric tons of CO<sub>2</sub>e in calendar year 2005. In addition to analyzing the data by scope, it can also be aggregated by sector. As shown in **Figure 3-2**, the transportation sector was by far the largest contributor to

**FIGURE 3-2: COMMUNITY GHG EMISSIONS BY SECTOR**



emissions (55.8%), producing approximately 1.323 million metric tons of CO<sub>2</sub>e in 2005. The commercial and industrial sectors, combined, accounted for 14.7% of total emissions, producing approximately 349,683 metric tons of CO<sub>2</sub>e. The residential sector accounted for 13.8% of total emissions, producing approximately 327,859 metric tons of CO<sub>2</sub>e. Emissions from off-road vehicles and equipment contributed 181,267 (7.6%) metric tons of CO<sub>2</sub>e and the agriculture sector contributed 100,470 (4.2%) metric tons CO<sub>2</sub>e. Solid waste and emissions from aircraft at three county airports accounted for the remaining 3.7% of the total.

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

## Transportation

As with the majority of California municipalities,<sup>6</sup> travel by on-road motorized vehicle constitutes the greatest percentage of greenhouse gas emissions in the county (55.8%). The Inventory does not include trains as there is no feasible methodology for calculating emissions from this source. However, this report does include marine vessels and off-road recreational vehicles, for which data is only available at the countywide level. These emissions are included in the Off-Road Sector. The majority of the emissions in the transportation sector came from travel on state highways (66.7%) in the county (**Table 3-2**). Approximately 33.3% of the greenhouse gas emissions in the transportation sector resulted from travel on local roads. Of the total emissions in the transportation sector, an estimated 90.0% was due to gasoline consumption, with the remaining 10.0% coming from diesel use (**Table 3-3**).

**TABLE 3-2: TRANSPORTATION GHG EMISSIONS BY ROAD TYPE**

Transportation Road Type Emissions Sources 2005	Local Roads	State Highways	TOTAL
CO <sub>2</sub> e (metric tons)	440,062	882,516	1,322,578
Percentage of Total CO <sub>2</sub> e	33.3%	66.7%	100%
Energy Use (MMBtu)	6,256,177	12,546,319	18,802,496

**TABLE 3-3: TRANSPORTATION GHG EMISSIONS BY FUEL SOURCE**

Transportation Fuel Emissions Sources 2005	Gasoline	Diesel	TOTAL
CO <sub>2</sub> e (metric tons)	1,190,958	131,620	1,322,575
Percentage of Total CO <sub>2</sub> e	90.0%	10.0%	100%
Energy Use (MMBtu)	17,010,925	1,791,571	18,802,496

These emissions result from the gasoline and diesel consumption of vehicles traveling within the county, including those that are just passing through. As a result, it is likely that neither the individual cities nor the County has jurisdictional control to reduce the transportation emissions from a portion of this sector. However ICLEI and State protocol require that these emissions be

<sup>6</sup> For a list of California cities and counties that have developed GHG Inventories, refer to the California Office of Planning and Research's website: <http://www.opr.ca.gov>

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

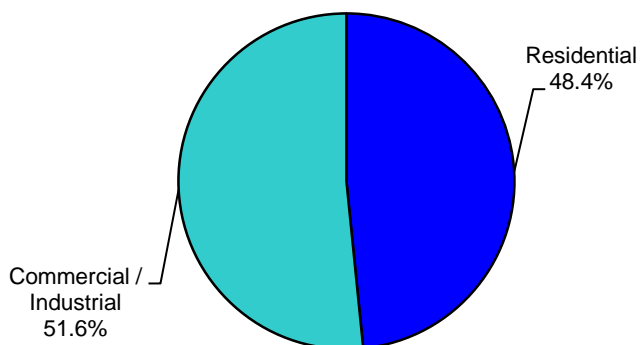
included in a local inventory in order to capture all emissions within the area and calculate their effect on the local community. The Inventories for all San Luis Obispo cities and the county use this methodology for consistency and to avoid double-counting of transportation emissions.

## ***The Built Environment (Residential, Commercial, Industrial)***

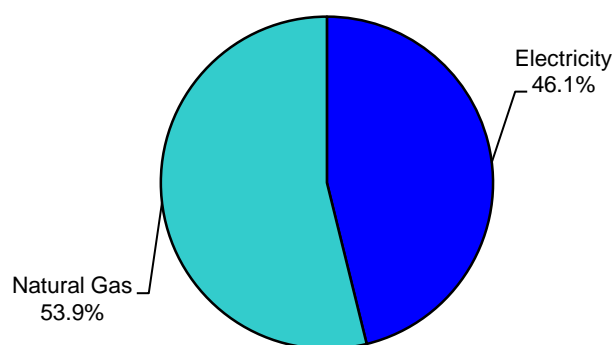
With all scopes aggregated, 28.5% of total countywide emissions in the year 2005 came from the “built environment.” The built environment is comprised of the residential, commercial, and industrial natural gas and electricity consumption. This analysis does not include emissions from other types of energy such as propane, solar, and wind due to lack of reliable sales, construction, or consumption data. The commercial and industrial sectors are combined in this Inventory due to the mandatory aggregating of commercial and industrial data by PG&E previously referenced.

In 2005, emissions from the residential and commercial and industrial sectors were nearly evenly split, 48%-52% (**Figure 3-3**). All of the emissions calculated from the built environment were the result of local natural gas consumption (Scope 1) and local consumption of electricity (Scope 2). Overall, electricity consumption and natural gas consumption were split roughly 46-54% as the cause of emissions from the built environment in 2005 as shown in **Figure 3-4**.

**FIGURE 3-3: BUILT ENVIRONMENT GHG EMISSIONS BY SECTOR**



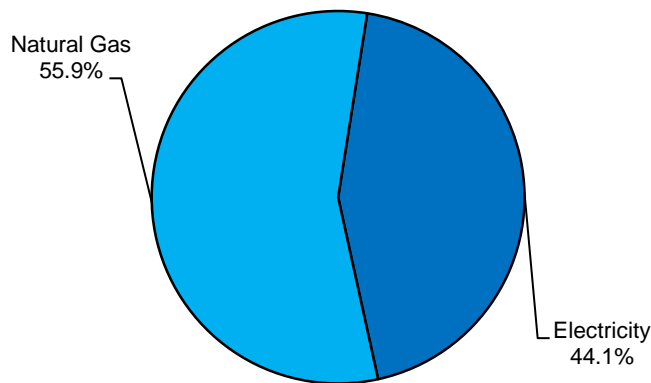
**FIGURE 3-4: BUILT ENVIRONMENT GHG EMISSIONS BY SOURCE**



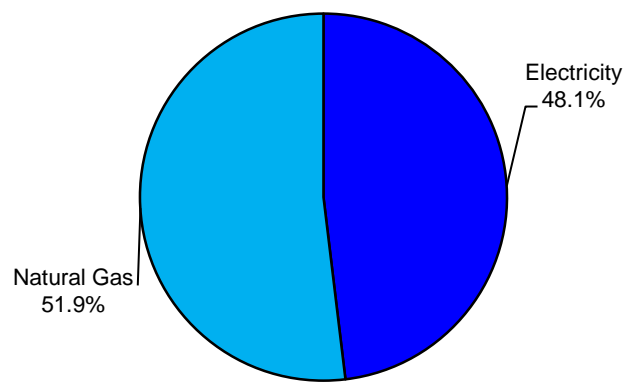
# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

Approximately 56% of emissions in the residential sector resulted from combustion of natural gas for heating and cooking (Figure 3-5 and Table 3-4), while 52% of emissions in the commercial/industrial sector came from combustion of natural gas (Figure 3-6 and Table 3-5).

**FIGURE 3-5: RESIDENTIAL GHG EMISSIONS BY SOURCE**



**FIGURE 3-6: COMMERCIAL/ INDUSTRIAL GHG EMISSIONS BY SOURCE**



**TABLE 3-4: RESIDENTIAL GHG EMISSIONS BY SOURCE**

Residential Emissions Sources 2005	Electricity	Natural Gas	TOTAL
CO <sub>2</sub> e (metric tons)	144,438	183,421	327,859
Percentage of Total CO <sub>2</sub> e	44.1%	55.9%	100%
Energy Use (MMBtu)	2,203,658	3,448,029	5,561,687

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

**TABLE 3-5: COMMERCIAL/INDUSTRIAL GHG EMISSIONS SOURCES**

Commercial/Industrial Emissions Sources 2005	Electricity	Natural Gas	TOTAL
CO <sub>2</sub> e (metric tons)	168,150	181,532	349,682
Percentage of Total CO <sub>2</sub> e	48.1%	51.9%	100%
Energy Use (MMBtu)	2,565,428	3,413,939	5,979,367

### **Waste**

Solid waste disposed of at managed landfills was responsible for 3.7% of total emissions for the county. The CACP2009 software calculates methane generation from waste sent to landfill in 2005, and accounts for the reported methane recovery factors among the three utilized landfills (Paso Robles, Cold Canyon, and Chicago Grade), which have a 57% weighted average. The Cold Canyon Landfill accepted approximately 46% of the county's solid waste, while 28% went to Paso Robles, and the remaining 28% went to Chicago Grade. The methane recovery factors of the landfills are well documented by the San Luis Obispo County Air Pollution Control District based on the system operations at that time. For more information, please see detailed methodology in **Appendix B**.

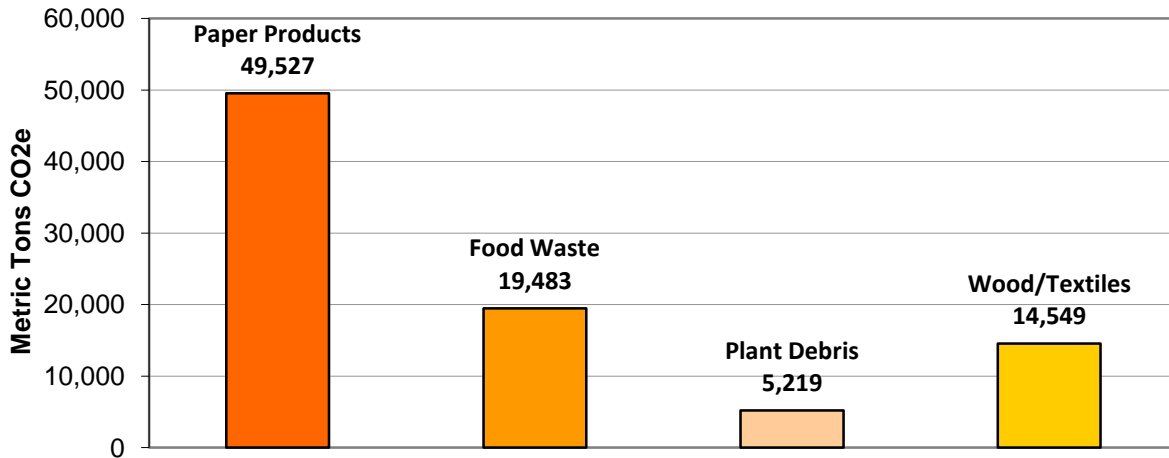
Waste emissions are considered Scope 3 emissions because they are not generated in the base year, but will result from the decomposition of waste generated in 2005 over the full 100-year+ cycle of its decomposition. In 2005, approximately 250,032 tons of waste was sent to landfills. The 2004 California Statewide Waste Characterization Study provides standard waste composition for the State of California.<sup>7</sup> 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<sup>8</sup> the methane released in managed landfills, therefore offsetting some or all of the emissions from food and plant waste. It is only with the eventual breakdown of these carbonaceous materials that both their own and the sequestered methane is released. **Figure 3-7** and **Table 3-6** show the estimated percentage of emissions coming from the various types of organic, methanogenic waste.

<sup>7</sup> <http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

<sup>8</sup> Sequestration involves the storage of carbon dioxide in a solid material through biological or physical processes.

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

**FIGURE 3-7: WASTE GHG EMISSIONS BY TYPE**



**TABLE 3-6: WASTE GHG EMISSIONS BY WASTE TYPE**

Waste Emissions Sources 2005	Paper Products	Food Waste	Plant Debris	Wood / Textiles	TOTAL
CO <sub>2</sub> e (metric tons)	49,527	19,483	5,219	14,549	88,778
Percentage of Total CO <sub>2</sub> e	55.8%	21.9%	5.9%	16.4%	100%
Energy Use (MMBtu)	n/a	n/a	n/a	n/a	n/a

### ***Off-Road Vehicles and Equipment***

Off-road vehicles and equipment, including both agricultural equipment and other types of off-road vehicles such as recreational vehicles, motor boats, and more, produced 7.6% of emissions in 2005, or 181,267 metric tons CO<sub>2</sub>e.<sup>9</sup> This calculation was performed using the California Air Resources Board OFFROAD2007 model and inputted into the 'other' category in

<sup>9</sup> The OFFROAD2007 Model does not reflect the several in-use rules/regulations, including: Portable Equipment ATCM, Transportation Refrigeration Units (TRU) ATCM, Red/Green Sticker Program (Recreational Vehicles), Carl Moyer Program, In-use Off-road Diesel Vehicle Regulation, and Local Rules (e.g. Ban on 2-stroke gasoline pleasure craft on certain local lakes) .

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

CACP2009. The OFFROAD model generates emission inventories by equipment type, accounting for age within a given year (2005).<sup>10</sup>

The countywide inventory captures the emissions from all of the sources available through the OFFROAD software, whereas the inventories prepared for the individual jurisdictions with San Luis Obispo captured only those emissions from agricultural equipment. This is due to the aggregation of data at the county level, and the lack of an accepted methodology for allocating other emissions to different jurisdictions. As current practice and methodology stands, population data is not an acceptable measure of emissions per jurisdiction.

## ***Agriculture***

This section includes emissions from cattle, sheep, and crop fertilizers in the county. Waste emissions from cattle and sheep in San Luis Obispo County accounted for 78% of greenhouse gas emissions related to agriculture, or 77,966 metric tons CO<sub>2</sub>e in 2005. Cattle caused the majority of emissions (77%), followed by crop fertilizer (22%) and sheep (1%), as shown in **Figure 3-8** and **Table 3-7** 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. Emissions from agricultural fertilizer usage account for 22% of total agriculture emissions, or 22,504 metric tons of CO<sub>2</sub>e. Emissions were calculated using an equation from the California Air Resources Board.

Industrial fertilizers are used to increase crop yields through increased input of nitrogen into soils.<sup>11</sup> Upon application of nitrogen into the soil, two microbial processes take place that convert this nitrogen into nitrous oxide emissions: nitrification and denitrification. The rate of production of nitrous oxide is complex and is affected by multiple factors, including soil type, temperature, moisture content, and oxygen concentrations in the soil.<sup>12</sup> Factors such as over-application of fertilizers can also exacerbate emissions. Nitrous oxide (N<sub>2</sub>O) contributes a small percentage of total US greenhouse gases; however, fertilizer application is one of the largest contributors to all N<sub>2</sub>O emissions nationwide, and thus, becomes an important greenhouse gas inventory sector. According to the US EPA National Inventory (2009), in 2007 soil management

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<sup>10</sup> ARB is working towards reconciling the emission estimates from the fuel usage approach and the OFFROAD2007 model.

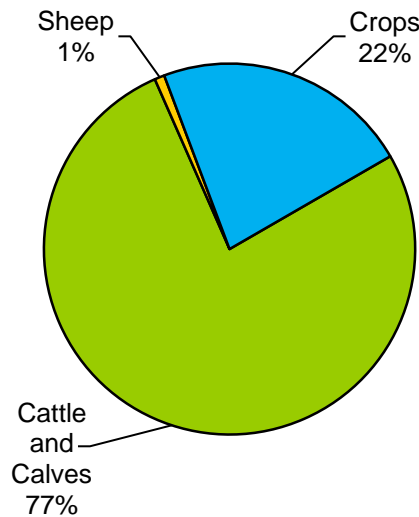
<sup>11</sup> Paustian et. al. (2006).

<sup>12</sup> Snyder et. al. (2009).

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

activities such as fertilizer application and other cropping practices contributed 67% of all US N<sub>2</sub>O emissions.

**FIGURE 3-8: AGRICULTURE GHG EMISSIONS BY SOURCE**



**TABLE 3-7: AGRICULTURE GHG EMISSIONS BY SOURCE**

Agriculture Emissions Sources 2005	Cattle & Calves	Sheep	Crops	TOTAL
CO <sub>2</sub> e (metric tons)	77,096	870	22,504	100,470
Percentage of Total CO <sub>2</sub> e	77.0%	1.0%	22.0%	100%
Energy Use (MMBtu)	n/a	n/a	n/a	n/a

Agriculture plays a major role in the County’s economy with an annual crop yield worth an estimated \$607 million in the year 2008. Accurately accounting for emissions related to agriculture will help guide future policy decisions to reduce greenhouse emissions in the agriculture sector and reach the County’s overall reduction goals.

### ***Aircraft***

This emissions sector accounts for emissions associated from aircraft landing and takeoff operations at the three commercial airports located in the county (San Luis Obispo, Oceano, and Paso Robles). The Airport Cooperative Research Program (ACRP) released the “Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories” in 2009. This report

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

provides a methodology for inventorying greenhouse gas emissions related to aircraft and airport operations. While this report is meant to provide a facility scale emissions inventory, the methodology can be adjusted to calculate Countywide Scope 3 emissions from aircraft Landing and Takeoff Operations (LTO). The information required to calculate aircraft emissions includes the make and model of aircraft, engine type, and number of annual LTOs. This information was provided by an engineering report prepared by the Air Pollution Control District staff in 2008. The report was a special project analyzing 2007 airport activity 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 LTOs for each aircraft arriving and departing each airport was entered into the Federal Aviation Administration's (FAA) Emission Dispersion Modeling System (EDMS 5.1.2) to calculate CO<sub>2</sub> emissions and fuel consumed within the LTO. The LTO is also defined as less than 3,000 feet elevation and is often considered the inversion layer where emissions have a direct impact to a community's air quality. Methane and nitrous oxide were calculated using fuel coefficients provided by the ACRP guidebook and entered into CACP2009 to calculate total CO<sub>2</sub>e. Calculating emissions from aircraft LTOs resulted in 252 metric tons of CO<sub>2</sub>e or 0.01% of communitywide emissions (**Table 3-8**).

It should be noted that using the ACRP guidebook to conduct a facility scale inventory of the airport would result in higher overall emissions than presented in this Inventory because it recommends all emissions occurring during flight be attributed to the departing city or county to avoid double counting. For the purposes of this Inventory, emissions associated with aircraft that directly impact air quality in the county – emissions in the LTO – were calculated.

**TABLE 3-8: AIRCRAFT GHG EMISSIONS BY SOURCE**

<b>Aircraft Emissions Sources 2005</b>	<b>San Luis Obispo</b>	<b>Paso Robles</b>	<b>Oceano</b>	<b>TOTAL</b>
CO <sub>2</sub> e (metric tons)	231	15	6	11,851
Percentage of Total CO <sub>2</sub> e	91.7%	6.0%	2.4%	100%
Energy Use (MMBtu)	n/a	n/a	n/a	n/a

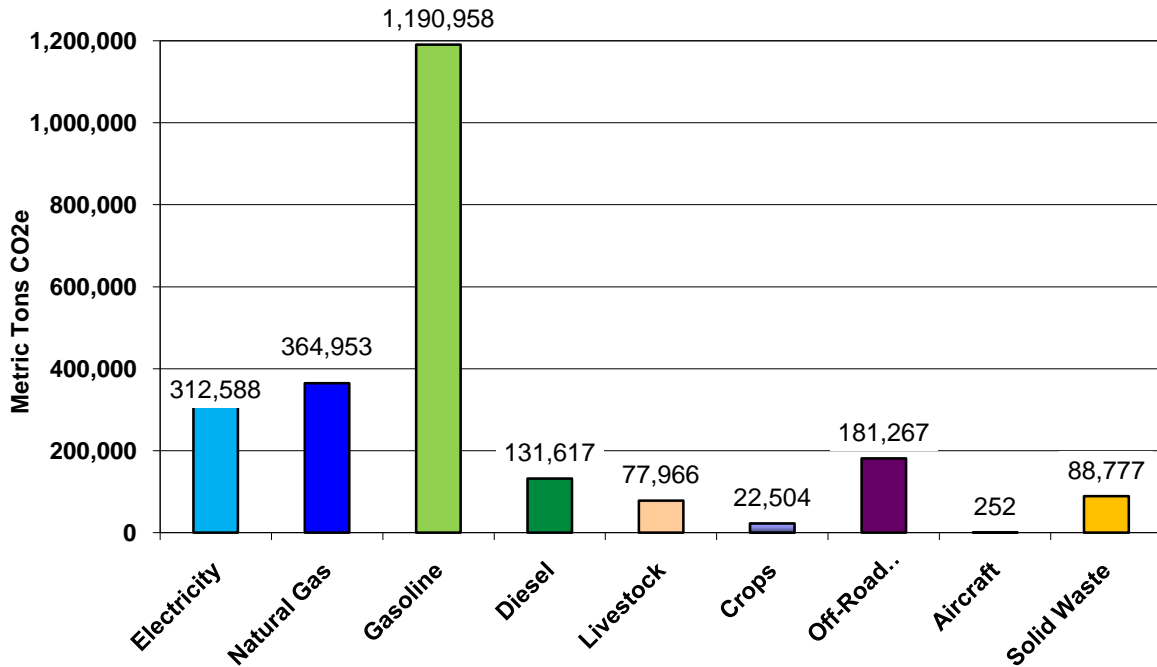
## COUNTYWIDE EMISSIONS BY SOURCE

In addition to viewing emissions by sector and by scope, policy and programs development can benefit from an analysis of emissions according to their raw fuel or waste source. **Figure 3-9** and **Table 3-9** below demonstrates that over half (50.2%) of all community emissions come

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

from the consumption of gasoline on local roads and highways. Natural gas (15.4%) and electricity (13.2%) consumption from the built environment are the next most significant figures, with the remainder coming from off-road equipment, diesel, agriculture, solid waste, and aircraft.

**FIGURE 3-9: COMMUNITY GHG EMISSIONS BY SOURCE**



**TABLE 3-9: COMMUNITY GHG EMISSIONS BY SOURCE**

Community GHG Emissions 2005 by Source	CO <sub>2</sub> e (metric tons)	CO <sub>2</sub> e (percent of total)
Electricity	312,588	13.2%
Natural Gas	364,953	15.4%
Gasoline	1,190,958	50.2%
Diesel	131,617	5.6%
Off-Road Equipment	181,267	7.6%
Solid Waste	88,777	3.7%
Livestock	77,966	3.3%
Crops	22,504	0.9%

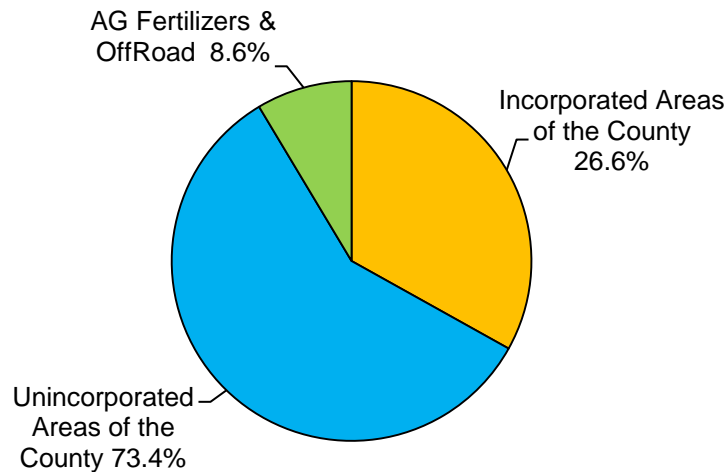
# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

Community GHG Emissions 2005 by Source	CO <sub>2</sub> e (metric tons)	CO <sub>2</sub> e (percent of total)
Aircraft	252	0.01%
TOTAL	2,370,882	100%

## COUNTYWIDE EMISSIONS BY JURISDICTION

The inclusion of additional off-road emission sources and fertilizer emissions at the countywide level that are not quantifiable for the individual jurisdictions prohibits the simple comparison of individual jurisdiction contributions to the countywide total. In order to assess each jurisdiction's relative contribution to the countywide total, the emissions from the Off-Road sector and Agricultural fertilizer emissions must be omitted. Excluding these two emission sources, the seven cities cumulatively produced 784,565 metric tons CO<sub>2</sub>e or approximately 33.1% of the Countywide total emissions, and unincorporated areas were responsible for 1,382,544 metric tons CO<sub>2</sub>e (58.3%). The remaining 230,777 metric tons CO<sub>2</sub>e or 8.6% were the result of Off-Road and fertilizer emissions that occurred throughout all jurisdictions (**Figure 3-10**).

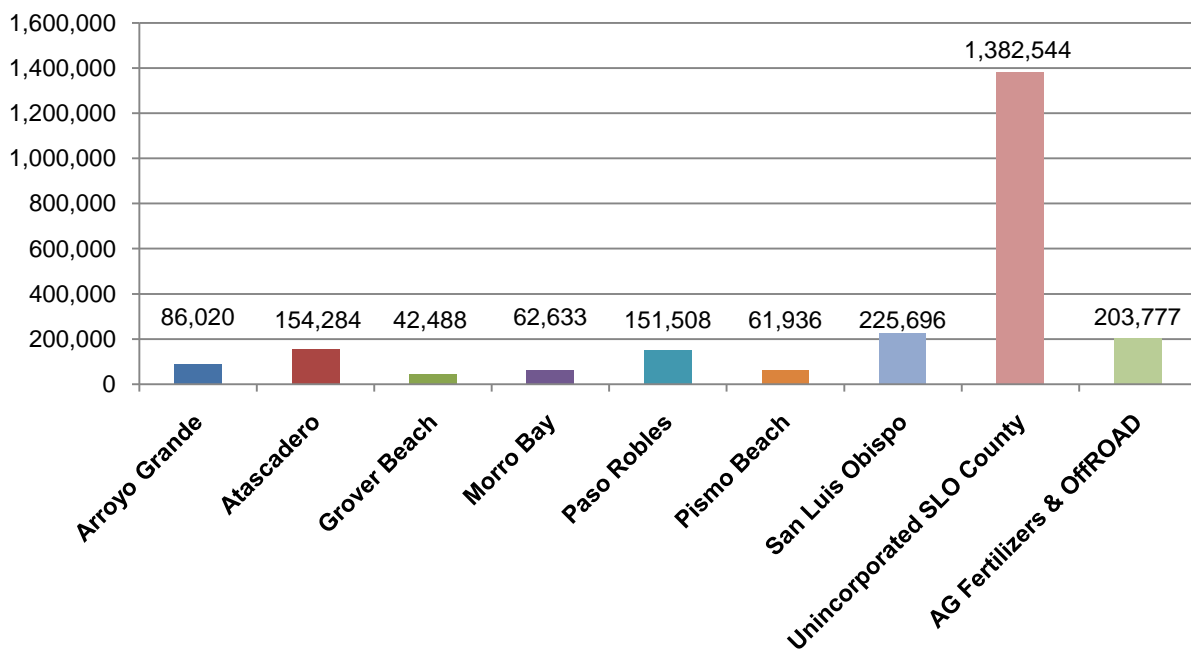
**FIGURE 3-10: CITY AND COUNTY PORTIONS OF COUNTYWIDE GHG EMISSIONS**



# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

The City of San Luis Obispo was the largest emitter of emissions amongst the seven cities accounting for 9.5% of the cumulative total or 225,696 metric tons of CO<sub>2</sub>e. The City of Atascadero was the next largest contributor (6.5%), followed by Paso Robles (6.4%), Arroyo Grande (3.6%), Morro Bay and Pismo Beach (2.6% each) and Grover Beach (1.8%) (Figure 3-11). The differences amongst cities can be attributed to resident and service population size, localized climate and climate-control energy needs, commercial/industrial characteristics, geographical land area and the number of highway miles within jurisdictional boundaries, and other features that would influence energy use, vehicle miles traveled, and waste stream.

**FIGURE 3-11: JURISDICTIONAL CONTRIBUTIONS TO COUNTYWIDE GHG EMISSIONS**



## 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 all off-road vehicles and equipment, which many inventories like the individual city GHG Inventory do not. Only when ICLEI, the California Air

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

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 county population in 2005 (260,770) yields a result of 9.09 metric tons CO<sub>2</sub>e per capita.<sup>13</sup> 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. It is also important to note that the per capita emissions numbers are calculated using resident populations, as reported in the San Luis Obispo Council of Governments Long Range Socio-Economic Projections Report, and total emissions. Because of the high number of unaccounted seasonal and weekend visitors in communities such as Pismo Beach and Morro Bay the per capita emissions appear high. **Table 3-10** compares the per capita emissions from the seven cities and unincorporated areas of the county.

**TABLE 3-10: PER CAPITA GHG EMISSIONS**

<b>2005 Community Emissions</b>	<b>Arroyo Grande</b>	<b>Atascadero</b>	<b>Grover Beach</b>	<b>Morro Bay</b>	<b>Paso Robles</b>	<b>Pismo Beach</b>	<b>San Luis Obispo</b>	<b>Unincorporated Areas of the County</b>
CO <sub>2</sub> e (metric tons)	86,020	154,284	42,488	62,633	151,508	61,936	225,696	1,382,544
2005 Population	16,330	25,940	13,100	10,310	27,580	8,620	42,660	100,390
Per Capita Emissions (MTCO <sub>2</sub> e)	5.27	5.95	3.24	6.07	5.649	7.19	5.29	13.77

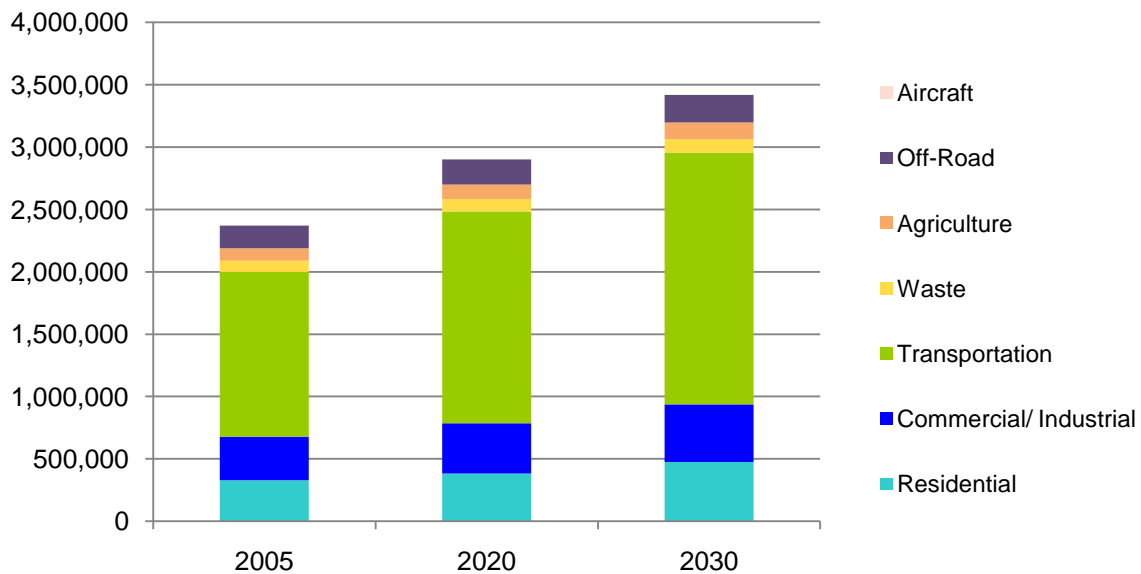
<sup>13</sup> Population in 2005 derived from the San Luis Obispo Council of Governments Long Range Socio-Economic Projections (Year 2025); July 2006 Revision.

# BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

## 4. Forecast

The emissions forecast for the countywide inventory represents a business-as-usual prediction of how countywide GHG levels will change over time if consumption trends and behavior continue as they did in 2005. These predictions are based on the inventory results included in this report and statistics on job, household, and population growth in the county. The analysis shows that if behavior and consumption trends continue as business-as-usual, emissions will reach 2,904,066 metric tons of CO<sub>2</sub>e by 2020, or a 22.5% increase over 2005 baseline levels (see **Figure 4-1**). By 2030 emissions will reach 3,419,030 metric tons of CO<sub>2</sub>e, or a 44.2% increase over 2005 baseline levels. The individual city inventories forecast an alternative year to reflect their respective General Plan build-out. For this inventory summary, 2030 was selected as the second forecast year. The second forecast year in this report is meant to demonstrate the business-as-usual emissions growth patterns and do not necessarily correspond with any city or county planning documents.

**FIGURE 4-1: 2020 AND 2030 BUSINESS-AS-USUAL PROJECTED GROWTH IN COUNTYWIDE GHG EMISSIONS**



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 2005, the results of which likely put the community's emissions on a track well below the business-as-usual linear projection.

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

Forecasts were performed by applying household, job, and population growth rates to 2005 countywide greenhouse gas emissions levels. Baseline data was obtained from a long-range projections report developed by the San Luis Obispo Council of Governments in 2006; estimated growth rates were obtained from the June 2009 revision of this document. The “mid-range” cases for population, job, and household growth were used in this forecast estimation.

## 5. Conclusion and Next Steps

San Luis Obispo County and the cities of Atascadero, Arroyo Grande, Grover Beach, Morro Bay, Pismo Beach, San Luis Obispo, and Paso Robles have each made a formal commitment to reduce their greenhouse gas emissions. The individual inventory reports lay the groundwork for those efforts by estimating baseline emission levels against which future progress can be demonstrated.

This analysis found that San Luis Obispo County, both incorporated and unincorporated areas, was responsible for emitting 2,370,886 metric tons of CO<sub>2</sub>e in the base year 2005, with the transportation sector contributing the most (55.9%) to this total. The City of San Luis Obispo was the largest contributor among the seven cities, emitting 225,696<sup>14</sup> metric tons CO<sub>2</sub>e. 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 County and City policies. If no action is taken, this report found that business-as-usual emissions will likely rise by 22.5% by 2020 and 44.2% by 2030.

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 2005 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 5-1** below shows the business-as-usual emissions forecast in relation to 2005 baseline levels and the 15% reduction below 2005 levels recommended by the State Attorney General and Air Resources Board.<sup>15</sup>

The difference between the business-as-usual forecast and the reduction targets is actually 37.5% in 2020 and 63.3% in 2030, which makes the State's recommended reduction goal

**If the community reduced GHG emissions by 888,813 metric tons of CO<sub>2</sub>e, what would that be equivalent to?**

- 191,984 passenger cars not driven for one year
- 2,044,269 barrels of oil saved
- 23,109,129 tree seedlings grown over 10 years

Source: [California Air Resources Board, "Conversion of 1 MMT CO<sub>2</sub> to Familiar Equivalents," Oct. 2007.](#)

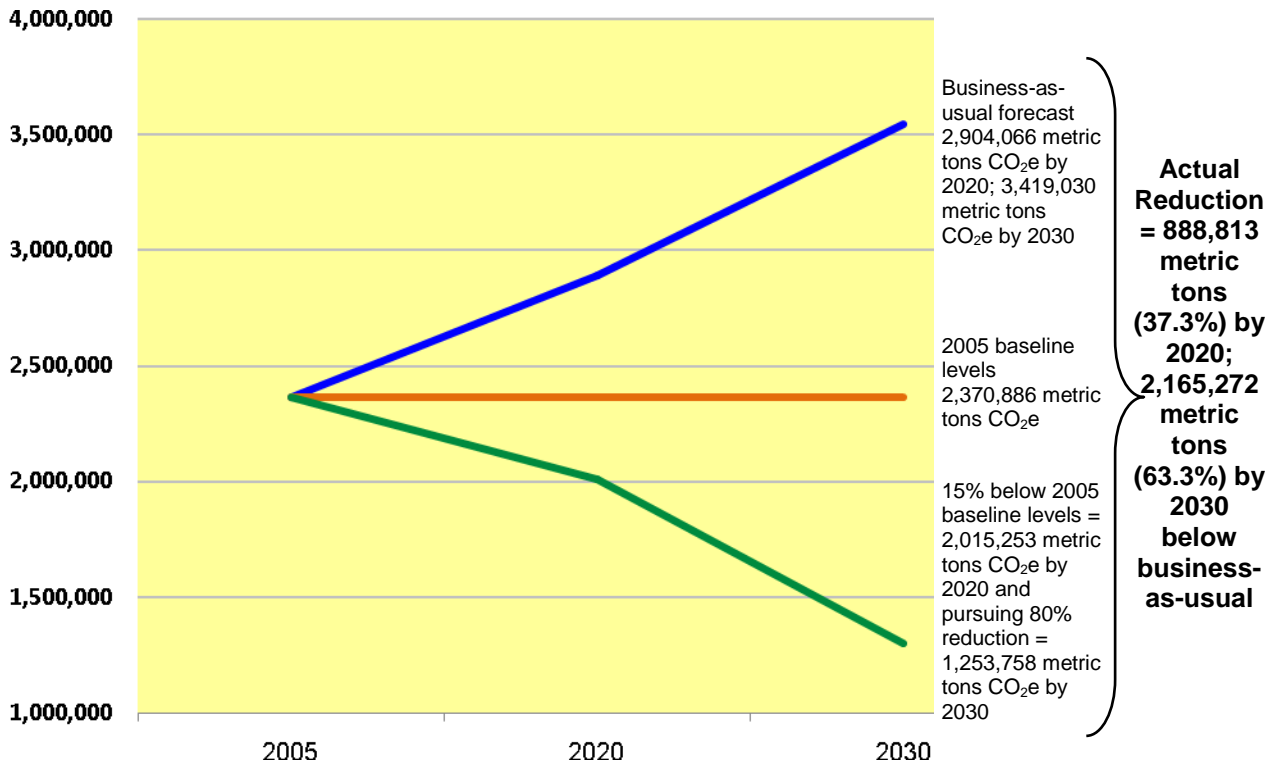
<sup>14</sup> The total emissions from each jurisdiction presented in this Inventory exclude Off-Road equipment, which is included only at the countywide level.

<sup>15</sup> The [AB 32 Climate Change Scoping Plan](#) Document prepared by the Air Resources Board calls for reducing greenhouse gas emissions to 1990 levels by cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 15 percent from today's levels.

# COMMUNITYWIDE EMISSIONS INVENTORY, 2005

challenging, but still feasible. As noted in the Forecast section, it is likely that the County and Cities' sustainability efforts have already caused emissions to fall below the business-as-usual linear projection line, thus making the reduction targets achievable.

**FIGURE 5-1: GHG FORECAST IN RELATION TO REDUCTION TARGETS**



As the County and Cities move forward to the next milestones in the process, including designation of emission reduction targets and development of Climate Action Plans, each jurisdiction should identify and quantify the emission reduction benefits of projects that have already been implemented since 2005, as well as the emissions reduction benefits of existing General Plan policies. The benefits of both existing strategies can be tallied against the baseline established in this report to determine the appropriate set of strategies that will deliver the County and Cities to their chosen emissions reduction goals.



**APPENDIX A:  
CACP2009 DETAILED REPORT FOR  
COUNTYWIDE EMISSIONS, 2005**





# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
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### Residential

#### San Luis Obsipo APCD, CA

##### 1 PG&E Residential Natural Gas Unincorporated

Natural Gas	718	1	68	720	0.0	13,530
<b>Subtotal 1 PG&amp;E Residential</b>	<b>718</b>	<b>1</b>	<b>68</b>	<b>720</b>	<b>0.0</b>	<b>13,530</b>

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" natural gas coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 11.7 lbs/therm of delivered natural gas, certified by the California Climate Action Registry and the CEC. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

2. PG&E provides natural gas to a minor portion of the unincorporated areas.

##### 1 SoCal Gas Co. Residential Natural Gas Arroyo Grande

Natural Gas	14,815	28	1,396	14,853	0.6	279,214
<b>Subtotal 1 SoCal Gas Co. Res</b>	<b>14,815</b>	<b>28</b>	<b>1,396</b>	<b>14,853</b>	<b>0.6</b>	<b>279,214</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO<sub>2</sub> Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set

##### 1 SoCal Gas Co. Residential Natural Gas Atascadero

Natural Gas	22,725	43	2,141	22,783	1.0	428,287
<b>Subtotal 1 SoCal Gas Co. Res</b>	<b>22,725</b>	<b>43</b>	<b>2,141</b>	<b>22,783</b>	<b>1.0</b>	<b>428,287</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO<sub>2</sub> Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>1 SoCal Gas Co. Residential Natural Gas Grover Beach</i>					
Natural Gas	9,246	17	871	9,270 0.4	174,256
<i>Subtotal 1 SoCal Gas Co. Res</i>	9,246	17	871	9,270 0.4	174,256

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

*1 SoCal Gas Co. Residential Natural Gas Morro Bay*

Natural Gas	9,810	18	924	9,835 0.4	184,884
<i>Subtotal 1 SoCal Gas Co. Res</i>	9,810	18	924	9,835 0.4	184,884

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

*1 SoCal Gas Co. Residential Natural Gas Paso Robles*

Natural Gas	23,088	44	2,176	23,147 1.0	435,123
<i>Subtotal 1 SoCal Gas Co. Res</i>	23,088	44	2,176	23,147 1.0	435,123

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>1 SoCal Gas Co. Residential Natural Gas Pismo Beach</i>					
Natural Gas	8,587	16	809	8,609 0.4	161,843
<i>Subtotal 1 SoCal Gas Co. Res</i>	<i>8,587</i>	<i>16</i>	<i>809</i>	<i>8,609 0.4</i>	<i>161,843</i>

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

*1 SoCal Gas Co. Residential Natural Gas SLO*

Natural Gas	31,062	59	2,927	31,142 1.3	585,418
<i>Subtotal 1 SoCal Gas Co. Res</i>	<i>31,062</i>	<i>59</i>	<i>2,927</i>	<i>31,142 1.3</i>	<i>585,418</i>

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

*1 SoCal Gas Co. Residential Natural Gas Unincorporated*

Natural Gas	62,901	119	5,927	63,062 2.7	1,185,474
<i>Subtotal 1 SoCal Gas Co. Res</i>	<i>62,901</i>	<i>119</i>	<i>5,927</i>	<i>63,062 2.7</i>	<i>1,185,474</i>

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

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

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>2 PG&amp;E Residential Electricity - Arroyo Grande</i>					
Electricity	8,772	197	520	8,844 0.4	134,931
<i>Subtotal 2 PG&amp;E Residential E</i>	8,772	197	520	8,844 0.4	134,931

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

*2 PG&E Residential Electricity Atascadero*

Electricity	15,768	355	935	15,897 0.7	242,538
<i>Subtotal 2 PG&amp;E Residential E</i>	15,768	355	935	15,897 0.7	242,538

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

*2 PG&E Residential Electricity Grover Beach*

Electricity	5,659	127	336	5,706 0.2	87,053
<i>Subtotal 2 PG&amp;E Residential E</i>	5,659	127	336	5,706 0.2	87,053

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>2 PG&amp;E Residential Electricity Morro Bay</i>					
Electricity	5,342	120	317	5,386 0.2	82,170
<i>Subtotal 2 PG&amp;E Residential E</i>	5,342	120	317	5,386 0.2	82,170

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

### *2 PG&E Residential Electricity Paso Robles*

Electricity	15,038	338	892	15,161 0.6	231,309
<i>Subtotal 2 PG&amp;E Residential E</i>	15,038	338	892	15,161 0.6	231,309

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

### *2 PG&E Residential Electricity Pismo Beach*

Electricity	5,297	119	314	5,340 0.2	81,476
<i>Subtotal 2 PG&amp;E Residential E</i>	5,297	119	314	5,340 0.2	81,476

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

### 2 PG&E Residential Electricity SLO

Electricity	20,671	465	1,226	20,841	0.9	317,968
<i>Subtotal 2 PG&amp;E Residential E</i>	20,671	465	1,226	20,841	0.9	317,968

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

### 2 PG&E Residential Electricity Unincorporated

Electricity	66,715	1,500	3,955	67,263	2.8	1,026,213
<i>Subtotal 2 PG&amp;E Residential E</i>	66,715	1,500	3,955	67,263	2.8	1,026,213

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
<b>Subtotal Residential</b>	326,214	3,566	25,733	327,860	13.8	5,651,684

### Commercial

#### San Luis Obsipo APCD, CA

##### 1 PG&E Commercial Natural Gas Unincorporated

Natural Gas	1,418	3	134	1,422	0.1	26,726
<b>Subtotal 1 PG&amp;E Commercial</b>	<b>1,418</b>	<b>3</b>	<b>134</b>	<b>1,422</b>	<b>0.1</b>	<b>26,726</b>

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" natural gas coefficient set is based on the 2005 PG&E eCO<sub>2</sub> emission factor of 11.7 lbs/therm of delivered natural gas, certified by the California Climate Action Registry and the CEC. Criteria air pollutant emissions factors for natural gas are derived from the US EPA's annual report of air pollution emission trends (USEPA, 2001c).

2. PG&E provides natural gas to a minor portion of the unincorporated areas.

3. This includes both the 260,975 therms that were used in the unincorporated areas and the 6,289 therms that were used in Districts.

##### 1 SoCal Gas Co. Commercial Natural Gas Arroyo Grande

Natural Gas	3,754	7	354	3,764	0.2	70,748
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>3,754</b>	<b>7</b>	<b>354</b>	<b>3,764</b>	<b>0.2</b>	<b>70,748</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.

2. Default Fuel CO<sub>2</sub> Set.

3. CEC Emission Factor for Natural Gas - RCI Average Set

##### 1 SoCal Gas Co. Commercial Natural Gas Atascadero

Natural Gas	6,438	12	607	6,455	0.3	121,340
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>6,438</b>	<b>12</b>	<b>607</b>	<b>6,455</b>	<b>0.3</b>	<b>121,340</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

## Community Greenhouse Gas Emissions in 2005 Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set

### 1 SoCal Gas Co. Commercial Natural Gas Grover Beach

Natural Gas	1,713	3	161	1,717	0.1	32,283
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>1,713</b>	<b>3</b>	<b>161</b>	<b>1,717</b>	<b>0.1</b>	<b>32,283</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

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

### 1 SoCal Gas Co. Commercial Natural Gas Morro Bay

Natural Gas	4,547	9	428	4,558	0.2	85,673
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>4,547</b>	<b>9</b>	<b>428</b>	<b>4,558</b>	<b>0.2</b>	<b>85,673</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

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

### 1 SoCal Gas Co. Commercial Natural Gas Paso Robles

Natural Gas	9,981	19	940	10,007	0.4	188,073
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>9,981</b>	<b>19</b>	<b>940</b>	<b>10,007</b>	<b>0.4</b>	<b>188,073</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

## Community Greenhouse Gas Emissions in 2005 Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set

### 1 SoCal Gas Co. Commercial Natural Gas Pismo Beach

Natural Gas	6,271	12	591	6,287	0.3	118,163
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>6,271</b>	<b>12</b>	<b>591</b>	<b>6,287</b>	<b>0.3</b>	<b>118,163</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Includes Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

### 1 SoCal Gas Co. Commercial Natural Gas SLO

Natural Gas	19,166	36	1,806	19,215	0.8	361,149
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>19,166</b>	<b>36</b>	<b>1,806</b>	<b>19,215</b>	<b>0.8</b>	<b>361,149</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

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

### 1 SoCal Gas Co. Commercial Natural Gas Unincorporated

Natural Gas	66,616	126	6,276	66,787	2.8	1,255,250
<b>Subtotal 1 SoCal Gas Co. Con</b>	<b>66,616</b>	<b>126</b>	<b>6,276</b>	<b>66,787</b>	<b>2.8</b>	<b>1,255,250</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set

### 2 PG&E Commercial + Industrial Electricity Arroyo Grande

Electricity	8,041	181	477	8,107	0.3	123,693
<i>Subtotal 2 PG&amp;E Commercial</i>	8,041	181	477	8,107	0.3	123,693

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

### 2 PG&E Commercial + Industrial Electricity Atascadero

Electricity	13,269	298	787	13,378	0.6	204,102
<i>Subtotal 2 PG&amp;E Commercial</i>	13,269	298	787	13,378	0.6	204,102

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

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# Community Greenhouse Gas Emissions in 2005

## Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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### 2 PG&E Commercial + Industrial Electricity Grover Beach

Electricity	3,925	88	233	3,957 0.2	60,370
<i>Subtotal 2 PG&amp;E Commercial</i>	3,925	88	233	3,957 0.2	60,370

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

### 2 PG&E Commercial + Industrial Electricity Morro Bay

Electricity	6,408	144	380	6,461 0.3	98,574
<i>Subtotal 2 PG&amp;E Commercial</i>	6,408	144	380	6,461 0.3	98,574

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>2 PG&amp;E Commercial + Industrial Electricity Paso Robles</i>					
Electricity	19,224	432	1,140	19,382 0.8	295,700
<i>Subtotal 2 PG&amp;E Commercial</i>	<i>19,224</i>	<i>432</i>	<i>1,140</i>	<i>19,382 0.8</i>	<i>295,700</i>

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.
2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

*2 PG&E Commercial + Industrial Electricity Pismo Beach*

Electricity	7,823	176	464	7,887 0.3	120,336
<i>Subtotal 2 PG&amp;E Commercial</i>	<i>7,823</i>	<i>176</i>	<i>464</i>	<i>7,887 0.3</i>	<i>120,336</i>

Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.
2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>2 PG&amp;E Commercial + Industrial Electricity SLO</i>					
Electricity	35,916	808	2,129	36,211 1.5	552,460
<b>Subtotal 2 PG&amp;E Commercial</b>	<b>35,916</b>	<b>808</b>	<b>2,129</b>	<b>36,211 1.5</b>	<b>552,460</b>

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

*2 PG&E Commercial + Industrial Electricity Unincorporated*

Electricity	72,174	1,623	4,279	72,767 3.1	1,110,193
<b>Subtotal 2 PG&amp;E Commercial</b>	<b>72,174</b>	<b>1,623</b>	<b>4,279</b>	<b>72,767 3.1</b>	<b>1,110,193</b>

## Source(s):

All PG&E data was provided by John Bohman, Pacific Gas and Electric Company Green Communities and Innovator Pilots; 415-973-0040 or jzbx@PGE.com.

## Notes:

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO<sub>2</sub>e emission factor of 0.489 lbs/kWh of delivered electricity. This emissions factor is certified by the California Climate Action Registry. Criteria air pollutant emission factors for electricity are derived from the NERC Region 13-Western Systems Coordinating Council/CNV Average Grid.

2. Commercial and Industrial electricity are combined due to the 15/15 Rule, which was adopted by the 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 and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled 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 once already using the 15/15 Rule, the customer be dropped from the information provided. In addition to the 15/15 Rule, the CPUC further determined that no information about customers with demands above 500 kW should be included in the distributed information.

<b>Subtotal Commercial</b>	<b>286,685</b>	<b>3,976</b>	<b>21,185</b>	<b>288,363 12.2</b>	<b>4,824,834</b>
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# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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### Industrial

#### San Luis Obsipo APCD, CA

##### 1 SoCal Gas Co. Industrial Natural Gas Arroyo Grande

Natural Gas	9	0	0	9 0.0	177
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>9 0.0</b>	<b>177</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

##### 1 SoCal Gas Co. Industrial Natural Gas Atascadero

Natural Gas	111	0	2	112 0.0	2,100
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>111</b>	<b>0</b>	<b>2</b>	<b>112 0.0</b>	<b>2,100</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

##### 1 SoCal Gas Co. Industrial Natural Gas Grover Beach

Natural Gas	140	0	3	140 0.0	2,640
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>140</b>	<b>0</b>	<b>3</b>	<b>140 0.0</b>	<b>2,640</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

### 1 SoCal Gas Co. Industrial Natural Gas Morro Bay

Natural Gas	30	0	1	30	0.0	570
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>30</b>	<b>0</b>	<b>1</b>	<b>30</b>	<b>0.0</b>	<b>570</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

### 1 SoCal Gas Co. Industrial Natural Gas Paso Robles

Natural Gas	2,780	5	52	2,783	0.1	52,400
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>2,780</b>	<b>5</b>	<b>52</b>	<b>2,783</b>	<b>0.1</b>	<b>52,400</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

### 1 SoCal Gas Co. Industrial Natural Gas SLO

Natural Gas	1,088	2	21	1,089	0.0	20,505
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>1,088</b>	<b>2</b>	<b>21</b>	<b>1,089</b>	<b>0.0</b>	<b>20,505</b>

Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
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## Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

*1 SoCal Gas Co. Industrial Natural Gas Unincorporated*

Natural Gas	57,100	108	1,076	57,156	2.4	1,076,142
<b>Subtotal 1 SoCal Gas Co. Indu</b>	<b>57,100</b>	<b>108</b>	<b>1,076</b>	<b>57,156</b>	<b>2.4</b>	<b>1,076,142</b>

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

## Source(s):

Southern California Gas Co. data provided by Colby Morrow, Air Quality Manager, Customer Programs Environmental Affairs; office:559.324.0109 or email CLMorrow@semprautilities.com.

## Notes:

1. Conversion of 1MCF=10 therms was used.
2. Default Fuel CO2 Set.
3. CEC Emission Factor for Natural Gas - RCI Average Set
4. Countywide Natural Gas Usage (therms) is the sum of usage in each of the incorporated cities and the unincorporated county.
5. Does not include Pismo Beach Industrial load which was aggregated with Commercial load by SoCal Gas Co.

<b>Subtotal Industrial</b>	61,260	115	1,155	61,320	2.6	1,154,534
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**Transportation****San Luis Obsipo APCD, CA***1 Highway VMT Arroyo Grande*

Diesel	1,059	6	296	1,067	0.0	14,522
Gasoline	9,368	819	1,517	9,653	0.4	137,884
<b>Subtotal 1 Highway VMT Arroy</b>	<b>10,426</b>	<b>825</b>	<b>1,813</b>	<b>10,720</b>	<b>0.5</b>	<b>152,405</b>

## Source(s):

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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classes to those used in CACP.

**Notes:**

-Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

### 1 Highway VMT Atascadero

Diesel	3,742	21	1,047	3,770	0.2	51,318
Gasoline	33,104	2,895	5,359	34,114	1.4	487,266
<i>Subtotal 1 Highway VMT Atasc</i>	36,846	2,916	6,406	37,884	1.6	538,584

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

### 1 Highway VMT Grover Beach

Diesel	232	1	65	234	0.0	3,184
Gasoline	2,054	180	332	2,116	0.1	30,229
<i>Subtotal 1 Highway VMT Grov</i>	2,286	181	397	2,350	0.1	33,413

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

### 1 Highway VMT Morro Bay

Diesel	1,395	8	390	1,405	0.1	19,128
Gasoline	12,339	1,079	1,998	12,715	0.5	181,619
<i>Subtotal 1 Highway VMT Morn</i>	13,734	1,087	2,388	14,121	0.6	200,747

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 Highway VMT Paso Robles*

Diesel	2,592	15	725	2,612	0.1	35,549
Gasoline	22,932	2,005	3,713	23,631	1.0	337,537
<b>Subtotal 1 Highway VMT Pasc</b>	<b>25,524</b>	<b>2,020</b>	<b>4,438</b>	<b>26,243</b>	<b>1.1</b>	<b>373,086</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 Highway VMT Pismo Beach*

Diesel	1,910	11	534	1,924	0.1	26,192
Gasoline	16,896	1,478	2,735	17,411	0.7	248,691
<b>Subtotal 1 Highway VMT Pism</b>	<b>18,805</b>	<b>1,488</b>	<b>3,270</b>	<b>19,335</b>	<b>0.8</b>	<b>274,883</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>1 Highway VMT SLO</i>					
Diesel	2,517	14	704	2,536 0.1	34,517
Gasoline	22,266	1,947	3,605	22,945 1.0	327,736
<b>Subtotal 1 Highway VMT SLO</b>	<b>24,782</b>	<b>1,961</b>	<b>4,309</b>	<b>25,481 1.1</b>	<b>362,252</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

- Highway mileage for the City of San Luis Obispo was re-calculated using methodology consistent with that utilized for other municipal inventories prepared for the APCD. Do to differing methodologies, highway mileage, and therefore emissions reported in the San Luis Obispo Municipal Inventory, prepared independently by the City of San Luis Obispo, will differ from those reported here.

- Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 Highway VMT Unincorporated*

Diesel	73,714	420	20,624	74,277 3.1	1,011,049
Gasoline	652,205	57,034	105,588	672,103 28.3	9,599,898
<b>Subtotal 1 Highway VMT Uninc</b>	<b>725,919</b>	<b>57,454</b>	<b>126,211</b>	<b>746,380 31.5</b>	<b>10,610,947</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 On-Road VMT Arroyo Grande*

Diesel	3,295	19	922	3,320 0.1	45,198
Gasoline	29,156	2,550	4,720	30,046 1.3	429,153
<b>Subtotal 1 On-Road VMT Arro</b>	<b>32,451</b>	<b>2,568</b>	<b>5,642</b>	<b>33,366 1.4</b>	<b>474,350</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

## Community Greenhouse Gas Emissions in 2005

### Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
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-Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

#### 1 On-Road VMT Atascadero

Diesel	4,742	27	1,327	4,778	0.2	65,040
Gasoline	41,956	3,669	6,792	43,236	1.8	617,554
<b>Subtotal 1 On-Road VMT Atas</b>	<b>46,698</b>	<b>3,696</b>	<b>8,119</b>	<b>48,014</b>	<b>2.0</b>	<b>682,594</b>

Source(s):

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

Notes:

-Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

#### 1 On-Road VMT Grover Beach

Diesel	1,630	9	456	1,643	0.1	22,364
Gasoline	14,426	1,262	2,336	14,866	0.6	212,341
<b>Subtotal 1 On-Road VMT Grov</b>	<b>16,057</b>	<b>1,271</b>	<b>2,792</b>	<b>16,509</b>	<b>0.7</b>	<b>234,705</b>

Source(s):

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

Notes:

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

#### 1 On-Road VMT Morro Bay

Diesel	1,910	11	534	1,925	0.1	26,202
Gasoline	16,902	1,478	2,736	17,418	0.7	248,788
<b>Subtotal 1 On-Road VMT Mor</b>	<b>18,813</b>	<b>1,489</b>	<b>3,271</b>	<b>19,343</b>	<b>0.8</b>	<b>274,990</b>

Source(s):

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board

## Community Greenhouse Gas Emissions in 2005 Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

-Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 On-Road VMT Paso Robles*

Diesel	4,244	24	1,187	4,276	0.2	58,209
Gasoline	37,550	3,284	6,079	38,695	1.6	552,698
<i>Subtotal 1 On-Road VMT Pasr</i>	41,794	3,308	7,266	42,972	1.8	610,907

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 On-Road VMT Pismo Beach*

Diesel	1,060	6	297	1,068	0.0	14,542
Gasoline	9,380	820	1,519	9,667	0.4	138,072
<i>Subtotal 1 On-Road VMT Pismr</i>	10,441	826	1,815	10,735	0.5	152,614

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

*1 On-Road VMT SLO*

Diesel	7,323	42	2,049	7,379	0.3	100,447
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## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
Gasoline	64,796	5,666	10,490	66,773	2.8	953,742
<b>Subtotal 1 On-Road VMT SLO</b>	<b>72,119</b>	<b>5,708</b>	<b>12,539</b>	<b>74,152</b>	<b>3.1</b>	<b>1,054,189</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

- Road mileage for the City of San Luis Obispo was re-calculated using methodology consistent with that utilized for other municipal inventories prepared for the APCD. Do to differing methodologies, road mileage, and therefore emissions reported in the San Luis Obispo Municipal Inventory, prepared independently by the City of San Luis Obispo, will differ from those reported here

-Diesel Heavy Duty Vehicles includes Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%.

- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

**1 On-Road VMT Unincorporated**

Diesel	19,256	110	5,387	19,403	0.8	264,110
Gasoline	170,371	14,899	27,582	175,569	7.4	2,507,717
<b>Subtotal 1 On-Road VMT Unin</b>	<b>189,627</b>	<b>15,008</b>	<b>32,969</b>	<b>194,972</b>	<b>8.2</b>	<b>2,771,827</b>

**Source(s):**

- Emissions factors for gas and diesel per vehicle class provided by EMFAC2007 v.2.3 run by Tom Scheffelin, California Air Resources Board Planning and Technical Support Division, TScheffee@arb.ca.gov. Manipulated by Jaime Hill, PMC, jhill@pmcworld.com to convert EMFAC vehicle classes to those used in CACP.

**Notes:**

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- Gasoline Passenger Vehicles includes Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%.

<b>Subtotal Transportation</b>	<b>1,286,321</b>	<b>101,808</b>	<b>223,645</b>	<b>1,322,578</b>	<b>55.8</b>	<b>18,802,494</b>
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**Waste**

**San Luis Obsipo APCD, CA**

**3 Solid Waste - Arroyo Grande**

*Disposal Method - Managed Landfill*

Paper Products	0	0	168,866	3,546	0.1	
Food Waste	0	0	66,454	1,396	0.1	
Plant Debris	0	0	17,797	374	0.0	
Wood or Textiles	0	0	49,613	1,042	0.0	
<b>Subtotal 3 Solid Waste - Arroy</b>	<b>0</b>	<b>0</b>	<b>302,730</b>	<b>6,357</b>	<b>0.3</b>	

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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## Source(s):

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

3. Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 157.47 mmcf/yr. Total gas transferred = 94.48 mmcf/yr.

Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 700 mmcf/yr. Total gas transferred = 400 mmcf/yr.

Paso Robles landfill reports a methane recovery factor of 50%. Paso Robles total gas generated = 129mmcf/yr. Total gas transferred = 64.5 mmcf/yr.

## Notes:

- Waste Type data not collected by landfill. State average waste characterization data is used for residential, commercial, and self haul waste.
- A weighted average of 57.23% is used for this calculation to account for the different recovery factor of Paso Robles Landfill and the percentage of the total waste generated.

**3 Solid Waste - Atascadero***Disposal Method - Managed Landfill*

Paper Products	0	0	259,514	5,450	0.2
Food Waste	0	0	101,777	2,137	0.1
Plant Debris	0	0	27,311	574	0.0
Wood or Textiles	0	0	76,210	1,600	0.1
<b>Subtotal 3 Solid Waste - Atasc</b>	<b>0</b>	<b>0</b>	<b>464,812</b>	<b>9,761</b>	<b>0.4</b>

## Source(s):

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

3. Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 157.47 mmcf/yr. Total gas transferred = 94.48 mmcf/yr.

Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 700 mmcf/yr. Total gas transferred = 400 mmcf/yr.

Paso Robles landfill reports a methane recovery factor of 50%. Paso Robles total gas generated = 129mmcf/yr. Total gas transferred = 64.5 mmcf/yr.

## Notes:

- Waste Type data not collected by landfill. State average waste characterization data is used for residential, commercial, and self haul waste.
- A weighted average of 57.23% is used for this calculation to account for the different recovery factor of Paso Robles Landfill and the percentage of the total waste generated.

**3 Solid Waste - Grover Beach***Disposal Method - Managed Landfill*

Paper Products	0	0	75,416	1,584	0.1
Food Waste	0	0	29,679	623	0.0
Plant Debris	0	0	7,948	167	0.0

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes)	(%)	Energy (MMBtu)
Wood or Textiles	0	0	22,157	465	0.0	
<i>Subtotal 3 Solid Waste - Grover</i>	0	0	135,201	2,839	0.1	

**Source(s):**

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

3. Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 157.47 mmcf/yr. Total gas transferred = 94.48 mmcf/yr.

Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 700 mmcf/yr. Total gas transferred = 400 mmcf/yr.

Paso Robles landfill reports a methane recovery factor of 50%. Paso Robles total gas generated = 129mmcf/yr. Total gas transferred = 64.5 mmcf/yr.

**Notes:**

1. Waste Type data not collected by landfill. State average waste characterization data is used for residential, commercial, and self haul waste.
2. A weighted average of 57.23% is used for this calculation to account for the different recovery factor of Paso Robles Landfill and the percentage of the total waste generated.

*3 Solid Waste - Morro Bay*

*Disposal Method - Managed Landfill*

Paper Products	0	0	77,029	1,618	0.1	
Food Waste	0	0	30,313	637	0.0	
Plant Debris	0	0	8,118	170	0.0	
Wood or Textiles	0	0	22,631	475	0.0	
<i>Subtotal 3 Solid Waste - Morro</i>	0	0	138,091	2,900	0.1	

**Source(s):**

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

*3 Solid Waste - Paso Robles*

*Disposal Method - Managed Landfill*

Paper Products	0	0	313,415	6,582	0.3	
Food Waste	0	0	123,338	2,590	0.1	
Plant Debris	0	0	33,031	694	0.0	
Wood or Textiles	0	0	92,081	1,934	0.1	
<i>Subtotal 3 Solid Waste - Paso</i>	0	0	561,865	11,799	0.5	

**Source(s):**

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

## Community Greenhouse Gas Emissions in 2005 Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

### 3 Solid Waste - Pismo Beach

*Disposal Method - Managed Landfill*

Paper Products	0	0	99,434	2,088	0.1
Food Waste	0	0	39,130	822	0.0
Plant Debris	0	0	10,479	220	0.0
Wood or Textiles	0	0	29,214	613	0.0
<b>Subtotal 3 Solid Waste - Pismo</b>	<b>0</b>	<b>0</b>	<b>178,258</b>	<b>3,743</b>	<b>0.2</b>

Source(s):

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, [pcron@iwma.com](mailto:pcron@iwma.com).

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

### 3 Solid Waste - SLO

*Disposal Method - Managed Landfill*

Paper Products	0	0	460,429	9,669	0.4
Food Waste	0	0	181,193	3,805	0.2
Plant Debris	0	0	48,525	1,019	0.0
Wood or Textiles	0	0	135,274	2,841	0.1
<b>Subtotal 3 Solid Waste - SLO</b>	<b>0</b>	<b>0</b>	<b>825,421</b>	<b>17,334</b>	<b>0.7</b>

Source(s):

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, [pcron@iwma.com](mailto:pcron@iwma.com).

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

### 3 Solid Waste - Unincorporated

*Disposal Method - Managed Landfill*

Paper Products	0	0	904,273	18,990	0.8
Food Waste	0	0	355,859	7,473	0.3
Plant Debris	0	0	95,302	2,001	0.1
Wood or Textiles	0	0	265,676	5,579	0.2
<b>Subtotal 3 Solid Waste - Uninc</b>	<b>0</b>	<b>0</b>	<b>1,621,110</b>	<b>34,043</b>	<b>1.4</b>

Source(s):

1. Total waste tonnage for the County in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, [pcron@iwma.com](mailto:pcron@iwma.com).

## Community Greenhouse Gas Emissions in 2005

### Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
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2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study.  
<http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097>

<b>Subtotal Waste</b>	0	0	4,227,488	88,777	3.7
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#### Other

##### San Luis Obsipo APCD, CA

##### 3 Agriculture - Crops

Nitrous Oxide	0	72,593	0	22,504	0.9
<b>Subtotal 3 Agriculture - Crops</b>	0	72,593	0	22,504	0.9

##### Notes:

- Crop data was gathered from the 2005 County Crop Report. For each crop category (i.e. Fruit and Nut, Vegetables, and Field Crops) the top three crops in acreage were identified.
- An average nitrogen fertilizer use for each crop was identified using University of California Cooperative Extension cost reports and the local Farm Advisor's office. A weighted average of nitrogen fertilizer was calculated for each crop category.
- An equation provided by the California Air Resources Board was used to calculate grams of N<sub>2</sub>O.
- Grams of N<sub>2</sub>O was entered into CACP to calculate CO<sub>2</sub>e.

##### 3 Airport - Oceano

Carbon Dioxide	0	0	0	0	0.0
Methane	0	0	218	5	0.0
Nitrous Oxide	0	3	0	1	0.0
<b>Subtotal 3 Airport - Oceano</b>	0	3	218	6	0.0

##### Notes:

- The Airport Cooperative Research Program (ACRP) Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, 2009.
- Make and model of aircraft, engine type, and number of annual Landing and Takeoff Operations (LTO) was provided by an engineering report prepared by the Air Pollution Control Board, 2008. This was a special report documenting airport activity in 2007. It was assumed that no significant changes in airport operations activity levels occurred during this time interval.
- The Federal Aviation Administration's (FAA) emission Dispersion Modeling System (EDMS 5.1.2) was used to calculate CO<sub>2</sub> emissions and fuel consumed with the LTO. CH<sub>4</sub> and N<sub>2</sub>O were calculated using fuel coefficients provided by the ACRP Guidebook.
- A total of 247,323.547 lbs of Aviation Gas (AvGas) was reported.
- A total of 0 lbs of Jet Fuel was reported.

##### 3 Airport - Paso Robles

Carbon Dioxide	1	0	0	1	0.0
Methane	0	0	495	10	0.0
Nitrous Oxide	0	12	0	4	0.0
<b>Subtotal 3 Airport - Paso Roble</b>	1	12	495	15	0.0

##### Notes:

# Community Greenhouse Gas Emissions in 2005

## Detailed Report

CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
-----------------------------	--------------------------	-------------------------	---------------------------------------	-------------------

- The Airport Cooperative Research Program (ACRP) Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, 2009.
- Make and model of aircraft, engine type, and number of annual Landing and Takeoff Operations (LTO) was provided by an engineering report prepared by the Air Pollution Control Board, 2008. This was a special report documenting airport activity in 2007. It was assumed that no significant changes in airport operations activity levels occurred during this time interval.
- The Federal Aviation Administration's (FAA) emission Dispersion Modeling System (EDMS 5.1.2) was used to calculate CO<sub>2</sub> emissions and fuel consumed with the LTO. CH<sub>4</sub> and N<sub>2</sub>O were calculated using fuel coefficients provided by the ACRP Guidebook.
- A total of 417,050.95845 lbs of Aviation Gas (AvGas) was reported.
- A total of 147,364.439 lbs of Jet Fuel was reported.

### 3 Airport - San Luis Obispo

Carbon Dioxide	5	0	0	5	0.0
Methane	0	0	8,226	173	0.0
Nitrous Oxide	0	174	0	54	0.0
<i>Subtotal 3 Airport - San Luis O</i>	5	174	8,226	231	0.0

#### Notes:

- The Airport Cooperative Research Program (ACRP) Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, 2009.
- Make and model of aircraft, engine type, and number of annual Landing and Takeoff Operations (LTO) was provided by an engineering report prepared by the Air Pollution Control Board, 2008. This was a special report documenting airport activity in 2007. It was assumed that no significant changes in airport operations activity levels occurred during this time interval.
- The Federal Aviation Administration's (FAA) emission Dispersion Modeling System (EDMS 5.1.2) was used to calculate CO<sub>2</sub> emissions and fuel consumed with the LTO. CH<sub>4</sub> and N<sub>2</sub>O were calculated using fuel coefficients provided by the ACRP Guidebook.
- A total of 3,297,074.50600 lbs of Aviation Gas (AvGas) was reported.
- A total of 3,714,067.182 lbs of Jet Fuel was reported.

### 3 Heads of Cattle and Sheep

Methane	0	0	3,712,671	77,966	3.3
<i>Subtotal 3 Heads of Cattle and Sheep</i>	0	0	3,712,671	77,966	3.3

#### Source(s):

- Livestock data obtained from the Department of Agriculture and reported in "Farming Operations" engineering report by Courtney Ward, July 22, 2008. Cattle and calve heads estimated at 89,000, and sheep and lamb heads estimated at 6,670.
- 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](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_ch10_Livestock.pdf)

#### Notes:

- CH<sub>4</sub> is attributed to the 89,000 cattle and 6,670 sheep in San Luis Obispo County (2005). 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 modeled (89,000\*75%)=66,750 cattle and (6,670 \*75%)=5002.5 sheep.
- All cattle were assumed to be in the Other/Meat Category of IPCC cattle categories as San Luis Obispo County does not raise cattle or calves for dairy uses. The only dairy in the County 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 CH<sub>4</sub> per head per year) for Other Cattle = 2. For sheep in temperate average temperatures (15 - 25 Degrees C) = 0.28.
- CATTLE: (66,750 heads \* 53 kg/head) + (66,750 heads \* 2 kg/head) = 3,537,750 + 133,500 = 3,671,250 kg/year
- SHEEP: (5,002.5 \* 8) + (5,002.5 heads \* 0.28) = 40,020 + 1,400.7 = 41,420.7 kg/year
- TOTAL: 3,671,250 + 41,420.7 = 3,712,670.7 kg/year

## Community Greenhouse Gas Emissions in 2005 Detailed Report

	CO <sub>2</sub> (tonnes)	N <sub>2</sub> O (kg)	CH <sub>4</sub> (kg)	Equiv CO <sub>2</sub> (tonnes) (%)	Energy (MMBtu)
<i>3 Off-Road Emissions</i>					
Carbon Dioxide	174,871	0	0	174,871 7.4	
Methane	0	0	94,260	1,979 0.1	
Nitrous Oxide	0	14,248	0	4,417 0.2	
<i>Subtotal 3 Off-Road Emissions</i>	174,871	14,248	94,260	181,267 7.6	
Source(S): -CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions calculated using the California Air Resources Board OFFROAD2007 modeling tool.					
Notes: -OFFROAD aggregates the emissions from the entire county from the following sources: recreation equipment, construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, agricultural equipment, airport ground support equipment, transport refrigeration units, oil drilling, military tactical support equipment, dredging, other portable equipment, entertainment equipment, railyard operations, and pleasure craft. Reported fuel types include: Gasoline 2-stroke and 4-stroke, Natural Gas 2-stroke and 4-stroke, and Diesel.					
<b>Subtotal Other</b>	174,876	87,030	3,815,869	281,989 11.9	
<b>Total</b>	2,135,355	196,496	8,315,075	2,370,885 100.0	30,433,547



**APPENDIX B:  
DETAILED METHODOLOGY FOR  
COUNTYWIDE INVENTORY**





# APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE 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 countywide analysis. The purpose of this appendix is to prove legitimacy of this Inventory, outline data limitations, and give guidance for future City 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 too unreliable to make an estimate.

#### **Residential**

PG&E and Southern California Gas Company (SoCal Gas Co.) provided residential electricity and natural gas consumption data. Specifically, data was provided by:

- John Bohman, Analyst with PG&E Green Communities and Innovator Pilots (jzbx@pge.com)
- Colby Morrow, Southern California Gas Company & San Diego Gas and Electric Company Air Quality Manager, Customer Programs Environmental Affairs (clmorrow@semprautilities.com)

The raw data received from these sources is summarized in the table below. This raw data was input into the CACP software in kWh and therms. CACP Average Grid Electricity, RCI Average, and Fuel CO<sub>2</sub> coefficient sets were amended per PG&E and state guidance (see “electricity and natural gas coefficients” section).

**TABLE 1: RESIDENTIAL ENERGY USE**

2005 Residential Energy Emissions	Scope	Input Data	Metric Tons CO <sub>2</sub> e per Year
PG&E Electricity	2	645,671,745 kWh	144,438
SoCal Gas Co. Natural Gas	1	34,344,964 Therms	183,421

## APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

### ***Commercial/Industrial***

Commercial and industrial electricity were combined into one section by PG&E 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% of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15% 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.

As a result, PG&E reports for commercial energy consumption also contained industrial consumption. SoCal Gas Co. 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 SoCal Gas Co. emissions were aggregated with commercial as well.

Data for this sector was provided by:

- John Bohman, Analyst with PG&E Green Communities and Innovator Pilots (jzbx@pge.com)
- Colby Morrow, Southern California Gas Company & San Diego Gas and Electric Company Air Quality Manager, Customer Programs Environmental Affairs (clmorrow@semprautilities.com)

Raw data received from these sources is reflected in the table below. CACP Average Grid Electricity, RCI Average, and Fuel CO<sub>2</sub> Coefficient Sets were amended to reflect California standards (see "electricity and natural gas coefficients" section).

# APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

**TABLE 2: COMMERCIAL/INDUSTRIAL ENERGY USE**

2005 Commercial/Industrial Energy Emissions	Scope	Input Data	Metric Tons CO <sub>2</sub> e per Year
PG&E Commercial + Industrial Electricity	2	751,670,638 kWh	168,150
SoCal Gas Co. Commercial Natural Gas	1	22,326,785 Therms	120,212
SoCal Gas Co. Industrial Natural Gas	1	11,545,343 Therms	61,320

### ***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 city's real impact on climate change, tailored coefficient sets for California were obtained. Sources and coefficient values are summarized in the table below.

**TABLE 3: PG&E COEFFICIENT SETS**

Coefficient Set	Unit	Value	Source
Average Grid Electricity Set	Lbs/MWh	489 CO <sub>2</sub>	John Bohman, Analyst with PG&E Green Communities and Innovator Pilots (jzbx@pge.com)
Marginal Grid Electricity Set	Lbs/MWh	489.16 CO <sub>2</sub> 0.00808 N <sub>2</sub> O 0.03024 CH <sub>4</sub>	Utility Pacific Gas and Electric coefficient set provided by CACP2009

# APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

**TABLE 4: SOCAL GAS CO. COEFFICIENT SETS**

Coefficient Set	Unit	Value	Source
Fuel CO <sub>2</sub> Set	kg/MMBtu	53.060	Coefficient set provided by CACP2009
RCI Average Set – Residential	kg/MMBtu	0.001 N <sub>2</sub> O 0.0059 CH <sub>4</sub>	Coefficient set created by the CEC and provided by SoCal Gas Co.
RCI Average Set - Commercial	kg/MMBtu	0.001 N <sub>2</sub> O 0.0059 CH <sub>4</sub>	Coefficient set created by the CEC and provided by SoCal Gas Co.
RCI Average Set - Industrial	kg/MMBtu	0.001 N <sub>2</sub> O 0.0059 CH <sub>4</sub>	Coefficient set created by the CEC and provided by SoCal Gas Co.

## TRANSPORTATION

### *Community On-Road VMT*

Community on-road vehicle miles traveled (VMT) are miles traveled on locally maintained roads within San Luis Obispo 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) 2005 Report. The raw data obtained from this report is reflected in the table below.

**TABLE 5: CALTRANS HPMS DATA FOR  
SAN LUIS OBISPO COUNTY, 2005**

San Luis Obispo County	Jurisdiction	Maintained Miles			Daily Vehicle Miles of Travel (DVMT) (1,000)		
		Rural	Urban	Total	Rural	Urban	Total
Cities	Arroyo Grande	0	58.52	58.52	0	199.7	199.70
	Atascadero	4.36	146.03	150.39	1.86	285.52	287.37
	Grover Beach	0	40.87	40.87	0	98.81	98.81
	Morro Bay	0	49.51	49.51	0	115.77	115.77
	Paso Robles	6.55	112.82	119.37	3.89	253.29	257.19
	Pismo Beach	0	45.47	45.47	0	64.25	64.25
	San Luis Obispo	0	121.08	121.08	0	443.81	443.81

# APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

San Luis Obispo County	Jurisdiction	Maintained Miles			Daily Vehicle Miles of Travel (DVMT) (1,000)		
		Rural	Urban	Total	Rural	Urban	Total
Other	County (unincorporated)	1,073.65	240.16	1,313.81	767.21	399.72	1,166.93
	State Highway	278.41	85.47	363.88	2,432.14	2,849.85	5,281.98
	State Park Service	20.56	1.7	22.26	1.85	5.78	7.63
	U.S. Fish & Wildlife Service	19.19	0	19.19	6.72	0	6.72
	U.S. Forest Service	42.5	0	42.5	1.28	0	1.28
<b>San Luis Obispo County Total</b>		<b>1,445.22</b>	<b>901.63</b>	<b>2,342.71</b>	<b>3,214.95</b>	<b>4,716.5</b>	<b>7,931.44</b>

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 decreased travel on weekends, which means this methodology is appropriate.

**TABLE 6: CALTRANS HPMS DATA ADJUSTED  
FOR ANNUAL VMT PER JURISDICTION, 2005**

City	Community On-Road Annual VMT
Arroyo Grande	72,890,500
Atascadero	104,890,050
Grover Beach	36,065,650
Morro Bay	42,256,050
Paso Robles	93,847,350
Pismo Beach	23,451,250
San Luis Obispo	161,990,650
Unincorporated County	425,929,450
Total	961,347,950

## APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

### **Highway VMT**

Highway VMT is also provided in the Caltrans HPMS report, aggregated at the county level. This analysis includes the following highways (SR = state route):

- US 101
- SR 41
- SR 166
- SR 1
- SR 46
- SR 227
- SR 33
- SR 58

**TABLE 7: STATE HIGHWAY VMT PER JURISDICTION, 2005**

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 CACP2009 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 city, 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 and 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.

## APPENDIX B: DETAILED METHODOLOGY FOR COUNTYWIDE INVENTORY

The EMFAC analysis was performed by the California Air Resources Board for San Luis Obispo 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 trucks” 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). Additionally, CACP2009 does not include categories for transit buses or motorcycles. To account for these vehicle types the fuel efficiency for the Diesel Heavy Duty Vehicles was manipulated to include Transit Buses, based on a weighted average of Trucks representing 98.7% of the category and Transit Buses representing 3.3%. Similarly, the emission factors for Gasoline Passenger Cars was manipulated to include Motorcycles, based on a weighted average of Passenger Vehicles representing 98.7% of the category and Motorcycles representing 1.3%. 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:

- **Heavy Truck:** LHDT1, LHDT2, HHDT, OB, MHDT
- **Light Truck/SUV/Pickup:** MDT
- **Passenger Vehicle:** Passenger Car, LDT1, LDT2
- **Transit Bus:** Urban Bus (UB), School Bus (SB)
- **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 life cycle emissions from waste generated within the jurisdictional boundary of the city in 2005. The analysis does not use the waste-in-place method, which calculates emissions from all waste generated in 2005 and all waste already existing in the landfill before the baseline year.

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The waste sector only takes into account the waste sent to landfills from city and 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 2005 since those landfills accept waste from areas outside of San Luis Obispo county.

Solid waste tonnage data per jurisdiction was provided by:

- “2005 Disposal Report” by quarter, prepared by the San Luis Obispo Integrated Waste Management Board on 3/6/06. Document provided by Peter Cron, San Luis Obispo County Integrated Waste Management Authority (pcron@iwma.com).

Since the composition of waste sent to landfill in 2005 is unknown, the following statewide average waste composition study was utilized:

- 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%
- Plant debris: 9.3%
- All other waste: 39.0%
- Food waste: 12.0%
- Wood/textiles: 19.2%

“Other” waste includes inorganic materials that will not break down in the anaerobic conditions present at landfills, and therefore do not release any of quantified greenhouse gases. The CACP software does not have the ability to assign an individual methane recovery factor to each landfill; therefore we took a weighted average (57%) based on the portion of waste in each landfill. The methane recovery factors of the landfills are well documented by the San Luis Obispo Air Pollution Control District based on the system operations at that time. The landfills have the following methane recovery factors:

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**TABLE 8: COMMUNITY GENERATED WASTE, 2005**

<b>Methane Recovery and Indicator Inputs, 2005</b>	<b>Methane Recovery</b>	<b>Total Gas Generated (mmcf/yr)</b>	<b>Total Gas Transferred (mmcf/yr)</b>	<b>Data Source</b>	<b>Waste Tonnage, 2005 (tons)</b>
Chicago Grade	60%	157.47	94.48	Data from APCD 2005 Inventory	65,433.78
Cold Canyon	60%	700.00	420.00	Data from APCD 2005 Inventory	115,399.73
Paso Robles	50%	129.00	64.50	Data from APCD 2005 Inventory	69,198.90

### ***Off-Road Equipment***

Off-road agricultural and recreational 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<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>, etc) for the entire county, including incorporated and unincorporated areas.

The OFFROAD software calculates emissions from agricultural equipment, recreational vehicles and watercrafts. 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.

### ***Agriculture***

This section includes emissions from cattle, sheep, and crop fertilizers in the county. 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. Emissions were estimated using the number of cattle, calves, and sheep from the San Luis Obispo County Department of Agriculture 2005 Crop Report.<sup>1</sup> The report stated that there

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<sup>1</sup> San Luis Obispo County Crop Report 2005

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were 95,000 heads of cattle and calves and 6,210 heads of sheep in San Luis Obispo in 2005. 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.<sup>2</sup> 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 Gas Inventories, as shown below.<sup>3</sup> 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 sheep, Tier 1, 2005	Cattle in the other/meat category (kg CH <sub>4</sub> /head/year)	Sheep (kg CH <sub>4</sub> /head/year)
Enteric Fermentation	53	8
Manure Management	2	0.28 <sup>4</sup>

Fertilizer emissions were calculated using an equation from the California Air Resources Board. Using the 2005 County Crop Report, the top three crops in acreage were identified for each crop group (i.e. Fruits and Nuts, Vegetables, and Field Crops). Due to the range of crops grown in the County, it was not feasible to gather fertilizer use data for each crop. Instead, the average amount of nitrogen fertilizer used in traditional farming practices was identified for the top three crops in each category using the University of California Cooperative Extension's cost study reports and the local Farm Advisor. Using a combination of U.C. Cooperative Extension resources and the local Farm Advisor ensured the data best represented the local soil conditions and microclimates within the county. A weighted average of fertilizer use was calculated for each crop category and entered into the ARB equation. The total amount of nitrous oxide was entered into CACP2009 to get total CO<sub>2</sub>e.

<sup>2</sup> US EPA, Ruminant Livestock FAQ

<sup>3</sup> IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Livestock

<sup>4</sup> For Sheep in temperate average temperatures (15-25 degrees C)

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The Inventory adjusts for agricultural nitrogen fertilizer for organic crops. In 2005, the county had 4,493 acres of organic crops. Research has indicated approximately 60 percent reduction in nitrogen fertilizer use in organic farming practices compared to traditional farming practices.

### ***Aircraft***

Aircraft travel was calculated in an engineering report prepared by the Air Pollution Control District in 2007. This emission category accounts for all aircraft exhaust emissions, excluding agricultural crop dusting. The operating emissions considered were those that occur below 3,000 feet, the average mixing depth in the U.S., which is also the assumed inversion height. Data for the report was obtained from the three operating commercial airports in the county; San Luis Obispo, Oceano, and Paso Robles Municipal Airport (references cited in report).

The emissions calculated in the engineering report are CO, HC, VOC, NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. However, since only CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub> are included in the CACP calculation of carbon dioxide equivalent (CO<sub>2</sub>e), the emissions from aircraft takeoffs and landings are not shown as a source of emissions in this report.

### **2020 AND 2030 FORECAST**

The 2020 and 2030 forecasts calculate business-as-usual growth based on population, job, and household growth rates. Employment and population baseline data was 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. Employment and population projections were obtained from the May 2009 revision. Mid-range estimates of growth were used in both instances (**Figures 4 and 10**). It should be noted that these forecasts do not take into consideration any planned or actual efficiency or conservation measures after 2005. For example, the State Renewable Energy portfolio has advanced significantly since 2005, but the forecast calculates 2020 energy emissions by assuming constant emissions factors.