



To: **Calistoga Community Resources Commission**  
From: Napa County-wide Climate Action Plan Project Team  
Date: January 12, 2009

***Re: DRAFT Greenhouse Gas Emissions Inventory for the City of Calistoga and Napa County***

On November 18, 2008, the International Council for Local Environmental Initiatives (ICLEI) and the Bay Area Air Quality Management District (BAAQMD) hosted a technical workshop at the Napa County Transportation and Planning Agency (NCTPA) for the purpose of generating preliminary greenhouse gas (GHG) baseline emissions inventories for all six Napa County jurisdictions. All six Napa County jurisdictions were present. This memo summarizes the results of this workshop.

## **I. Emissions Inventory**

The baseline inventory was produced by ICLEI in partnership with the Napa County Climate Action Plan consultants (MIG and the Climate Protection Campaign) and staff from NCTPA and all six Napa County jurisdictions. The purpose of the baseline emissions inventory is to determine the levels of greenhouse gas emissions emitted in Napa County in 2005, the established base year for analysis and forecasting.

ICLEI's Cities for Climate Protection inventory methodology allows local governments to systematically estimate and track greenhouse gas emissions from transportation, energy and waste related activities at the community-wide scale.

Once completed, these inventories provide the basis for creating an emissions forecast and reduction target, and enable the quantification of emissions reductions associated with implemented and proposed measures.

### **1. ICLEI's Emissions Analysis Software**

To facilitate local government efforts to identify and reduce greenhouse gas emissions, ICLEI developed the Clean Air and Climate Protection (CACP) software package. This software estimates emissions derived from energy consumption and waste generation within a community. The CACP software determines emissions using specific factors (or coefficients) according to the type of fuel used. Emissions are aggregated and reported in terms of carbon dioxide equivalent units, or CO<sub>2</sub>e. Converting all emissions to carbon dioxide equivalent units allows for the consideration of different greenhouse gases in comparable terms. For example,

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methane is twenty-one times more powerful than carbon dioxide in its capacity to trap heat, so the model converts one ton of methane emissions to 21 tons of CO<sub>2</sub>e.

The emissions coefficients and methodology employed by the software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National GHG Emissions Inventories), the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form 1605), and, for emissions generated from solid waste, the U.S. EPA's Waste Reduction Model (WARM).

The CACP software has been and continues to be used by over 250 U.S. local governments to reduce their greenhouse gas emissions. However, it is worth noting that, although the software provides all Napa County jurisdictions with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. *The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation rather than an exact value.*

## 2. Inventory Data Sources and Creation Process

An inventory of greenhouse gas emissions requires the collection of information from a variety of sectors and sources. Here is a brief summary of the data sources. (For an in-depth review of data sources, methods and protocols used to compute the GHG emissions please see the Community Greenhouse Gas Emissions Inventory Methodology for Bay Area Local Governments prepared by ICLEI for the November 18, 2008, Napa County Community Technical Workshop.)

### **Built Environment: Residential, Commercial and Industrial Sectors**

#### Data Sources

- Utility electricity and natural gas consumption for 2005 was provided by PG&E. Data is reported at an aggregate level for each sector – Residential, Commercial and Industrial (Commercial and Industrial are often bundled together for privacy reasons.)
- Countywide Direct Access electricity consumption (purchased directly from the power generator, not through PG&E) for Napa County was obtained from the California Energy Commission.

#### What is not included in this data?

- Fuel sources not delivered by PG&E. For example, wood, charcoal, propane, kerosene, diesel, heavy fuel oil, etc. In California, this largely results in an exclusion of industrial process emissions.
- Perfluorocarbons (PFCs), Hydrofluorocarbons (HFCs), Sulfur Hexafluoride (SF<sub>6</sub>) This data is typically prohibitively difficult to obtain.



## Waste Sector

### Data Sources

- *Landfill Emissions*: total captured and fugitive emissions (methane emissions) released from any landfills located in your jurisdiction in the baseline year
- *Lifetime Decomposition Associated with Waste Generated*: total emissions (methane emissions) from solid waste generated in your jurisdiction in the baseline year that was sent to landfills regardless of whether they are located within or outside of your jurisdiction's boundaries
- Total emissions (methane emissions) from the Alternative Daily Cover (ADC) used in the landfills where the waste generated in your jurisdiction is disposed.

### What is not included in this data?

- Any GHG emissions from fossil-based products (incineration or decomposition) are not included nor are GHG emissions from organic waste handling and decay because they are considered to be biogenic in origin.

## Transportation/Mobile Emissions Sector

### Data Sources

- Local Roads 2005 Vehicle Miles Traveled (VMT) data was obtained from CalTrans, which compiles and published statewide VMT data annually through the Highway Performance Monitoring System.<sup>6</sup> CalTrans obtains local roads VMT data from regional transportation planning agencies and councils of governments across the state. For the San Francisco Bay Area, CalTrans obtains data from the Metropolitan Transportation Commission (MTC). MTC obtains data on local roads VMT either from the local governments within its jurisdiction or, if that data is unavailable, through a CalTrans model.
- State Highways Vehicle Miles Traveled (VMT) 2005 data was also obtained from CalTrans, with daily VMT by road segment.
- Off Road non-point source emissions were obtained by the California Air Resources Board

### What is not included in this data?

- Emissions associated with port or airport operations.
- Rail transit emissions.
- This methodology will not reflect the use of any fuels besides gasoline and diesel.
- Perfluorocarbons (PFCs), Hydrofluorocarbons (HFCs), Sulfur Hexafluoride (SF<sub>6</sub>) This data is typically prohibitively difficult to obtain.

In short, after some initial manipulation of the raw data from these sources, these data were entered into the CCAP software to generate a community emissions inventory. The community inventory represents an estimated overview of the energy used and waste produced within Napa County and its contribution to greenhouse gas emissions.

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<sup>6</sup> The 2005 report is available at: <http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2005PRD.pdf>.



The Community-scale Calistoga inventory is based on the year 2005. When calculating the emissions inventory, all energy consumed in Calistoga was included. This means that, even though the electricity used by local residents is produced elsewhere, this energy and emissions associated with it is accounted for in this inventory. The decision to calculate emissions in this manner reflects the general philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

## II. Inventory Results

### *Calistoga and Overall Napa County GHG Emissions Inventory Results*

The GHG emissions inventory results for both the City of Calistoga and all of Napa County are shown in Table 1 below.

**Table 1: City of Calistoga and Napa County GHG Emissions (2005)**

City of Calistoga			Napa County	
<i>Emissions by Sector</i>	<i>CO2e emissions (metric tons)</i>	<i>Percent of total</i>	<i>CO2e emissions (metric tons)</i>	<i>Percent of total</i>
Residential	7,758	27.4%	196,350	16.8%
Commercial/ Industrial	7,062	25.0%	226,661	19.4%
On-Road Vehicles	8,704	30.8%	636,724	54.5%
Off-Road Garden	151	0.5%	3,616	0.3%
Off-Road Industrial/Commercial	1,949	6.9%	49,675	4.3%
Solid Waste	2,671	9.4%	54,209	4.6%
<b>TOTAL</b>	<b>28,295</b>		<b>1,167,235</b>	

Source ICLEI CCAP Software

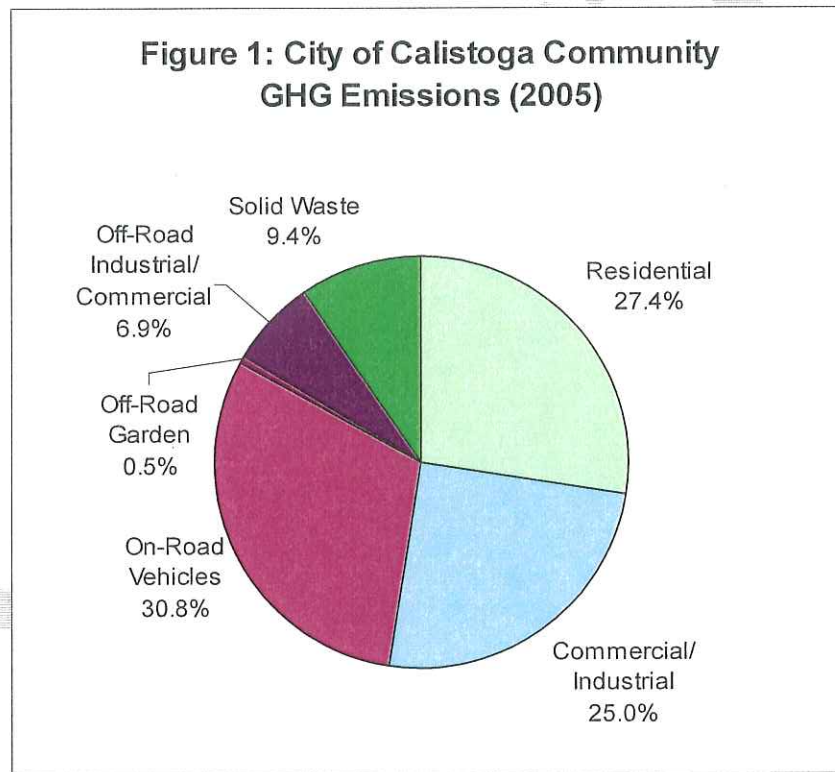
A unique characteristic of the City of Calistoga GHG emissions profile is the relatively small percentage attributed to the transportation sector (30.8% for on-road vehicles)

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relative to the transportation sector total for Napa County (54.5%). Conversely, the percentage of GHG emissions attributed to Calistoga’s built environment (52.4% for the residential and commercial/industrial sectors combined) is significantly higher than the total for the entire County (36.2%). This suggests that action plan measures focused on cost-effective energy conservation and efficiency and a green building ordinance may have a much greater GHG reduction impact in the City of Calistoga compared to other jurisdictions in Napa County.



### III. Forecast for Greenhouse Gas Emissions

Forecasting emissions to a projected target year (most often 2020) is done to create a more accurate picture of the emission reductions necessary to meet desired targets. Because of population increase, as well as growth in the jobs and transportation sectors, emissions will experience a background change not related to policy changes made by the local government. When creating an emissions reduction target, it is therefore



important to consider not only emissions in the base year, but projected emissions in the target year, as these will need to be accounted for in the policies and measures taken to reduce GHG emissions in Calistoga.

To assist in the forecast, ICLEI provides a forecasting tool based on Household, Population, and Job forecasts from ABAG's policy-based *Projections 2005*. The ABAG 2005 growth projections have been revised downward slightly for 2007. Since 2005 was used as the baseline year, this same year was used for forecasting. However, before finalizing target reductions for each sector, the most recent projection data will be used. (For an in-depth review of data sources and methods and protocols used to compute the GHG emissions please see the Community Greenhouse Gas Emissions Inventory Methodology for Bay Area Local Governments prepared by ICLEI for the November 18, 2008, Napa County Community Technical Workshop.)

The below Table 2 and Figure 2 show the forecasted growth in GHG emissions in the City of Calistoga by sector. The forecasted growth assumes that the City does not take any action to reduce emissions.

**Table 2: City of Calistoga GHG Emissions Growth Forecast (2005 to 2020)**

<i>Emissions Growth Forecast by Sector</i>	<i>2005</i>	<i>2020</i>	<i>Annual Growth Rate</i>	<i>Percent Change from 2005 to 2020</i>
<b>Residential</b>	7,758	8,022	0.223%	3.4%
<b>Commercial/ Industrial</b>	7,062	7,486	0.390%	6.0%
<b>On-Road Vehicles</b>	8,704	10,896	1.509%	25.2%
<b>Off-Road Garden</b>	151	156	0.223%	3.4%
<b>Off-Road Industrial/Commercial</b>	1,949	2,066	0.390%	6.0%
<b>Solid Waste</b>	2,671	2,722	0.127%	1.9%
<b>TOTAL</b>	<b>28,295</b>	<b>31,348</b>	<b>0.685%</b>	<b>10.8%</b>

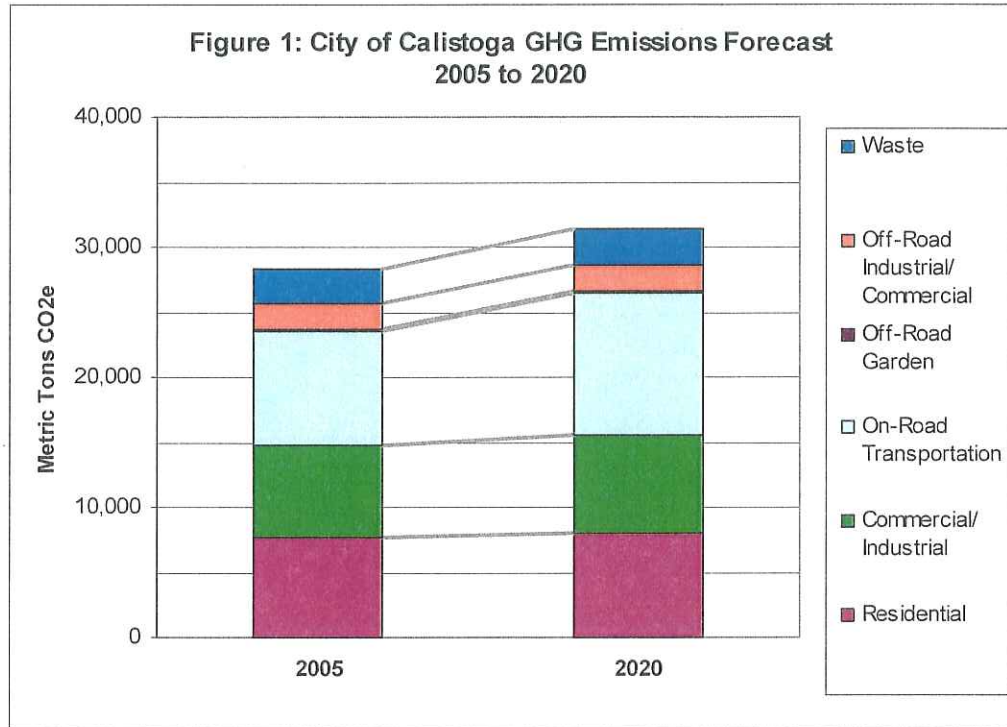
Source ICLEI CCAP Software

The portion of countywide greenhouse gas emissions from Calistoga is expected to remain stable at 2% over the next 15 years. The City's GHG emissions growth rate of 10.8% is expected to be significantly lower than the countywide growth rate of 22.8%.

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The compounded annual growth rate (CAGR) of 1.509% for the on-road vehicle or transportation sector is a statewide projection derived from the California Energy Commission report titled, Transportation Energy Forecasts for the 2007 Integrated Energy Policy Report. The annual growth rates for all of the other sectors are determined using the ABAG Projections 2005 summarized in Table 3 below.

**Table 3: ABAG 2005 to 2020 Growth Projections for the City of Calistoga**

2005 Population	5,200
2020 Population	5,300
<b>15 Year CAGR (%):</b>	<b>0.127%</b>
2005 Jobs	2,830
2020 Jobs	3,000
<b>15 Year CAGR (%):</b>	<b>0.390%</b>
2005 HH	2,060
2020 HH	2,130
<b>15 Year CAGR (%):</b>	<b>0.223%</b>