

Issue Paper on Greenhouse Gas Emissions and Reduction Strategies

City of Calabasas General Plan Update



CITY *of* CALABASAS

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BACKGROUND INFORMATION

What are greenhouse gases?

The primary greenhouse gas (GHG) of concern is carbon dioxide (CO₂). Other common greenhouse gases include methane (CH₄) and nitrous oxide (N₂O). Different greenhouse gases have different “strengths” in terms of global warming, known as their global warming potential. While the global warming potential of CO₂ is less than that of many other gases, CO₂ is so abundant that even with all emissions standardized to CO₂ equivalents, CO₂ represents approximately 85% of U.S. greenhouse gas emissions.¹

How do greenhouse gases cause global warming?

Greenhouse gases produced by various activities are released into the atmosphere, where they trap heat, creating a greenhouse effect for the Earth. The average surface temperature of the Earth has risen by 1.3°F since 1900, and scientific consensus is that the increased concentration of greenhouse gases in the atmosphere has been a major contributor. With the increasing concentration of greenhouse gases in the atmosphere, an accelerated warming of 2.5 to 10.4°F is expected by 2100.²

What is the difference between “global warming” and “climate change”?

While the two terms are often used interchangeably, it is helpful to understand the subtle difference between them. Global warming refers to the overall increase in the average temperature of the Earth’s surface, as described in the above section. Climate change refers to the different changes in climate that may result from global warming. In other words, the planet as a whole is warming, but that does not mean that all regions of the world will become warmer. Instead, due to complex climate patterns, some regions may become cooler, some warmer, some wetter, and some drier.

Where do greenhouse gases come from?

The United States is responsible for over 25% of the world’s greenhouse gas emissions. The majority of greenhouse gas emissions currently produced in the U.S. are produced by burning fossil fuels such as coal and oil for energy.³ Examples of burning fossil fuels for energy include power plants burning coal to create electricity for home lighting and air conditioning, and automobile engines burning gasoline. In California, over 70% of greenhouse gas emissions come from burning fossil fuels. Over 50% of total greenhouse gas emissions in the state are from vehicle exhaust (Figure 1).⁴

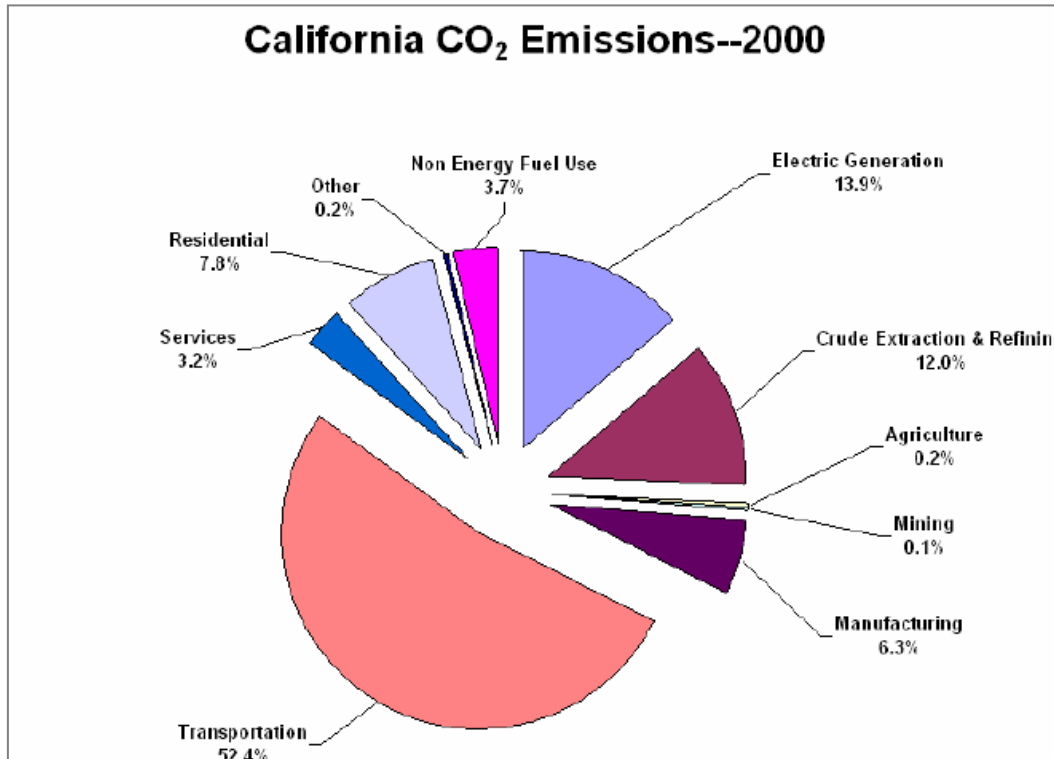


Figure 1: Breakdown of California's Greenhouse Gas Emissions Sources
Source: California Energy Commission

WHY SHOULD CALABASAS BE CONCERNED WITH GLOBAL WARMING?

Policy Trends

While the U.S. has not yet adopted strong national legislation regarding greenhouse gas emissions, there are several bills proposed in the current Congress that address this issue.⁵ The European Union has put a cap on carbon dioxide emissions and is implementing broad national programs to meet emissions reduction goals.⁶ In the U.S., local and state governments have largely taken the lead on climate change policy. Over 400 mayors, representing over 60 million Americans, have signed commitments to reduce greenhouse gas emissions from their cities by at least 7% from 1990 levels by 2012.⁷ A number of states, including California, Connecticut, Illinois, Massachusetts, New Jersey, New York and Washington, have also set emissions reduction targets.⁸

In 2006, the state of California passed the Global Warming Solutions Act, AB 32. The effects of this legislation have already been felt by local jurisdictions throughout the state. In October 2006, San Bernardino County received a letter from the California Attorney General's Office, stating that the county's recently completed general plan and



the associated environmental review were not adequate because the planners failed to consider climate change impacts in the documents. Orange County received a similar letter in March 2006 regarding the county's long term transportation plan.⁹

In their letter to the County of San Bernardino, the Attorney General's Office stated, "AB 32 requires both reporting of greenhouse gas emissions and their reduction on a brisk time schedule, including a reduction of carbon dioxide emissions to 1990 levels by 2020. Local governments will be called upon to help carry out the legislation's provisions, and its General Plan revision is the appropriate place for the County to identify both carbon dioxide and other greenhouse gas sources, as well as actions for mitigation of the increases in emissions in greenhouse gases resulting from actions set forth in the General Plan revision."

Climate Trends

The warmer temperatures and decreasing Sierra Nevada snowfall experienced in California in recent years have been labeled as early effects of climate change. According to a 2006 report from the California Climate Change Center at UC Berkeley, these effects will become more apparent by 2030 as greenhouse gases already in the atmosphere persist and cause further warming.

As a result of higher temperatures, increased strain on electricity supplies necessary to meet the demand for summer air-conditioning is predicted in the hottest parts of the state. Calabasas could suffer from electricity shortages as a result of increased temperatures. Higher temperatures are also expected to contribute to worsened air quality.

Another global warming impact predicted in California is increased frequency and intensity of extreme weather events such as wildfires, heat waves, and flooding. Some of California's most prosperous and popular industries – agriculture, wine, tourism, and skiing – are especially threatened by climate change.¹⁰

Greenhouse gas emissions mix in the atmosphere; therefore, emissions from anywhere in the world affect the climate everywhere.¹¹ Consequently, greenhouse gas emissions from Calabasas may contribute to the detrimental effects of global warming not just in Calabasas itself, but across California, the U.S., and the world. It is not possible to immediately reverse the warming trend and the City can play only a minor part in the solution to this global issue; nevertheless, the City can take various actions to limit its contribution to the problem by reducing greenhouse gas emissions within the city.

WHAT CALABASAS CAN DO

1. Conduct a greenhouse gas emissions inventory.

An important first step in addressing greenhouse gas emissions issues is to conduct an inventory of greenhouse gas emissions produced in the community. An inventory is necessary to establish a baseline level of emissions so that changes can be measured over time. An inventory would also reveal how much different sources contribute to the



total emissions from Calabasas, so that emissions reduction measures can be prioritized.

Figure 2 provides an example of the type of information that can be gained from a greenhouse gas emissions inventory. This figure represents the breakdown of emission sources for the town of Berlin in Central Connecticut.¹²

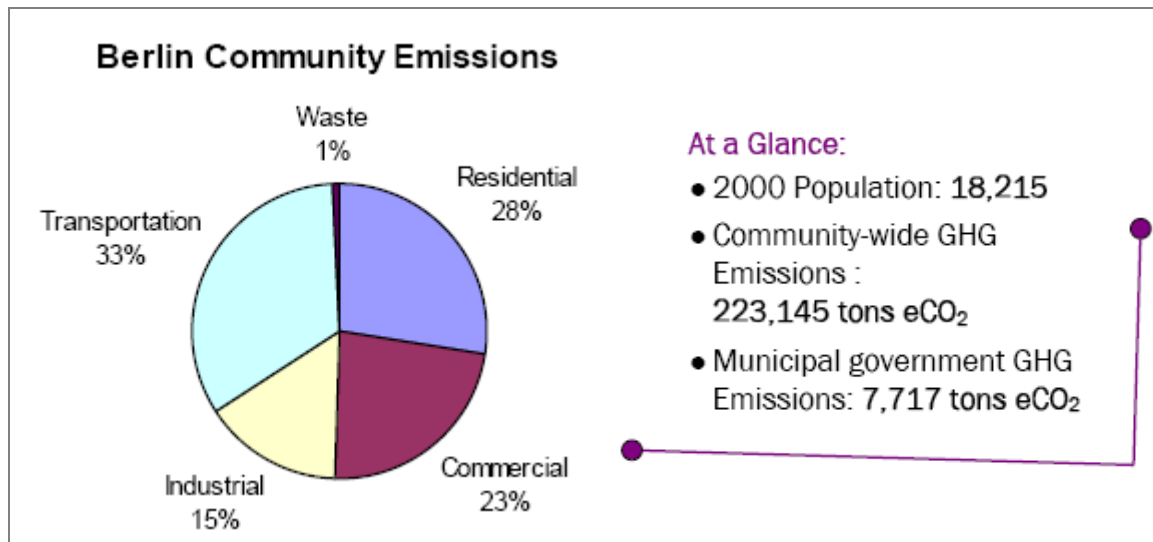


Figure 2: Information Produced by a Greenhouse Gas Inventory
Source: Central Connecticut Regional Planning Agency

A popular source of information on how to conduct a local greenhouse gas emissions inventory is the Cities for Climate Protection initiative (CCP), coordinated by the non-profit organization ICLEI – Local Governments for Sustainability. Over 170 US cities have joined CCP in an effort to reduce greenhouse gas emissions in their communities.

The CCP approach to emissions inventories emphasizes a detailed inventory of municipal government emissions as well as a broader citywide inventory that covers all sectors. The detailed local government inventory can incorporate cost estimates so that city officials can consider financial impacts when weighing different emissions reduction strategies. By conducting an inventory of its own emissions, a local government can then set an example for residents and businesses by committing to a specific reduction target¹³.

There are at least two ways that the city of Calabasas could promote a greenhouse gas emissions inventory through the General Plan Update

- Include a policy in the Conservation Element that states that an inventory shall be conducted. This could easily be accomplished within the current framework of the General Plan.



- Actually conduct the inventory during the General Plan Update process, so that the results of the inventory could be used to develop more specific General Plan policies that address the identified problem areas. This approach would allow for the development of more targeted policies and actions, but would require an amendment to the current General Plan work scope.

2. Develop and implement greenhouse gas emissions reduction measures

City governments are well-positioned to craft policies to reduce greenhouse gas emissions since they control many of the day-to-day activities that determine the amount of energy used and waste generated by their communities. For example, local governments make land use and development decisions that influence how much people drive.

The current Calabasas General Plan contains the following policies to reduce energy consumption (and thereby reduce greenhouse gas emissions):

- H.1 Promote innovative building design, site design, and building orientation techniques which minimize energy use.*
- H.3 Reduce the amount of energy consumed by City operations and assist residents and businesses in reducing their energy consumption rates.*
- H.4 Promote the incorporation of feasible energy conservation measures into existing developments and structures.*
- H.5 Promote the use of alternative energy sources (e.g., unobtrusive solar energy, co-generation, and non-fossil fuels for vehicles).*

These policies could be made more specific and directive. Described below are examples of how different state and local governments have reduced greenhouse gas emissions by changing energy consumption patterns in their own operations as well as in the broader community. The majority of these emissions reduction measures, as well as additional measures, are described in more detail in ICLEI's *Best Practices for Climate Protection: A Local Government Guide*, and Natural Capital Solutions' *Climate Protection Manual for Cities*. The latter document will be a valuable resource if the City decides to proceed with expanding greenhouse gas emissions reduction measures. The *Climate Protection Manual for Cities* is available online at <http://www.natcapsolutions.org/ClimateManual/REVIEW/>.

Government Emissions Reduction Strategies

- **Retrofit city buildings – Portland, OR.** Portland completed comprehensive retrofits of city buildings that included installing energy efficient lighting and windows. These energy efficiency measures resulted in cost-savings through lower utility bills. Table A below illustrates the investment and payback involved in this retrofit.



Table 1: Returns on Investment and Per Ton CO₂ Reduction Costs for City of Portland Municipal Buildings

City Facility	Investment	Annual Savings	Simple Payback	Tons of CO ₂ Avoided per Year	\$/Ton CO ₂ Avoided
Portland Building	\$200,000	\$35,000	5.7 years	291.67	- \$74.29
Fire Station #1	\$80,000	\$8,000	10 years	66.67	- \$40.00
Portland City Hall	\$105,000	\$15,000	7 years	125.00	- \$25.26

- **Buy green power – Santa Monica, CA.** By switching the city’s electricity source from the standard grid to 100% renewable energy, Santa Monica reduced greenhouse gas emissions by 13,762 tons in the first year. The additional cost to the City was \$120,000, or a 5% increase over prior electric costs.
- **Buy energy efficient products – State of Massachusetts.** The state began including US Environmental Protection Agency Energy Star standards in its procurement specifications for computers, fax machines, copiers, printers, and other office equipment. Each Energy Star computer and monitor saves \$15-\$25 in energy costs per year, and prevents nearly 1 ton of CO₂ emissions.
- **Trip reduction program – Los Angeles, CA.** The City implemented a comprehensive trip reduction program for its employees that encourages and facilitates carpooling and public transit, and allows for flexible work schedules and telecommuting. Los Angeles uses the parking permit fees paid by solo drivers to fund the trip reduction program. With the City’s 38,000 employees, this program prevents over 1,160,000 vehicle trips and 17,700 tons of CO₂ per year.
- **LED traffic signals and exit signs – Philadelphia, PA and Overland Park, KS.** LED traffic signals use approximately 83% less energy than incandescent lights, require less maintenance, and, in Philadelphia’s project, had a payback of about 4 years. The City of Overland Park switched all exit signs in municipal buildings to LEDs, which saved the City \$2,750 in the first year and reduced greenhouse gas emissions by 35 tons.
- **Green fleet – Denver, CO.** Denver requires fleet managers to purchase the most cost-effective and lowest emission vehicle possible, which means incorporating fuel efficiency standards into procurement specifications. This program saved \$40,000 in operation and maintenance costs in one year.
- **Carbon Offsets (carbonfund.org).** Some individual and agencies pay “carbon offsets” to groups like Carbonfund.org. These are fees paid to fund the development of programs to reduce CO₂ emissions to offset CO₂ emissions associated with day-to-day activities. For example, funds collected as part of a carbon offset program might be used to build a wind energy facility that serves an entire community. According to Carbonfund.org, offsetting the annual CO₂



annual emissions associated with operation of a 2,500-4,000 square foot house is about \$110 per year.

Community-wide Emissions Reduction Strategies

- ***Incorporate green building standards into building code – Berkeley, CA.*** Calabasas already has in effect an ordinance requiring all new non-residential development to receive a LEED Certified rating from the City, (LEED Silver if the structure is over 5,000 square feet). Additional policies could address existing buildings within the commercial and industrial sectors, and/or could begin to address the residential sector. Berkeley has mandated efficiency upgrades for existing residential and commercial buildings, which can be completed using off-the-shelf technologies. Examples of home improvements include insulating hot water pipes, weather stripping, and installing low-flow showerheads.
- ***Consider carbon offset requirements.*** General Plan policies could require proposals for large development projects to include an estimation of the increase in greenhouse gas emissions that would result from the project. Project proponents could be required to develop a plan to offset the increase in greenhouse gas emissions, through such approaches as investing in renewable energy, planting trees, or donating funds for other conservation programs. We did not find an example of a city with an existing carbon offset requirement in our research, but as other types of offset programs are rapidly developing throughout the state and world, it is likely that cities will move in this direction in the near future.
- ***Make solar power affordable – Aspen, CO.*** Calabasas is in an ideal location to take advantage of solar power. In Aspen, the city created an incentive for homeowners to install solar panels by offering to pay the homeowners approximately three times the retail electricity rate for the extra electricity the home generated. By reducing the primary challenge of upfront cost, Aspen was able to help 10 homeowners install photovoltaic systems in the first year. Federal tax credits are available to homeowners and businesses as an incentive for installing solar panels. The state of California also offers incentives in the form of property tax exemptions and rebates.¹⁴ For example, the California Energy Commission's New Solar Homes Partnership provides incentives for residential projects with solar panels installed in at least 50% of units.
- ***District heating and cooling – Saint Paul, MN.*** Instead of having each commercial, residential, and industrial building operate its own boilers and chillers, development of a centralized system in Saint Paul cut fuel costs in half and kept energy dollars in the local community. This district system reduces peak electricity demand and reduces carbon dioxide, sulfur dioxide, and nitrous oxide emissions by over 75%.



- **Parking cash-out – Santa Monica, CA.** Santa Monica requires employers with over 50 employees to set up a parking cash-out program. Employers offer employees the option of having a parking space, or forfeiting the parking space but receiving a monthly payment for the cost of the space. The average value of the cashed-out space is \$70. This program reduces 544,000 vehicle miles traveled per year, equivalent to a CO₂ emissions reduction of 196 tons.
- **Encourage infill development.** Infill development that provides a mix of uses within close proximity to one another has been demonstrated to reduce vehicle miles traveled (VMT) and emissions of greenhouse gases as compared to “greenfield” development at the periphery of communities (as shown in Table 2, which shows the results of a 1999 simulation study conducted for the U.S. Environmental Protection Agency comparing infill development to greenfield development).

Measures that reduce GHG emissions tend to bring a variety of co-benefits. As demonstrated by the Los Angeles trip reduction program, improved public transportation systems reduce vehicle emissions by encouraging people to drive their cars less, which also results in decreased traffic congestion. Open space preservation, which helps reduce greenhouse gas levels in the atmosphere because grasslands and forests absorb CO₂ from the air and store it, brings co-benefits of scenic vistas and recreational opportunities for residents.¹⁵ Promoting renewable energy sources reduces emissions from fossil-fuel burning power plants, which can improve air quality. Using energy from renewable sources can also help reduce the nation’s reliance on foreign fuel sources.¹⁶

Table 2: Comparison of VMT and Emissions: Infill versus Greenfield Development

Case Study	Per Capita Daily VMT, Infill as a Percentage of Greenfield	CO ₂ Emissions, Infill as a Percentage of Greenfield
San Diego, CA	52%	55%
Montgomery County, MD	42%	54%
West Palm Beach, FL	39%	50%

Source: Allen, E., Anderson, G., and Schroerer, W., "The Impacts of Infill vs. Greenfield Development: A Comparative Case Study Analysis," U.S. Environmental Protection Agency, Office of Policy, EPA Publication #231-R-99-005, September 2, 1999.



3. Consider adaptive measures

Many climate models predict changes in the climate over the next 20 years. The General Plan Advisory Committee may wish to consider policies for this 2030 Plan that will allow the city to adapt to these changes. The two most consistent predictions for southern California over the next 20 years are increasing average temperatures and changes in water supplies as a result of shrinking snowpack in the Sierra Nevada Mountains.

Temperatures increases of 1.0 to 2.3°F are predicted in California over the next 20 to 30 years. Increased temperatures are likely to create additional electricity demand as a result of increased air conditioning needs.¹⁰ Building codes that emphasize passive heating and cooling and other energy efficient design features will help decrease the likelihood of energy shortages. General Plan policies could also require lighter colored roofs and pavement and urban green spaces to reduce the urban “heat island” effect.

As a result of increasing temperatures, the patterns of precipitation in California are predicted to change over the next 20 years, such that more precipitation will fall as rain, and less water will be stored in the Sierra snowpack over the winter months. New infrastructure will be necessary to capture and store the rain as it falls¹⁰. The Las Virgenes Water District, which serves Calabasas, receives 100% of its water from the Sierra snowpack; therefore, the shifts in state water supply could result in water shortages in Calabasas during the summer months. General Plan policies could address this issue by supporting improved water storage infrastructure on a regional level, and by promoting water conservation strategies within the city of Calabasas.

The current Calabasas General Plan contains the following water conservation policies:

- E.3** *Promote the use of primarily drought-tolerant plants and efficient landscape irrigation design.*
- E.4** *Require the use of dual water systems to use reclaimed wastewater for landscape irrigation purposes where reclaimed water service is or can be made available within a five year period.*
- E.5** *Ensure that new buildings are constructed in such a manner as to minimize the use of water for domestic purposes.*

Additional policies could require specific water conservation measures for City projects, such as requiring xeriscaping where possible on City property, and requiring low flow appliances for all new City buildings or upgrades to existing buildings. Calabasas could also require new development projects to offset their water use by investing in water efficiency measures in existing buildings. For example, the city of Ventura created a program in which developers retrofitted toilets in existing residences in order to offset the water use created by their new development. Rainwater capture requirements are another possibility for reducing the water consumption of development projects in Calabasas.



FOR MORE INFORMATION

The information in this issue paper is drawn primarily from the websites of the US Environmental Protection Agency, the California Energy Commission, the Intergovernmental Panel on Climate Change, the Pew Center on Climate Change, and the Cities for Climate Protection Campaign. Detailed references are provided below.

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