Town of Portola Valley
2005 Government Operations
Greenhouse Gas Emissions Inventory

Prepared by ICLEI - Local Governments for Sustainability USA.

Credits and Acknowledgements

Town of Portola Valley

Brandi de Garmeaux, Sustainability and Resource Efficiency Coordinator

Gary Fitzer, Deputy Building Official

Stacie Nerdahl, Administrative Services Officer

Scott Weber, Public Works Maintenance Worker II

Sahm White, Intern

PG&E Contributors

Lynne Galal, Senior Project Manager, Customer Energy Efficiency Third Party and Partnership Implementation Department

Corie Cheeseman, Program Manager

Joint Venture: Silicon Valley Network

Kara LaPierre, Vice President

Rachel Massaro, Associate Director, Climate Initiatives

Seth Fearey, Former Vice President, Chief Operating Officer, Smart Valley Initiative Director

Sustainable Silicon Valley

Marianna Grossman, President and Executive Director

Rick Row, Former Executive Director

Waste Hauler Name

Green Waste Recovery, Valerie Enyart

Chase Harris, Zanker Road Landfill

This report was prepared by Jonathan Strunin Program Officer, Anna Frankel and Jamie O'Connell, Program Associates at ICLEI-Local Governments for Sustainability USA. The authors gratefully acknowledge the dedication of the staff of Portola Valley, which provided much of the insight and local information necessary for the completion of this report. Thanks also to the San Mateo City/County Association of Governments, which provided funds to local governments in San Mateo County for the completion of this inventory.

Partners

Joint Venture: Silicon Valley Network

Russell Hancock, President and Chief Executive Officer

Established in 1993, Joint Venture provides analysis and action on issues affecting the Silicon Valley economy and quality of life. The organization brings together established and emerging leaders—from business, government, academia, labor, and the broader community—to spotlight issues, launch projects, and work toward innovative solutions. http://www.jointventure.org

Sustainable Silicon Valley

Marianna Grossman, Executive Director

Sustainable Silicon Valley (SSV) is a collaboration of businesses, governments, and non-governmental organizations that are identifying and addressing environmental and resource pressures in the Valley. As its first initiative, SSV is engaging prominent Valley organizations to work toward self-imposed goals of reducing regional carbon dioxide (CO_2) emissions. The SSV approach is to facilitate strategies to reduce CO_2 emissions through increased energy and fuel efficiency and through the use of renewable sources of energy. SSV envisions a thriving Silicon Valley with a healthy environment, a vibrant economy, and a socially equitable community. Sustainable Silicon Valley's mission is to lead the Silicon Valley community to create a more sustainable future by engaging and collaborating with local government agencies, businesses, and community organizations to identify and help address the highest priority environmental issues in the Valley. http://www.sustainablesiliconvalley.org

ICLEI-Local Governments for Sustainability USA

Jeb Brugmann, Executive Director

ICLEI-Local Governments for Sustainability is a membership association of more than 1,000 local governments worldwide—more than 500 in the United States—committed to advancing climate protection and sustainability. Through technical expertise, direct network engagement, and the innovation and evolution of tools, ICLEI strives to empower local governments to set and achieve their emissions reduction and sustainability goals. http://www.icleiusa.org

Table of Contents

Appendix A: The Local Government Operations Protocol

Appendix B: LGOP Standard Report VIII

Appendix C: Employee Commute

Appendix D: Government-Generated Solid Waste Methodology

Appendix E: Conducting a Monitoring Inventory

List of Tables and Figures

List of Tables

List of Figures

Executive Summary

The Town of Portola Valley has recognized that human-caused climate change is a reality, with potentially disruptive effects to Portola Valley's residents and businesses. The Town also recognizes that local governments play a leading role in both reducing greenhouse gas emissions and mitigating the potential impacts of climate change. Local governments can dramatically reduce the emissions from their government operations by such measures as increasing energy efficiency in facilities and vehicle fleets, utilizing renewable energy sources, sustainable purchasing, waste reduction, and supporting alternative modes of transportation for employees. The co-benefits of these measures may include lower energy bills, improved air quality, and more efficient government operations.

The Town has begun its efforts to address the causes and effects of climate change with the assistance of the partners in the Silicon Valley Climate Protection Partnership. These partners include Joint Venture: Silicon Valley Network; Sustainable Silicon Valley; local governments in San Mateo, Santa Clara, and Santa Cruz counties and ICLEI-Local Governments for Sustainability USA.

This greenhouse gas emissions inventory represents completion of an important first step in Portola Valley's climate protection initiative. As advised by ICLEI, it is essential to first quantify emissions to establish:

- A baseline emissions inventory, against which to measure future progress.
- An understanding of the scale of emissions from the various sources within government operations.

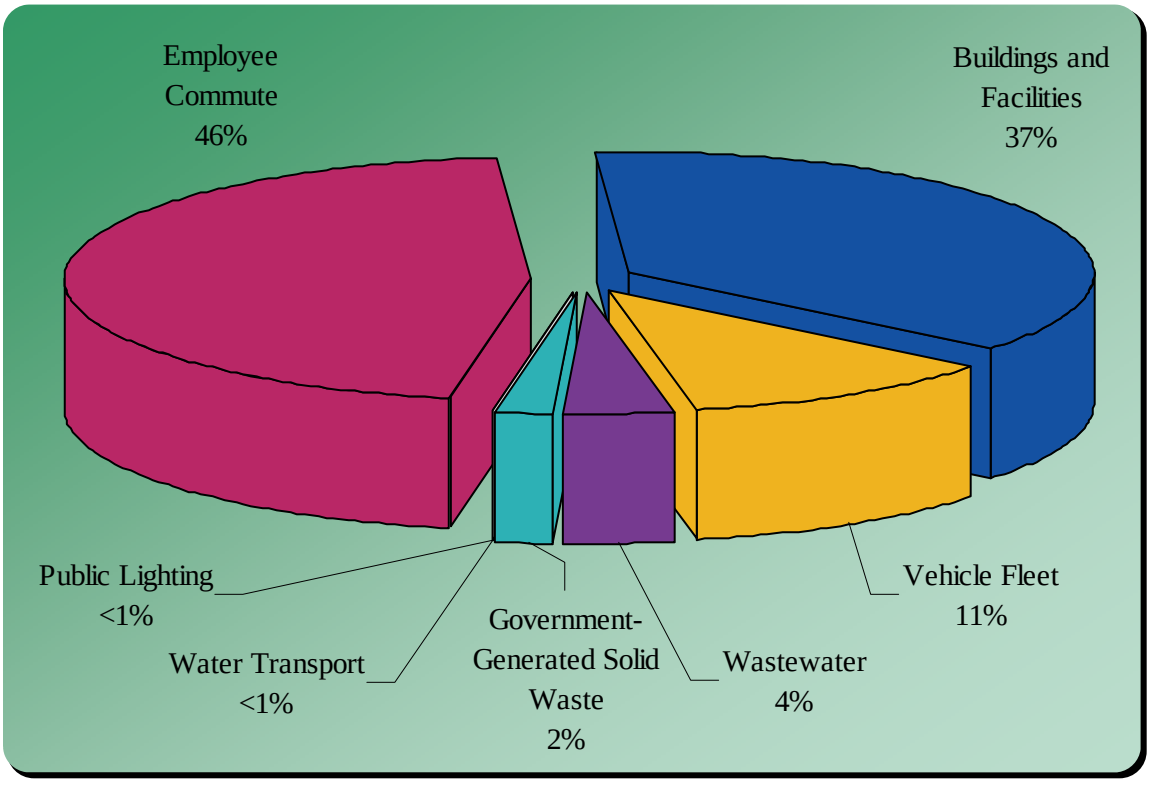
Presented here are estimates of greenhouse gas emissions in 2005 resulting from the Town of Portola Valley's government operations. With one exception,[1] all emissions estimates in this report refer to emissions generated from

1 The exception is emissions from employee-owned vehicles that are used by employees during commuting.

sources over which the Town has direct operational control, exclusive of physical location.[2] This includes all government-operated facilities, lights, and other stationary sources; vehicle fleet and off-road equipment; and waste generated by government operations. The inventory *does not* estimate emissions from the larger community—these will be addressed in the community-scale greenhouse gas emissions inventory. Therefore, this inventory should be considered an independent analysis relevant only to Portola Valley's internal operations.

This inventory is one of the first inventories to use a new national standard developed and adopted by the California Air Resources Board (ARB) in conjunction with ICLEI, the California Climate Action Registry, and The Climate Registry. This standard, called the Local Government Operations Protocol (LGOP), provides standard accounting principles, boundaries, quantification methods, and procedures for reporting greenhouse gas emissions from local government operations. To that end, LGOP represents a strong step forward in standardizing how inventories are conducted and reported, providing a common national framework for all local governments to establish their emissions baseline. This and all emissions inventories represent an estimate of emissions using the best available data and calculation methodologies. Emissions estimates are subject to change as better data and calculation methodologies become available in the future. Regardless, the findings of this inventory analysis provide a solid base against which the Town can begin planning and taking action to reduce its greenhouse gas emissions.

Figure ES.1 2005 Portola Valley Government Operations Emissions by Sector



2 Facilities, vehicles, or other operations wholly or partially owned by, but not operated by, Portola Valley are not included in this inventory. See Appendix A for more details on the boundaries of the inventory.

Inventory Results

In 2005, the Town of Portola Valley's direct emissions, emissions from electricity consumption, and select indirect sources totaled 160 metric tons of CO_2e.[3] Of the total emissions accounted for in this inventory, emissions from employee commute were the largest (46 percent as shown in Figure ES.1 and Table ES.1). The next largest sources of emissions came from Portola Valley's buildings and facilities and vehicle fleet with 37 and 11 percent of all inventoried emissions respectively. Wastewater and government–generated solid waste accounted for most of the remainder of inventoried emissions (4 percent and 2 percent), with public lighting and water delivery each comprising less than one percent of emissions.

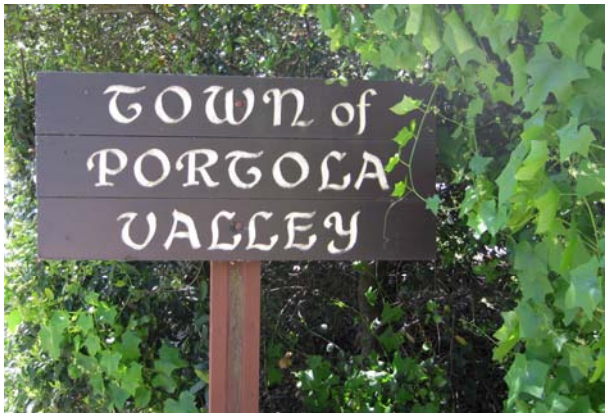
Cumulatively, the Town spent approximately $42,156 on energy (electricity, natural gas, gasoline, diesel) and waste services for government operations in 2005. Of this total, 34 percent of these energy expenses ($14,218) resulted from electricity consumption, and 22 percent ($9,272) from natural gas purchases from Pacific Gas and Electric Company (PG&E). Fuel purchases (gasoline and diesel) for the vehicle fleet and mobile equipment totaled $3,884, or 9 percent of total costs included in this inventory. The estimated cost of waste services for hauling the waste generated by the Town's operations was $14,774 or 35 percent of all estimated costs. Cost data for employee commute was not available for this analysis. Beyond reducing greenhouse gases, any future reductions in municipal energy consumption will have the potential to reduce these costs, enabling the Town to reallocate limited funds toward other municipal services or create a revolving energy loan fund to support future climate protection activities.

Table ES.1: 2005 Portola Valley Government Operations Emissions by Sector

Sector	Greenhouse Gas Emissions (metric tons CO_2e)
Employee Commute	74
Buildings and Facilities	59
Vehicle Fleet	18
Wastewater	6
Government-Generated Sold Waste	3
Water Transport	0.06
Public Lighting	0.003

3 CO_2e stands for "carbon dioxide equivalent," the standard unit for describing how much global warming different types and amounts of greenhouse gases (such as carbon dioxide, methane, and nitrous oxide) would cause. This number represents a "roll-up" of emissions, and is not intended to represent a complete picture of emissions from Portola Valley's operations. This roll-up number should not be used for comparison with other local government roll-up numbers without a detailed analysis of the basis for this total.

Section One: Introduction



Introduction

Local governments play a fundamental role in addressing the causes and effects of human-caused climate change through their actions at both the community and government operations levels. While local governments cannot solve the problems of climate change by themselves, their policies can dramatically reduce greenhouse gas emissions from a range of sources and can prepare their communities for the potential impacts of climate change.

Within the context of government operations, local governments have direct control over their emissions-generating activities. They can reduce energy consumption in buildings and facilities, reduce fuel consumption by fleet vehicles and equipment, reduce the amount of government-generated solid waste that is sent to a landfill, and increase the amount of energy that is obtained through alternative energy sources. By quantifying the emissions coming from its operations, this report will enable the Town of Portola Valley to choose the most effective approach to reducing its contribution to climate change.

1.1 Climate Change Background

A balance of naturally occurring gases dispersed in the Earth's atmosphere determines its climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence suggests that modern human activity is artificially intensifying the greenhouse gas effect, causing global average surface temperatures to rise. This intensification is caused by activities that release carbon dioxide and other greenhouse gases into the atmosphere—most notably the burning of fossil fuels for transportation, electricity, and heat generation.

Rising temperatures affect local and global climate patterns, and these changes are forecasted to manifest themselves in a number of ways that might impact the Town. For example, the San Francisco Bay may experience rising sea levels and the Sacramento Delta may experience changes in salinity, affecting land uses, water sources, and agricultural activity. Changing temperatures will also likely result in more frequent and damaging storms accompanied by flooding and landslides. Reduced snow pack in the Sierra Nevada mountains may lead to water shortages, and the disruption of ecosystems and habitats is likely to occur.

In response to this threat, many communities in the United States are taking responsibility for addressing climate change at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around sustainable land use patterns, transportation demand management, energy efficiency, green building, and waste diversion, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts. As the effects of climate change become more common and severe, local government adaptation policies will be fundamental in preserving the welfare of residents and businesses.

1.2 Purpose of Inventory

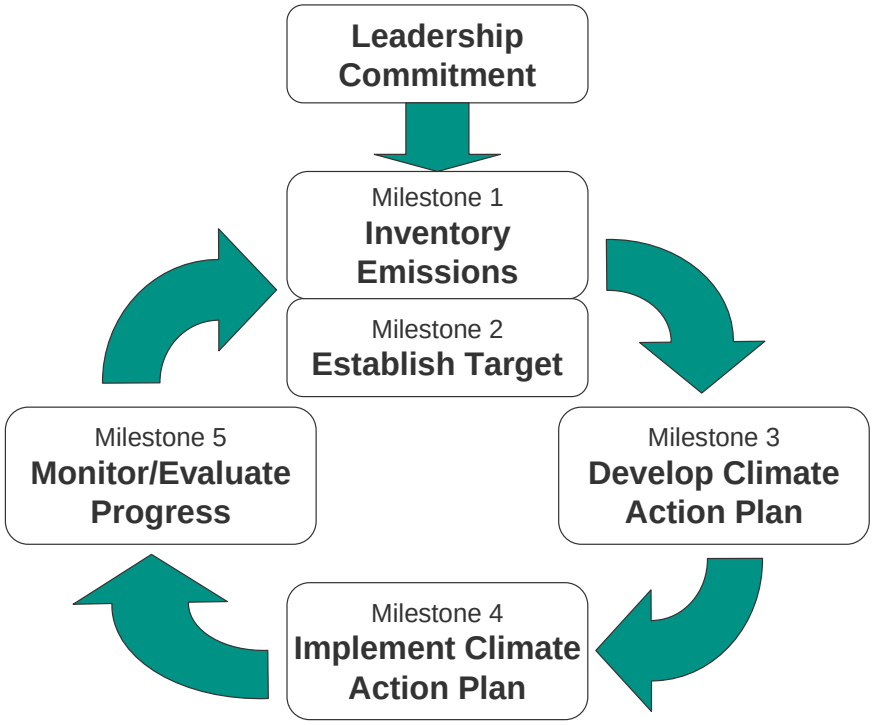
The objective of this greenhouse gas emissions inventory is to identify the sources and quantities of greenhouse gas emissions resulting from government operations in Portola Valley in 2005. This inventory is a necessary first step in addressing greenhouse gas emissions, serving two purposes:

- It creates an emissions baseline against which the Town can set emissions reductions targets and measure future progress.
- It allows local governments to understand the scale of emissions from the various sources within their operations.

While the Town has already begun to reduce greenhouse gas emissions through its actions (See Section 1.4 for more detail), this inventory represents the first step in a systems approach to reducing its emissions. This system, developed by ICLEI, is called the Five Milestones for Climate Mitigation. This Five-Milestone process involves the following steps:

Milestone One: Conduct a baseline emissions inventory and forecast
Milestone Two: Adopt an emissions reduction target for the forecast year
Milestone Three: Develop a local climate action plan
Milestone Four: Implement the climate action plan
Milestone Five: Monitor progress and report results

Figure 1.1 The Five-Milestone Process



1.3 Climate Change Mitigation Activities in California

Beginning in 2005, the State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. This approach was officially initiated with the passage of the Global Warming Solutions Act of 2006 (AB 32), which required the state to reduce its greenhouse gas emissions to 1990 levels by 2020. It also required the California Air Resources Board (ARB) to regularly inventory emissions at the state level and to create a plan for reducing these emissions. The bill authorized ARB to adopt and enforce regulations targeted at greenhouse gas emissions reductions in the public and private sectors.

The resulting AB 32 Scoping Plan was adopted by ARB in December 2008. It established the following measures that the State will take to meet the greenhouse gas emissions reduction targets:

- Develop a California cap-and-trade program
- Expand energy efficiency programs
- Establish and seek to achieve reduction targets for transportation-related GHG emissions
- Support implementation of a high-speed rail system
- Expand the use of green building practices

- Increase waste diversion, composting, and commercial recycling toward zero-waste
- Continue water efficiency programs and use cleaner energy sources to move and treat water
- Implement the Million Solar Roofs Programs
- Achieve a statewide renewable energy mix of 33 percent
- Develop and adopt the low-carbon fuel standard
- Implement vehicle efficiency measures for light-, medium-, and heavy-duty vehicles
- Adopt measures to reduce high global warming potential gases
- Reduce methane emissions at landfills
- Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation
- Capture of methane through use of manure digester systems at dairies

Other measures taken by the state have included mandating stronger vehicle emissions standards (AB 1493, 2002), establishing a low-carbon fuel standard (EO # S-01-07, 2007), mandating a climate adaptation plan for the state (S-EO # 13-08, 2008), establishing a Green Collar Job Council, and establishing a renewable energy portfolio standard for power generation or purchase in the state. The state also has made a number of changes that will likely have potentially large effects on local governments:

- SB 97 (2007) required the Office of Planning and Research to create greenhouse gas planning guidelines for the California Environmental Quality Act (CEQA). In addition, ARB is tasked with creating energy-use and transportation thresholds in CEQA reviews, which may require local governments to account for greenhouse gas emissions when reviewing project applications.
- SB 732 (2008) established a Strategic Growth Council charged with coordinating policies across state agencies to support a unified vision for land use development in the state. This vision will serve as a reference point for local land use policies.
- SB 375 (2008) mandated the creation of regional sustainable community strategies (SCS) by regional planning agencies. The SCS links regional housing and transportation planning processes in an attempt to meet regional greenhouse gas emissions targets.

1.4 Climate Change Mitigation Activities in the Town of Portola Valley

One of the Town of Portola Valley's deeply held values and a major community goal in the Town's General Plan is limiting the use of planning area lands so that the landscape's natural attributes "can be sustained over time." The goals further state that the Town will take actions to greatly reduce disturbance to the environment, lessen resident exposure to natural hazards, protect the watershed and, specifically, "minimize the use of non-renewable resources, conserve water, and encourage energy conservation and the use of renewable energy resources."

With the signing of the Mayor's Climate Protection Agreement and support of the greenhouse gas emissions reduction required under Assembly Bill 32, the Town has committed to reducing its impact on climate change. Below is a summary of the climate protection initiatives pursued since early 2000. These achievements are part of an organic progression of community efforts to further implement these goals.

September 13, 2006 the Town Council adopted a resolution endorsing and authorizing the Mayor to sign the U.S. Mayors' Climate Protection Agreement**.** Under the Agreement, participating cities commit to take following three actions: 1) Strive to meet or beat the Kyoto Protocol targets in their own communities; 2) Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emissions reduction target suggested for the U.S. in the Kyoto Protocol – 7% reduction from 1990 levels by 2012; and 3) Urge the U.S. Congress to pass the bipartisan greenhouse gas reduction legislation.

December 13, 2006 the Town Council unanimously approved a recommendation for the Town to join ICLEI Local Governments for Sustainability (ICLEI) to participate in the Cities for Climate Protection Campaign, and undertake the campaign's five milestones to reduce greenhouse gas and air pollution emissions throughout the community.

October 4, 2007 the Town Council adopted a resolution supporting Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, and pledged to take a leadership role in promoting public awareness of the causes and impacts of climate change. As part of the resolution the Town adopted AB 32's targets for reducing its global warming emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

February 27, 2008 the Town Council signed the Tuolumne River Resolution. The resolution supports water conservation, efficiency and recycling rather than increasing diversions from the Tuolumne River.

December 10, 2008 the Town Council approved joining the Joint Venture: Silicon Valley Network Climate Protection Partnership to enlist ICLEI to complete a greenhouse gas emissions inventory for the Town's government operations. Completing the government operations inventory is a first step in achieving Milestone 1 under the ICLEI Cities for Climate Protection methodology and Action 1 under the Mayor's Climate Protection Agreement. Participating in the Partnership exemplifies a commitment to the regional greenhouse gas emissions reduction effort.

January 28, 2009 the Town Council adopted a Sustainability Element as an amendment to the General Plan; the objective of the Sustainability Element is to realize the community goal of ensuring the sustainability of the environment. The Sustainability Element includes six overarching goals with objectives, and illustrative policies and practices organized under: transportation, new buildings, existing building stock, water resources, living environment, and community education and involvement.

February 11, 2009 the Town Council adopted a resolution to support the San Mateo County Energy Strategy 2012 (Strategy), to pursue the next steps recommended by the Strategy and to commit to work collaboratively with other cities and the County towards the goals of the Strategy. The Strategy identifies five main goals with associated actions related to renewable energy and energy efficiency, water conservation and new sources of water, collaboration between cities and with utilities, economic development opportunities and promoting leadership.

Specific climate protection efforts undertaken by the Town and the community include:

- Convened a Climate Protection Task Force and subcommittees to develop recommendations for a comprehensive energy savings plan for the Town; the Task Force developed a multi-front programs to achieve the Council-adopted goals for greenhouse gas emissions reductions, including recommendations on: new construction, existing buildings, transportation, carbon offsets, alternative energy, Town events and communication
- The Climate Protection Task Force Metrics subcommittee generated an initial greenhouse gas emissions inventory; the findings lead to the Council support of Assembly Bill 32, the Global Warming Solutions Act of 2006
- Climate Protection Task Force developed a website called CoolPV.com; the purpose is to inform and engage the public through an exchange of ideas to reduce their carbon footprint as well as ongoing activities of the Climate Protection Task Force
- Participated in annual ICLEI National Conversation on Climate Change with other local jurisdictions to discuss next steps in climate action planning
- Developed handouts on Sustainable Building in Portola Valley; the purpose of the website is to help homeowners start thinking about green building in project planning stage and to demystify common misconceptions about costs of building green
- Encouraging vegetation preservation, planting of natives and a minimal approach to lighting through Town Design Guidelines
- Instituted a Construction & Demolition Ordinance that requires at least 60% of construction and demolition debris to be reused, recycled or diverted so that it does not end up in the landfill
- Encouraging use of solar energy through establishment of a $50.00 flat rate fee for issuance and inspection of permits for solar photovoltaic systems

- Portola Valley and Ladera residents partnered with SolarCity to arrange the first community bulk buy of solar photovoltaic arrays; the initial goal was 44 homes and 175kW – final total was 77 homes and 355kW
- Facilitated energy audits of five Portola Valley homes with goal to create baseline of a representative sampling of the housing stock
- Hosted public workshops on Home Energy Efficiency and Green Design to share ideas for moving the Town forward on practices to save energy, conserve water and use sustainable materials in the built environment; follow-up workshops on Sustainable Building were held to discuss the adoption of the Build It Green, GreenPoint Rated system as a new standard and a campaign to improve energy efficiency in the existing housing stock
- Encouraging green building practices including required submittal of Build it Green, GreenPoint Rated Checklist for all new homes and major remodels with suggested point requirements and mandatory review of green design elements in the Architectural and Site Control review process; LEED for Homes is welcomed as an alternative to GreenPoint Rated
- Designed and built the new green Town Center, including Town Hall, Library and Community Hall, to LEED green building standards; Town Center functions as a model for outreach to the community on green building; a 76kW solar photovoltaic system is expected to save 33 tons of CO^2 per year
- Daylighted and restored 300 feet of Sausal Creek and habitat previously buried in culvert under Town Center site
- Purchased electric vehicle for public works staff to use for maintenance work at Town Center
- Hired a Sustainability and Resource Efficiency Coordinator to implement and promote resource efficiency and environmental programs through community outreach and education as well as monitor progress toward attaining Town's commitments under the U.S. Mayors' Climate Protection Agreement and AB 32
- Adopted, implemented and currently tracking Environmentally Preferable Purchasing Policy for Town operations
- Joined the San Mateo County Green Business Program; the Town will pursue certification as a green business and, once certified, will launch a program to engage local businesses in Town's climate protection initiatives
- Launched redesigned Town website including Sustainability section; the Sustainability section is organized to provide residents, businesses, schools and children with information and resources targeted to their Town activities
- Hosted of Green Speaker Series: Pioneers of Sustainability featuring visionaries Amory Lovins, James Hansen and Mathis Wackernagel

- Hosting of Green Speaker Series: Local Heroes on Local Issues; topics include water conservation, renewable energy, green building, energy efficiency retrofits, green interior design and food & climate change; series will provide the community with concrete actions and tools to use in their daily lives
- Educated the local community at Earth Day Fair about environmental issues and providing tools and resources to make their homes more efficient, to conserve resources and to live more sustainably**;** representatives included local water service provider, waste collection provider, RecycleWorks, Acterra and The Reuse People
- Negotiated a cutting-edge waste collection agreement (the first of its kind in the U.S.), which has increased waste diversion from the landfill to over 75%
- Supporting Safe Routes to Schools program including map of local trails and bus route that students can use to bike/walk/bus safely to school
- Creating an alliance with the local schools to bring sustainability to the next generation

A comprehensive chronology of the Town's climate protection activities including links to relevant documents can be found on the Town's website under Town Sustainability: www.portolavalley.net

1.5 The Silicon Valley Climate Protection Partnership

The Silicon Valley Climate Protection Partnership is a joint effort between Joint Venture: Silicon Valley Network (JV:SVN); Sustainable Silicon Valley (SSV); local governments in San Mateo, Santa Clara and Santa Cruz counties (hereby referred to as the "Silicon Valley area"); and ICLEI. The Partnership was initiated in 2008 to provide a solid regional platform for local governments to follow ICLEI's Five-Milestone process (described in Section 1.2), as well as a shared learning experience.

In early 2008, JV:SVN contracted with ICLEI to conduct government operations emissions inventories for participating local governments, using the standards outlined in the then soon-to-be-released Local Government Operations Protocol (LGOP—see Appendix A for details). For this project, 27 local governments have signed on to this contract. SSV joined the Partnership to provide additional educational and other services to facilitate more rapid progress by participating governments through the Five Milestones. While ICLEI created these inventories concurrently using the same tools and methods, each inventory was conducted independently using data specific to each local government's operations. For this reason, inventories from different jurisdictions will involve different sources of data and emissions calculation methods.

Alongside the activities of the Partnership, JV:SVN and SSV have been facilitating regional climate dialogues to further emissions reductions goals in the Silicon Valley area. JV:SVN supports the work of the Climate Protection

Task Force, a group that includes staff members from 44 jurisdictions in the Silicon Valley area, including cities, counties, and special districts. In this neutral forum, the partners learn from each other and from expert guests about climate protection programs. They then work to develop effective, collaborative programs for the reduction of greenhouse gas emissions from public agency operations. SSV holds quarterly conferences and monthly meetings that discuss specific approaches to addressing climate change, including the pros and cons of regional climate planning. SSV also puts out annual reports highlighting successes of businesses and local governments that have voluntarily pledged to set and work toward their own carbon dioxide reduction goals. JV:SVN and SSV, along with ICLEI, the San Mateo City/County Association of Governments, and the Bay Area Air Quality Management District[4], have dramatically pushed forward the pace and scale of climate actions by local governments in the Silicon Valley area.

4 C/CAG and the Air Quality District have provided funding which have allowed a number of these inventories to occur and have been strong players in pushing forward local and regional actions on climate change.

Section Two: Methodology

Methodology

This greenhouse gas emissions inventory follows the standard methodology outlined in LGOP, which was adopted in 2008 by ARB and serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. By participating in the Silicon Valley Climate Protection Partnership, the Town of Portola Valley has the opportunity to be one of the first in the nation to follow LGOP when inventorying emissions from government operations.

This chapter outlines the basic methodology utilized in the development of this inventory to provide clarity to how the inventory results were reported. Specifically, this section reviews:

- What greenhouse gases were measured in this inventory.
- What general methods were used to estimate emissions.
- How emissions estimates can be reported (the scopes framework, roll-up numbers).
- How emissions estimates were reported in this inventory.

A more detailed account of LGOP and the methodology used in this inventory can be found in Appendices A and B.

2.1 Greenhouse Gases

According to LGOP, local governments should assess emissions of all six internationally recognized greenhouse gases regulated under the Kyoto Protocol. These gases are outlined in Table 2.1, which includes the sources of these gases and their global warming potential (GWP).[5]

5 Global warming potential (GWP) is a measure of the amount of warming a greenhouse gas may cause, measured against the amount of warming caused by carbon dioxide.

Table 2.1 Greenhouse Gases

Gas	Chemical Formula	Activity	Global Warming Potential (CO_2e)
Carbon Dioxide	CO_2	Combustion	1
Methane	CH_4	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	21
Nitrous Oxide	N_2O	Combustion, Wastewater Treatment	310
Hydrofluorocarbons	Various	Leaked Refrigerants, Fire Suppressants	12–11,700
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC Equipment Manufacturing	6,500–9,200
Sulfur Hexafluoride	SF_6	Transmission and Distribution of Power	23,900

2.2 Calculating Emissions

LGOP outlines specific methods for quantifying emissions from local government activities. What methods a local government can use to quantify emissions vary largely by how it gathers data, and therefore what data were available. In general, emissions can be quantified in two ways.

1. Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions from a monitoring system. Emissions measured this way may include those emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility. This method is the most accurate way of inventorying emissions from a given source, but is generally available for only a few sources of emissions.

2. Calculation-based methodologies refer to an estimate of emissions calculated based upon some measurable activity data and emission factors. Table 2.2 demonstrates some examples of common emissions calculations in this report. For a detailed explanation of the methods an emissions factors used in this inventory, see Appendix B.

Table 2.2 Basic Emissions Calculations

Activity Data	Emissions Factor	Emissions
Electricity Consumption (kilowatt hours)	CO_2 emitted/kWh	CO_2 emitted
Natural Gas Consumption (therms)	CO_2 emitted/therm	CO_2 emitted
Gasoline/Diesel Consumption (gallons)	CO_2 emitted /gallon	CO_2 emitted
Waste Generated by Government Operations (tons)	CH_4 emitted/ton of waste	CH_4 emitted

2.3 Reporting Emissions

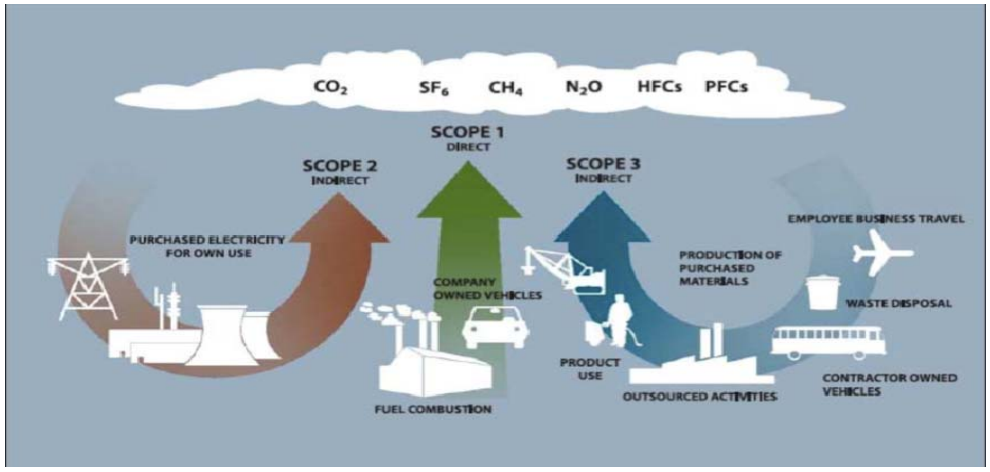
LGOP provides two reporting frameworks: reporting by scope and reporting by sector. This section defines the two reporting frameworks and discusses how they are used in this inventory. It also discusses the concept of "rolling up" emissions into a single number. This can assist local governments in communicating the results of the inventory and using the inventory to formulate emissions reductions policies.

2.3.1 The Scopes Framework

For local government operations, LGOP categorizes emissions according to what degree of control local governments have over the emissions sources. These categorizations (developed by the World Resources Institute and the World Business Council for Sustainable Development) are called *emissions scopes.* The scopes framework helps local governments to:

- Determine which emissions should be inventoried.
- Organize emissions by degree of control and therefore the potential for reduction of these emissions.
- Avoid "double counting" of emissions, i.e., summing up of different emissions sources that may result in reporting these emissions twice.

Figure 2.1 Emissions Scopes



Source: WRI/WBCSD GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition), Chapter 4.

The emissions scopes are defined as follows:

Scope 1: Direct emissions from sources within a local government's operations that it owns and/or controls. This includes stationary combustion to produce electricity, steam, heat, and power equipment; mobile combustion of fuels; process emissions from physical or chemical processing; fugitive emissions that result from production, processing, transmission, storage and use of fuels; leaked refrigerants and other sources.

Scope 2: Indirect emissions associated with the consumption of electricity or steam used for heating and cooling that is purchased from an outside utility.

Scope 3: All other emissions sources that hold policy relevance to the local government that can be measured and reported. This includes all indirect emissions not covered in Scope 2 that occur as a result of activities within the operations of the local government. Sources over which the local government does not have any financial or operational control over would be accounted for here. Scope 3 emission sources include (but are not limited to) tailpipe emissions from employee commutes, employee business travel, and emissions resulting from the decomposition of government-generated solid waste.

Table 2.3 Inventoried Emission Sources by Scope[6]

Scope 1	Scope 2	Scope 3
Fuel consumed to heat/cool facilities	Purchased electricity consumed by facilities	Solid waste generated by government operations
Fuel consumed for vehicles and mobile equipment	Purchased electricity consumed by electric vehicles	Fuel consumed for employee vehicles used for commuting
Fuel consumed to generate electricity	Purchased steam for heating or cooling facilities	
Leaked refrigerants from facilities and vehicles		
Leaked/deployed fire suppressants		
Wastewater decomposition and treatment in municipal treatment facilities		
Solid waste in government landfills		

2.3.2 Double Counting and Rolling Up Scopes

Many local governments find it useful for public awareness and policymaking to use a single number (a "roll-up" number) to represent emissions in its reports, target setting, and action plan. A roll-up number allows local governments to determine the relative proportions of emissions from various sectors (e.g., 30 percent of rolled up emissions came from the vehicle fleet). This can help policymakers and staff identify priority actions for reducing emissions from their operations.

For these reasons, this report includes a roll-up number as the basis of the emissions analysis in this inventory. This roll-up number is composed of direct emissions (Scope 1), all emissions from purchased electricity (Scope 2), and indirect emissions from employee commutes and government-generated solid waste (Scope 3). While this report

6 This only represents a list of emissions that were inventoried for the Silicon Valley Climate Protection Partnership inventories. This is not meant to be a complete list of all emissions that can be inventoried in a government operations inventory.

uses a standard roll-up number, these numbers should be used with caution, as they can be problematic for three reasons:

First, a roll-up number does not represent all emissions from Portola Valley's operations, only a summation of inventoried emissions using available estimation methods. Reporting a roll-up number can be misleading and encourage citizens, staff, and policymakers to think of this number as the local government's "total" emissions. Therefore, when communicating a roll-up number it is important to represent it only as a sum of inventoried emissions, not as a comprehensive total.

Second, rolling up emissions may not simply involve adding emissions from all sectors, as emissions from different scopes can be double-counted when they are reported as one number. For example, if a local government operates a municipal utility that provides electricity to government facilities, these are emissions from both the power generation and facilities sectors. If these sectors are rolled up into a single number, these emissions are double counted, or reported twice. For these reasons, it is important to be cautious when creating a roll-up number to avoid double counting; the roll-up number used in this report was created specifically to avoid any possible double counting.

Third, local governments often wish to compare their emissions to those of other local governments. But it is very difficult to use a roll-up number as a common measure between local governments, for a number of reasons. First, as of now there is no national or international standard for reporting emissions as a single roll-up number. In addition, local governments provide different services to their citizens, and the scale of the services (and thus the emissions) is highly dependent upon the size of the jurisdiction. For these reasons, comparisons between local government roll-up numbers should not be made without significant analysis of the basis of the roll-up number and the services provided by the local governments being compared.

2.3.3 Emissions Sectors

ICLEI recommends that local governments examine their emissions in the context of the part of their operations (sector) that is responsible for those emissions. This is helpful from a policy perspective, and will assist local governments in formulating sector-specific reduction measures and climate action plans. This inventory uses LGOP sectors as a main reporting framework, including the following sectors:

- Buildings and other facilities
- Streetlights, traffic signals, and other public lighting
- Water delivery facilities
- Wastewater facilities
- Vehicle fleet and mobile equipment
- Government-generated solid waste
- Emissions from employee commutes

Section Three: Inventory Results

Inventory Results

This chapter provides a detailed description of the Town of Portola Valley's emissions from government operations in 2005, rolling up and comparing emissions across sectors and sources as appropriate. This chapter also provides details on the greenhouse gas emissions from each sector, including a breakdown of emissions types and, where possible, an analysis of emissions by department. This information identifies more specific sources of emissions (such as a particular building) that can help staff and policymakers in Portola Valley to best target emissions reduction activities in the future.

For a report of emissions by scope, and a detailed description of the methodology and emission factors used in calculating the emissions from the Town's operations, please see Appendix B: LGOP Standard Report.

In 2005, the Town's direct emissions, emissions from electricity consumption and select indirect sources totaled 160 metric tons of CO_2e.[7] In this report, this number is the basis for comparing emissions across sectors and sources (fuel types), and is the aggregate of all emissions estimates used in this inventory.

3.1 Summary by Sector

Reporting emissions by sector provides a useful way to understand the sources of Portola Valley's emissions. By better understanding the relative scale of emissions from each of the sectors, the Town can more effectively focus emissions reductions strategies to achieve the greatest emissions reductions.[8]

7 This number represents a roll-up of emissions, and is not intended to represent a complete picture of emissions from Portola Valley's operations. This roll-up number should not be used for comparison with other local government roll-up numbers without a detailed analysis of the basis for this total. See section 2.3.2 for more detail.

8 The sectors with the largest scale of emissions do not necessarily represent the best opportunity for emissions reductions. Cost, administration, and other concerns may affect Portola Valley's ability to reduce emissions from any one sector.

Figure 3.1 2005 Portola Valley Government Operations Emissions by Sector

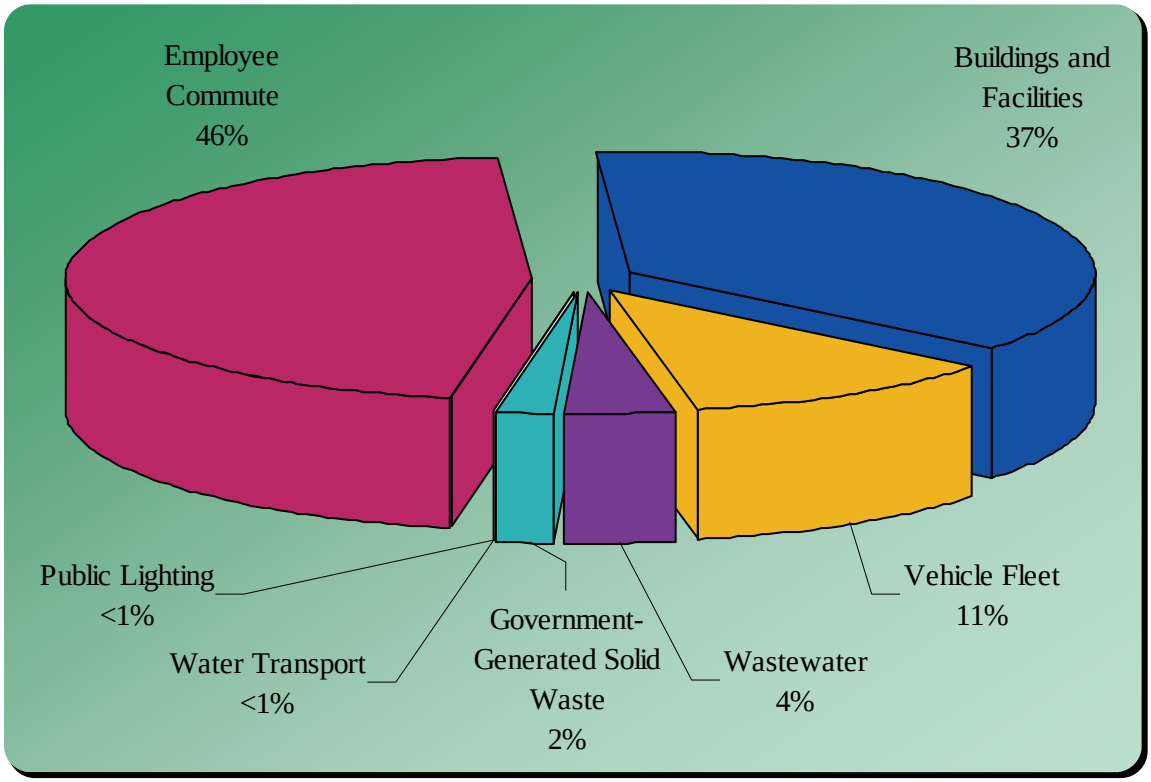


Table 3.1: 2005 Portola Valley Government Operations Emissions by Sector

Sector	Greenhouse Gas Emissions (metric tons CO_2e)
Employee Commute	74
Buildings and Facilities	59
Vehicle Fleet	18
Wastewater	6
Government-Generated Solid Waste	3
Water Transport	0.06
Public Lighting	0.003

As visible in Figure 3.1 and Table 3.1, emissions from employee commutes composed the largest amount of inventoried emissions (74 metric tons CO_2e) in 2005. The Town's facilities produced the second highest quantity of emissions, resulting in 59 metric tons of CO_2e. Solid waste produced from the Town's operations in 2005 will produce 3 metric tons, and a large remainder of 2005 emissions came from the Town's vehicle fleet (18 metric tons CO_2e) and wastewater (6 metric tons CO_2e). Water transport equipment and lighting equipment produced less than one percent of the Town's 2005 emissions.

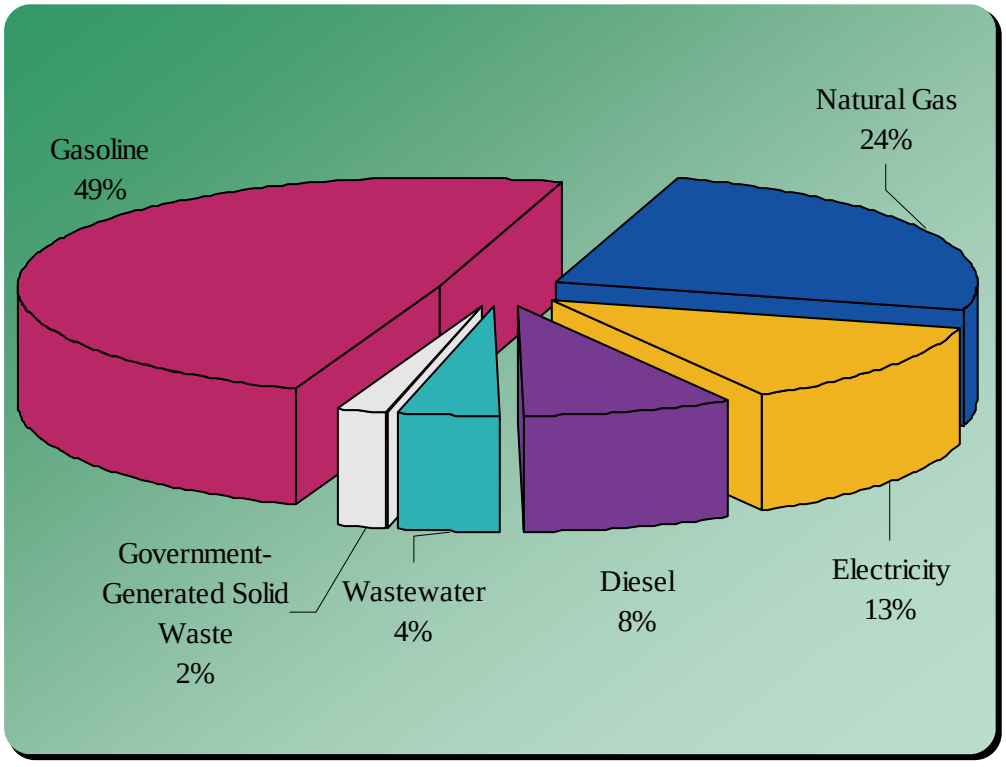
3.2 Summary by Source

When considering how to reduce emissions, it is helpful to look not only at which sectors are generating emissions, but also at the specific raw resources and materials (gasoline, diesel, electricity, natural gas, solid waste, etc.) whose use and generation directly result in the release of greenhouse gases. This analysis can help target resource management in a way that will successfully reduce greenhouse gas emissions. Table 3.2 and Figure 3.2 provide a summary of the Town's government operations 2005 greenhouse gas emissions by fuel type or material.

Table 3.2: 2005 Portola Valley Government Operations Emissions by Source

Source	Greenhouse Gas Emissions (metric tons CO_2e)
Gasoline	79
Natural Gas	39
Electricity	20
Diesel	13
Wastewater	6
Government-Generated Solid Waste	3

Figure 3.2 2005 Portola Valley Government Operations Emissions by Source



3.3 Summary of Energy-Related Costs

In addition to tracking energy consumption and generating estimates on emissions per sector, ICLEI has calculated the basic energy costs of various government operations. During 2005, the Town spent approximately $42,156 on energy (e.g., electricity, natural gas, gasoline, and diesel) and waste services for its operations (see Table 3.3). Fifty-six percent of these energy expenses ($23,490) are the result of electricity and natural gas purchases from Pacific Gas and Electric Company (PG&E). The Town spent approximately $3,884 on gasoline and diesel for the municipal fleet and diesel generators (9 percent of total costs). Handling of the Town's waste in 2005 had an estimated cost of $14,774. Beyond reducing harmful greenhouse gases, any future reductions in energy use will have the potential to reduce these costs, enabling the Town to reallocate limited funds toward other municipal services or create a revolving energy loan fund to support future climate protection activities.

Table 3.3: 2005 Portola Valley Government Operations Costs by Sector

Sector	Cost
Buildings and Facilities	$23,185
Waste	$14,774
Vehicle Fleet	$3,884
Water / Sewage	$214
Public Lighting	$99
TOTAL	**$42,156**

3.4 Detailed Sector Analyses

3.4.1 Buildings and Other Facilities

Through their use of energy for heating, cooling, lighting, and other purposes, buildings and other facilities operated by local governments constitute a significant amount of their greenhouse gas emissions. Portola Valley operates one facility: the Portola Valley Town Center[9]. Facility operations contribute to greenhouse gas emissions in two major ways. First, facilities consume electricity and fuels such as natural gas, and this consumption contributes the majority of greenhouse gas emissions from facilities. In addition, fire suppression, air conditioning, and refrigeration equipment in buildings can emit hydrofluorocarbons (HFCs) and other greenhouse gases when these systems leak refrigerants or fire suppressants.

In 2005, the operation of the Town Center produced approximately 59 metric tons of CO_2e from the above sources. Table 3.4 shows 2005 estimated costs associated with the activities that generated these emissions. Of total facility

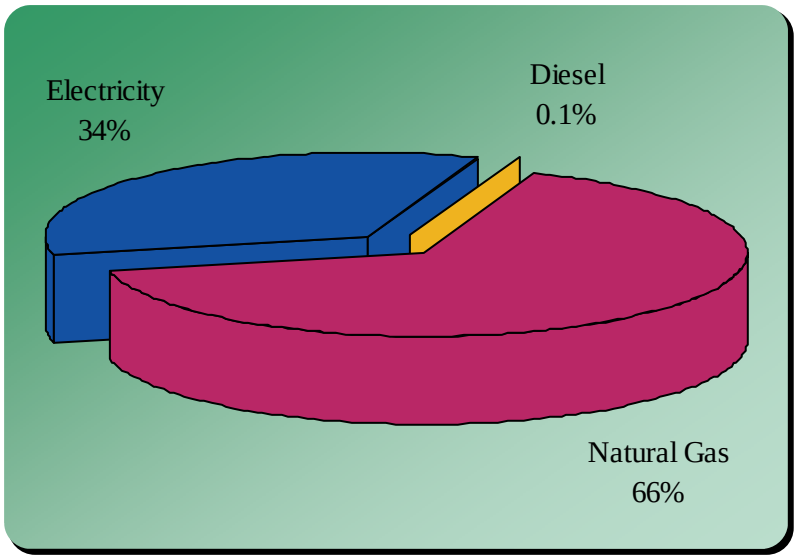
9 The Town Center in 2005 has since been demolished and replaced with a LEED-certified facility. Emissions from the Town Center have thus likely been significantly reduced since 2005.

emissions, 66 percent came from the combustion of natural gas, 34 percent came from the consumption of electricity, and less than one percent came from diesel sources (see Figure 3.3). The Town reported no leakage of refrigerants or fire suppressants, and therefore there are no emissions form these sources. The Town spent approximately $23,185 in 2005 on the fuels and electricity that were the cause of these emissions.

Table 3.4: Energy Use and Emissions from Facilities

Facility	Greenhouse Gas Emissions (metric tons CO_2e)	Electricity Use (kWh)	Natural Gas Use (therms)	Diesel (gal)	Total Energy Cost
Town Center	59	90,436	7,313	3	$23,185

Figure 3.3: Emissions from Facilities by Source



3.4.2 Streetlights, Traffic Signals, and Other Public Lighting

Portola Valley is relatively unique in that the Town operates only one piece of public lighting equipment – a lighted crosswalk. Electricity consumed in the operation of the crosswalk is a source of greenhouse gas emissions.

In 2005, the crosswalk consumed a total of 14 kilowatt hours of electricity, producing approximately 0.003 metric tons CO_2e. Table 3.5 depicts estimated electricity consumption and associated cost. The Town spent approximately $99 in 2005 on the electricity that was the cause of these emissions.

Table 3.5: Energy Use and Emissions from Public Lighting

Source	Greenhouse Gas Emissions (metric tons CO_2e)	Electricity Use (kWh)	Cost
Traffic Signals/Controllers	0.003	14	$99

3.4.3 Water Transport

This section addresses any equipment used for the distribution of water. The Town operates a few sprinklers and irrigation control systems, which consume electricity and therefore emit greenhouse gases through this consumption.

In 2005, the operation of Portola Valley's water transport equipment produced approximately 0.06 metric tons of CO_2e from the above sources. Table 3.6 depicts 2005 emissions per equipment type and shows estimated activities and costs associated with the operation of this equipment. The Town spent approximately $214 in 2005 on the electricity that were the cause of these emissions.

Table 3.6: Energy Use and Emissions from Water Transport Equipment

Source	Greenhouse Gas Emissions (metric tons CO_2e)	Electricity Use (kWh)	Cost
Sprinkler/Irrigation Control	0.06	264	$214

3.4.4 Wastewater Treatment Facilities

Wastewater coming from homes and businesses is rich in organic matter and has a high concentration of nitrogen and carbon (along with other organic elements). As wastewater is collected, treated, and discharged, chemical processes in aerobic and anaerobic conditions lead to the creation and emission of two greenhouse gases: methane and nitrous oxide. Local governments that operate wastewater treatment facilities, including wastewater pumps, treatment plants, septic systems, collection lagoons, and other facilities, must therefore account for the emission of these gases in their overall greenhouse gas emissions inventory.[10]

In 2005, Portola Valley operates a septic system that served approximately 29 people per day.[11] That year, the operation of this system produced approximately 6 metric tons of CO_2e from the above sources (Table 3.7).

Table 3.7: Wastewater Treatment Emissions

Gas	Source	Greenhouse Gas Emissions (metric tons CO_2e)
CH_4	**Septic System Fugitive Emissions**	6

10 These emissions should not be confused with the emissions described in Section 3.4.3—those emissions refer to the *transportation* of water and wastewater while this section refers exclusively to the decomposition and treatment of wastewater.

11 This includes full time employees, regular visitors (for clubs and other activities) and one-time attendees of events. Details on how daily facility usage was estimated are available in the Portola Valley Master Data Summary File.

3.4.5 Vehicle Fleet and Mobile Equipment

The majority of local governments use vehicles and other mobile equipment as an integral part of their daily operations—from maintenance trucks used for parks and recreation to police cruisers and fire trucks. These vehicles and equipment burn gasoline, diesel, and other fuels, which results in greenhouse gas emissions. In addition, vehicles with air conditioning or refrigeration equipment use refrigerants that can leak from the vehicle. Emissions from vehicles and mobile equipment compose a significant portion of emissions within most local governments.

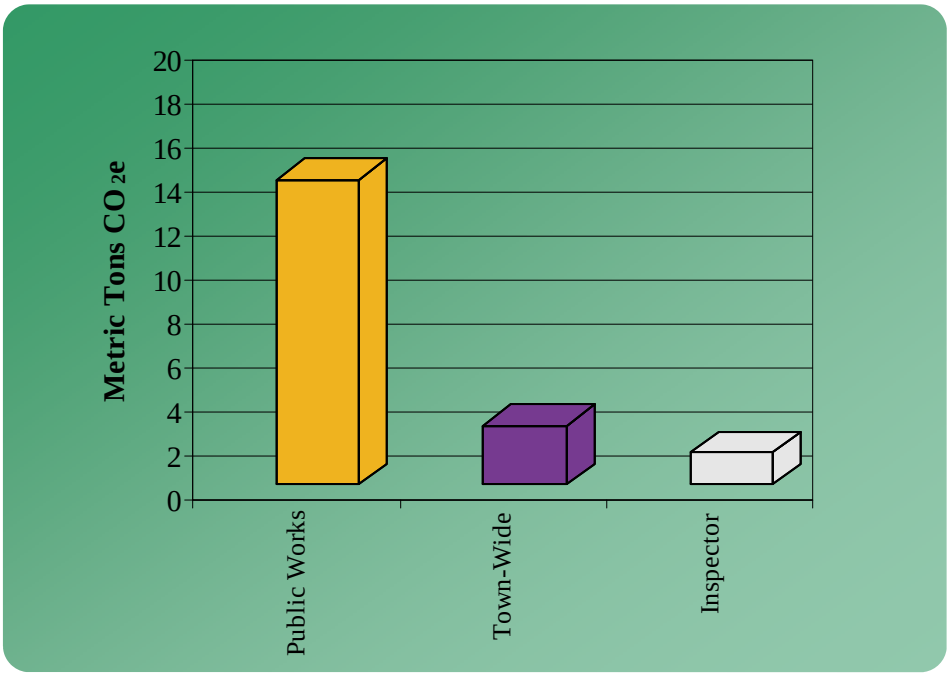
Table 3.8: Vehicle Fleet and Mobile Equipment Emissions by Department

Function	GHG Emissions (metric tons CO_2e)	Percent of All Mobile Emissions	Gasoline Consumption (gal)	Diesel Consumption (gal)	Cost*
Public Works	14	77%	1,516	24	$3,884
Town-Wide	3	15%	298	0	N/A
Inspector	1	8%	160	0	N/A
TOTAL	**18**	**100%**	**1,974**	**24**	**$3,884**

*Costs not tracked for operation of town-wide and inspector vehicles

In 2005, Portola Valley operated a vehicle fleet with four vehicles and various pieces of off-road equipment (not including personal vehicles used for business purposes). In 2005, the Town emitted a total of 18 metric tons of CO_2e as a result of the combustion of fuels to power the Town's vehicle fleet. Table 3.8 shows estimated costs associated with the activities that generated these emissions, and Figure 3.4 depicts 2005 emissions per department. Across departments, the vehicles used by the Public Works department were the largest emitters of greenhouse gases, representing 77 percent of total vehicle fleet emissions. Portola Valley spent approximately $3,884 in 2005 on the fuels for its mobile vehicle fleet.

Figure 3.4: Emissions from Mobile Sources



3.4.6 Government-Generated Solid Waste

Many local government operations generate solid waste, much of which is eventually sent to a landfill. Typical sources of waste in local government operations include paper and food waste from offices and facilities, construction waste from public works, and plant debris from parks departments. Organic materials in government-generated solid waste (including paper, food scraps, plant debris, textiles, wood waste, etc.) generate methane as they decay in the anaerobic environment of a landfill. An estimated 75 percent of this methane is routinely captured via landfill gas collection systems;[12] however, a portion escapes into the atmosphere, contributing to the greenhouse effect. As such, estimating emissions from waste generated by government operations is an important component of a comprehensive emissions inventory.

Inventorying emissions from government-generated solid waste is considered optional by LGOP for two reasons. First, the emissions do not result at the point of waste generation (as with fuel combustion), but in a landfill located outside of Portola Valley's jurisdictional boundaries. In addition, the emissions are not generated in the same year that the waste is disposed, but over a lengthy decomposition period. Since inventorying these emissions is considered optional, LGOP does not provide guidance on recommended methods for quantifying these types of

12 This is a default methane collection rate per LGOP. This rate can vary from 0 to 99 percent based upon the presence and extent of a landfill gas collection system at the landfill/s where the waste is disposed. Most commonly, captured methane gas is flared into the atmosphere, which converts the methane gas to CO_2 and effectively negates the human-caused global warming impact of the methane. Increasingly, landfill methane is being used to power gas-fired turbines as a carbon-neutral means of generating electricity.

emissions. ICLEI therefore devised data collection and calculation methods based upon previous experience and national standards. See Appendix D for more information for more detail on quantifying emissions from government-generated solid waste.

It is estimated that the waste disposed by government facilities in 2005 will cumulatively produce 0.2 metric tons of methane gas, or 3 metric tons of CO_2e. Please see Table 3.9 for a breakdown of emissions per facility.

Table 3.9: Emissions from Government-Generated Solid Waste

Source	Greenhouse Gas Emissions (metric tons CO_2e)	Estimated Landfilled Waste (Tons)
Town Center	2	7
Ford Baseball Field	0.7	3
Street Cleaning	0.6	4
Rosotti Field	0.1	0.5
TOTAL*	**3**	**14**

*Total GHG emissions equals 3 due to rounding

3.4.7 Employee Commute

Fuel combustion from employees commuting to work is another important emissions source. Similar to the Town's vehicle fleet, personal employee vehicles use gasoline and other fuels which, when burned, generate greenhouse gas emissions. Emissions from employee commutes are considered optional to inventory by LGOP because the vehicles are owned and operated privately by the employees. However, LGOP encourages reporting these emissions because local governments can influence how their employees commute to work through policy measures. For this reason, employee commute emissions were included in this report as an area where Portola Valley could achieve significant reductions in greenhouse gases.

To calculate emissions, the Town administered a survey to all of its employees regarding their commute patterns and preferences. ICLEI then extrapolated the results of the survey to represent emissions from all employees. See Appendix C for a detailed description of the survey and methods used to calculate emissions.

In 2005, employees commuting in vehicles to and from their jobs at Portola Valley emitted an estimated 74 metric tons of CO_2e. See Table 3.10 for estimated emissions from all employee commutes, as well as the total and average miles traveled to work by employees.

Table 3.10: Emissions from Employee Commutes

	Greenhouse Gas Emissions (metric tons CO_2e)	Estimated Vehicle Miles Traveled to Work (per year)	Average Estimated Vehicle Miles Traveled to Work (per Employee)
All Employees (Estimated)	74	149,613	9,974

3.4.7.1 Employee Commute Indicators

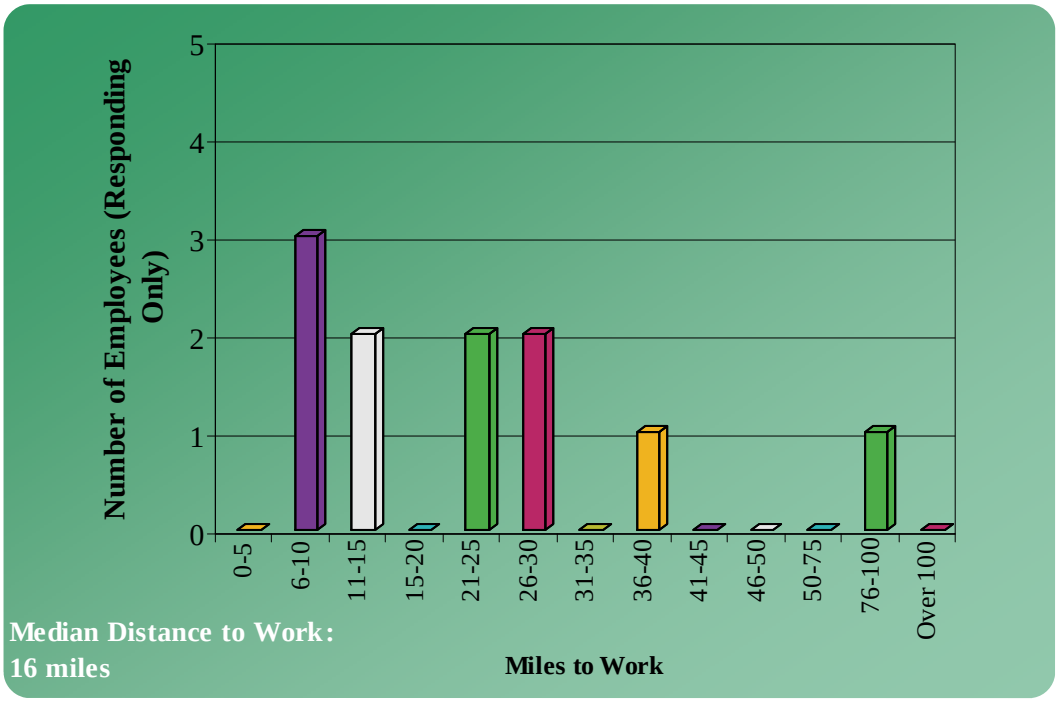
In addition to estimating greenhouse gas emissions resulting from employee commute, ICLEI examined other policy-relevant information that was extracted from the employee commute survey—in this way Portola Valley staff can develop the most effective policies to reduce emissions from employee commutes. These measures often have co-benefits including increased productivity, reduced commute times and costs, and improvement in the quality of life for employees. No extrapolation was done with the following data; analyses were done using data from respondents only.

All employees of Portola Valley that responded to the survey indicated that they drove alone to work, and Table 3.11 shows associated time and costs for employee commutes. Figure 3.5 shows that the majority of employees live within 16 miles, and this suggests that there may be good opportunities for the Town to promote carpooling or vanpooling for employees. Encouraging telecommuting may also be a viable option for the Town. By encouraging employees to shift commute modes through incentives, the Town could not only save employees money and time, but allow their work days to be more efficient.

Table 3.11: Median Distance and Time to Work and Cost of Employee Commutes

Median Time to Work (minutes)	Median Cost of Commute (weekly)	Median Distance To Work (Miles)
25	$20	16

Figure 3.5: Employee Commute Distance to Work



Commuter Preferences

When asked if employees would consider taking a list of alternative transportation modes (Figure 3.6), 23 percent of respondents indicated they would be interested in carpooling with other employees. Respondents also expressed an interest in vanpooling and public transit (15 percent each). One major obstacle identified to employees using alternative commute methods is the lack of usable transit, as 92 percent of respondents indicated that there was no transit route available which they could take to and from work (Figure 3.7).

Respondents indicated that they would be more encouraged to take alternative commute modes if (see Figure 3.8) the Town offered vanpool/carpool incentives or worked with SamTrans to improve transit options (23 percent each), offered free/inexpensive shuttle or telecommuting (15 percent each), and improved biking conditions and or offered better information about commute options (8 percent each).

Figure 3.6: Interest in Alternative Commute Modes

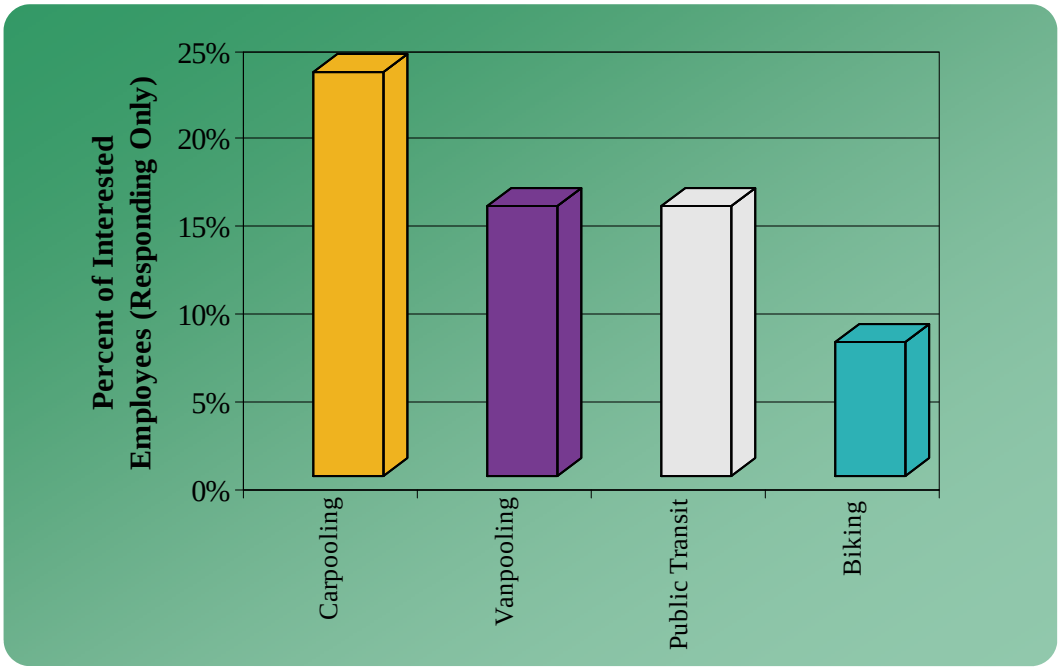


Figure 3.7: Employees with Available "Usable" Transit Route to Work

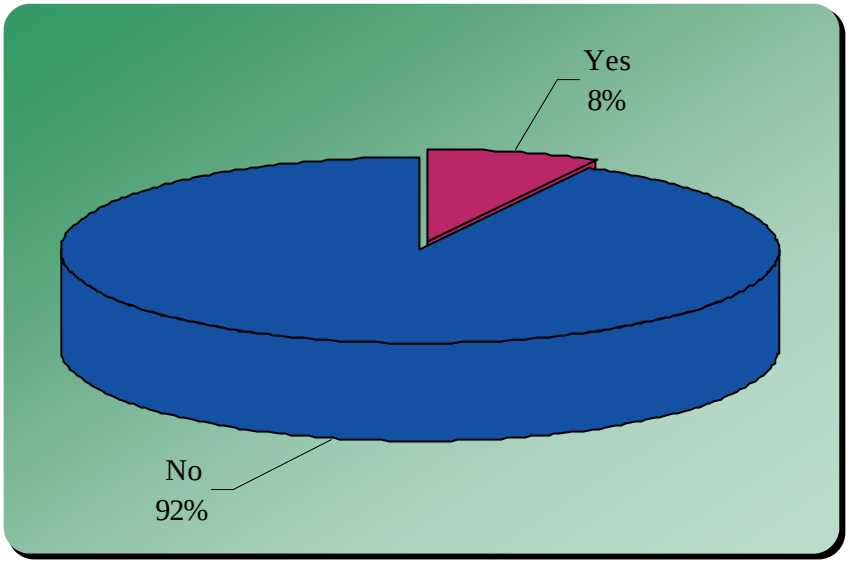
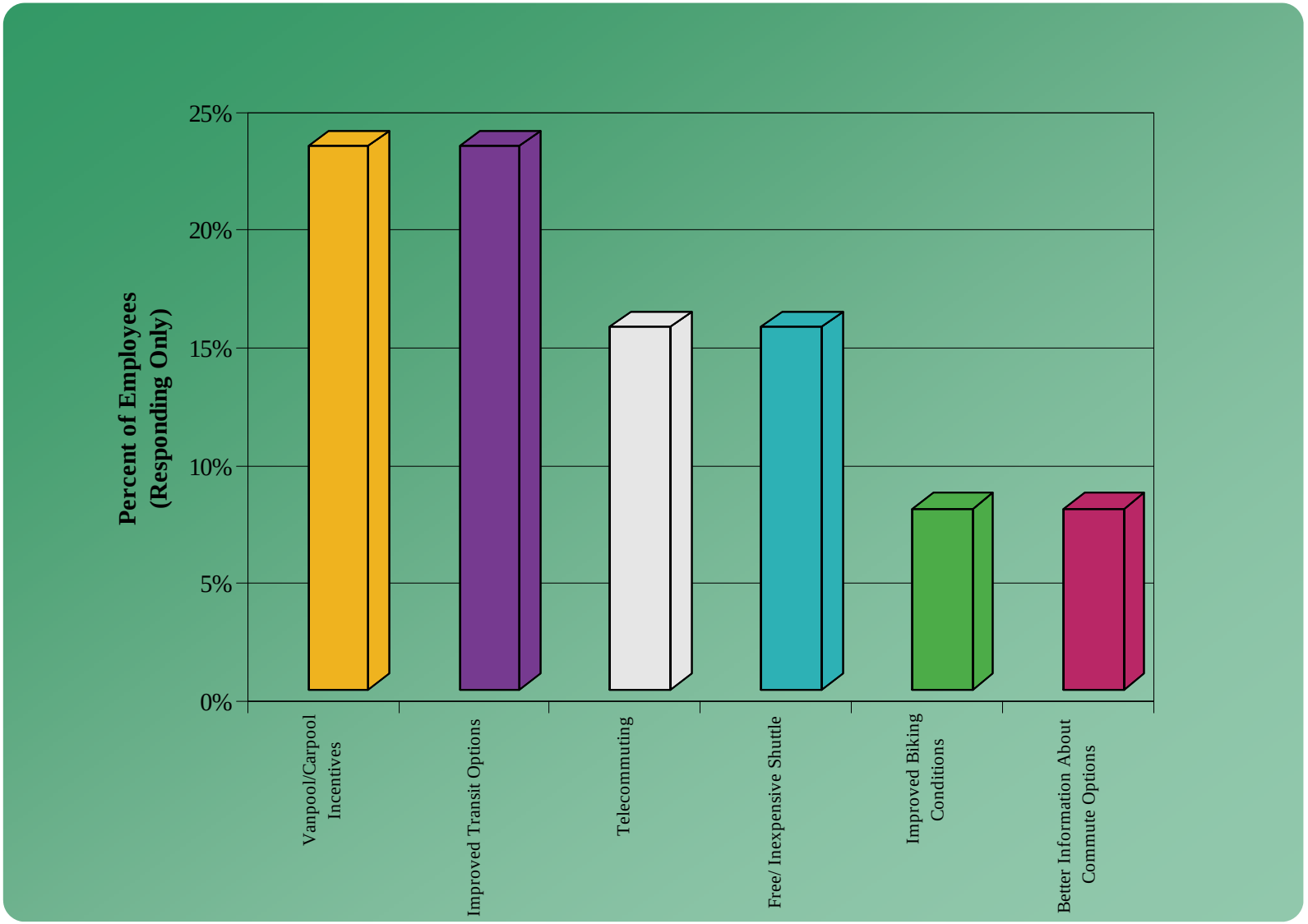


Figure 3.8: Employee Interest in Commute Benefits



Section Four: Conclusion

Conclusion

By committing itself to the Silicon Valley Climate Protection Partnership and through its previous actions on sustainability, the Town of Portola Valley has taken bold steps toward reducing its impacts on the environment. Staff and policymakers have chosen to take a leadership role in addressing climate change, and this leadership will allow the Town to make tough decisions to create and implement innovative approaches to reduce its emissions. With increasing guidance and support from the state and the federal governments, the Town should be increasingly empowered to make the necessary changes to promote its vision for a more sustainable future.

This inventory provides an important foundation for the Portola Valley's comprehensive approach to reducing the greenhouse gas emissions from its operations. Specifically, this inventory serves to:

- Establish a baseline for setting emissions reductions targets.
- Identify the largest sources of emissions from local government operations.

This conclusion discusses the inventory as a baseline for emissions targets and suggests steps for Portola Valley to move forward to reduce emissions from its internal operations.

4.1 Toward Setting Emissions Reduction Targets

This inventory provides an emissions baseline against which the Town can move forward to Milestone Two of ICLEI's Five-Milestone process—setting emissions reduction targets for its municipal operations. The greenhouse gas emissions reduction target represents the percentage by which the Town plans to reduce total greenhouse gas emissions in its government operations below base year levels by a chosen future target year. An example target might be a 30 percent reduction in emissions below 2005 levels by 2020. A target provides an objective toward which to strive and against which to measure progress. It allows a local government to quantify its commitment to fighting climate change—demonstrating that the Town is serious about its commitment and systematic in its approach.

In selecting a target, it is important to strike a balance between scientific necessity, ambition, and what is realistically achievable. Portola Valley will want to give itself enough time to implement chosen emissions

reduction measures—but note that the farther out the target year is, the more that the Town should pledge to reduce. ICLEI recommends that regardless of the Town's chosen long-term emissions reduction target (e.g., 15-year, 40-year), it should establish interim targets for every two- to three-year period. Near-term targets facilitate additional support and accountability, and help to ensure continued momentum around Portola Valley's local climate protection efforts. To monitor the effectiveness of its programs, the Town should plan to re-inventory its emissions at least every five years and more frequently if possible. See Appendix E for more information on how to re-inventory Portola Valley's emissions.

4.1.1 The Long-Term Goal

ICLEI recommends that the Town of Portola Valley's near-term climate work should be guided by the long-term goal of reducing its emissions by 80 percent to 95 percent from the 2005 baseline level by the year 2050. By referencing a long-term goal that is in accordance with current scientific understanding, the Town can demonstrate that it intends to do its part towards addressing greenhouse gas emissions from its internal operations.

It is important to keep in mind that it will be next to impossible for local governments to reduce emissions by 80 to 95 percent without the assistance of state and federal policy changes that create new incentives and new sources of funding for emissions reduction projects and programs. However, in the next 15 years, there is much that local governments can do to reduce emissions independently. It is also important that the Town works to reduce its emissions sooner, rather than later: the sooner a stable level of greenhouse gases in the atmosphere is achieved, the less likely we are to face some of the most dire climate change scenarios.

4.1.2 State of California Targets and Guidance

An integral component of the State of California's climate approach has been establishing three core emissions reduction targets at the community level. While these targets are specific to the community-scale, they can be used to inform emissions targets for government operations as well. Figure 4.1 highlights adopted emissions targets for the State. The AB 32 Scoping Plan also provides further guidance on establishing targets for local governments; specifically the Plan suggests creating an emissions reduction goal of 15 percent below "current" levels by 2020. This target has informed many local government's

Figure 4.1: California Greenhouse Gas Reduction Targets

On June 1, 2005, California Governor Schwarzenegger signed Executive Order S-3-05 establishing climate change emission reductions targets for the State of California. The California targets are an example of near-, mid- and long-term targets:

Reduce emissions to 2000 levels by 2010
Reduce emissions to 1990 levels by 2020
Reduce emissions to 80 percent below 1990 levels by 2050

emission reduction targets for municipal operations—most local governments in California with adopted targets have targets of 15 to 25 percent reductions under 2005 levels by 2020.

4.2 Creating an Emissions Reduction Strategy

This inventory identifies the major sources of emissions from the Town's operations and, therefore, where staff and policymakers will need to target emissions reductions activities if they are to make significant progress toward adopted targets. For example, since employee commute was a major source of emissions from Portola Valley's operations, it is possible that the Town could meet near-term targets simply by implementing a few major actions within this sector. In addition, medium-term targets could be met by focusing emissions reduction actions on the Town's building and facilities and government-generated solid waste, and the long term (2050) target will not be achievable without major reductions in all of those sectors.

Given the results of the inventory, ICLEI recommends that Portola Valley focus on the following tasks in order to significantly reduce emissions from its government operations:

- Promote carpooling among employees and institute telecommuting or flex schedule program
- Expand recycling and composting in government facilities, street cleaning and park facilities
- Replace existing vehicles with more fuel efficient or alternative fuel vehicles
- Replace personal vehicle use with Town-owned fuel efficient/alternative fuel vehicles

Using these strategies as a basis for a more detailed emissions reductions strategy, the Town of Portola Valley should be able to reduce its impact upon climate change. In the process, it may also be able to improve the quality of its services, become more efficient with energy, and reduce long-term costs.

Appendices

Appendix A: The Local Government Operations Protocol

This inventory follows the standard outlined in the Local Government Operations Protocol, which was adopted in 2008 by the California Air Resources Board (ARB) and serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. This and the other inventories conducted for the Silicon Valley Climate Protection partnership are the first to follow LGOP, representing a strong step toward standardizing how inventories are conducted and reported.

A.1 Local Government Operations Protocol

A.1.1 Background

In 2008, ICLEI, ARB, and the California Climate Action Registry (CCAR) released LGOP to serve as a U.S. supplement to the International Emissions Analysis Protocol. The purpose of LGOP is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory. It leads participants through the process of accurately quantifying and reporting emissions, including providing calculation methodologies and reporting guidance. LGOP guidance is divided into three main parts: identifying emissions to be included in the inventory, quantifying emissions using best available estimation methods, and reporting emissions.

The overarching goal of LGOP is to allow local governments to develop emissions inventories using standards that are consistent, comparable, transparent, and recognized nationally, ultimately enabling the measurement of emissions over time. LGOP adopted five overarching accounting and reporting principles toward this end: relevance, completeness, consistency, transparency and accuracy. Methodologies that did not adhere to these principles were either left out of LGOP or included as Scope 3 emissions. LGOP was created solely to standardize how emissions inventories are conducted and reported; as such it represents a currently accepted standard for inventorying emissions but does not contain any legislative or program-specific requirements. Mandates by the State of California or any other legislative body, while possibly using LGOP as a standard, do not currently exist, and California local governments are not currently required to inventory their emissions. Program-specific

requirements, such as ICLEI's Milestones or CCAR's reporting protocol, are addressed in LGOP but should not be confused with LGOP itself.

Also, while LGOP standardizes inventories from government operations, it does not seek to be a wholly accurate inventory of all emissions sources, as certain sources are currently excluded or otherwise impossible to accurately estimate. This and all emissions inventories therefore represent a best estimate of emissions using best available data and calculation methodologies; it does not provide a complete picture of all emissions resulting from Portola Valley's operations, and emissions estimates are subject to change as better data and calculation methodologies become available in the future.

A.1.2 Organizational Boundaries

Setting an organizational boundary for greenhouse gas emissions accounting and reporting is an important first step in the inventory process. The organizational boundary for the inventory determines which aspects of operations are included in the emissions inventory, and which are not. Under LGOP, two control approaches are used for reporting emissions: operational control or financial control. A local government has operational control over an operation if it has full authority to introduce and implement its operating policies at the operation. A local government has financial control if the operation is fully consolidated in financial accounts. If a local government has joint control over an operation, the contractual agreement will have to be examined to see who has authority over operating policies and implementation, and thus the responsibility to report emissions under operational control.[13] Local governments must choose which approach is the most applicable and apply this approach consistently throughout the inventory.

While both control approaches are acceptable, there may be some instances in which the choice may determine whether a source falls inside or outside of a local government's boundary. LGOP strongly encourages local governments to utilize operational control as the organization boundary for a government operations emissions inventory. Operational control is believed to most accurately represent the emissions sources that local governments can most directly influence, and this boundary is consistent with other environmental and air quality reporting program requirements. For this reason, all inventories in the Silicon Valley Climate Protection Partnership are being conducted according to the operational control framework.

13 Please see Local Government Operations Protocol for more detail on defining your organizational boundary: http://www.icleiusa.org/programs/climate/ghg-protocol

A.1.3 Types of Emissions

The greenhouse gases inventoried in this report are described in Section 2.1 As described in LGOP, emissions from each of the greenhouse gases can come in a number of forms:

Stationary or mobile combustion: These are emissions resulting from on-site combustion of fuels (natural gas, diesel, gasoline, etc.) to generate heat, electricity, or to power vehicles and mobile equipment.

Purchased electricity: These are emissions produced by the generation of power from utilities outside of Portola Valley.

Fugitive emissions: Emissions that result from the unintentional release of greenhouse gases into the atmosphere (e.g., leaked refrigerants, methane from waste decomposition, etc.).

Process emissions: Emissions from physical or chemical processing of a material (e.g., wastewater treatment).

A1.4 Quantifying Emissions

Emissions can be quantified two ways:

Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility. This methodology is not generally available for most types of emissions and will only apply to a few local governments that have these monitoring systems.

The majority of the emissions recorded in the inventory can be and will be estimated using **calculation-based methodologies** to calculate their emissions using activity data and emission factors. To calculate emissions, the equation below is used:

Activity Data x Emission Factor = Emissions

Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual energy consumption, and annual vehicle mileage by vehicle type. Emissions factors are calculated ratios relating emissions to a proxy measure of activity at an emissions source (e.g., CO_2 generated/kWh consumed). For a list of common emissions calculations see Table 2.2.

The guidelines in LGOP are meant to provide a common method for local governments to quantify and report greenhouse gas emissions by using comparable activity data and emissions factors. However, LGOP recognizes that local governments differ in how they collect data concerning their operations and that many are not able to meet the data needs of a given estimation method. Therefore, LGOP outlines both “recommended” and “alternative” methods

to estimate emissions from a given source. In this system, recommended methods are the preferred method for estimating emissions, as they will result in the most accurate estimate for a given emission source. Alternative methods often require less intensive data collection, but are likely to be less accurate. This approach allows local governments to estimate emissions based on the data currently available to them. It also allows local governments that are unable to meet the recommended methods to begin developing internal systems to collect the data needed to meet these methods.

This inventory has used the recommended activity data and emissions factors wherever possible, using alternative methods where necessary. For details on the methodologies used for each sector, see Appendix B.

A.1.5 Reporting Emissions

A.1.5.1 Significance Thresholds

Within any local government's own operations there will be emission sources that fall within Scope 1 and Scope 2 that are minimal in magnitude and difficult to accurately measure. Within the context of local government operations, emissions from leaked refrigerants, backup generators and other septic tanks may be common sources of these types of emissions. For these small, difficult to quantify emission sources, LGOP specifies that up to 5 percent of total emissions can be reported using estimation methods not outlined in LGOP.[14]

In this report, the following emissions fell under the significance threshold and were reported using best available methods:

- Scope 1 CH_4 and N_2O emissions from vehicle fleet

A.1.5.2 Units Used in Reporting Emissions

LGOP requires reporting of individual gas emissions, and this reporting is included in Appendix B. In this narrative report, emissions from all gases released by an emissions source (e.g., stationary combustion of natural gas in facilities) are combined and reported in metric tons of carbon dioxide equivalent (CO_2e). This standard is based on the global warming potential (GWP) of each gas, which is a measure of the amount of warming a greenhouse gas may cause, measured against the amount of warming caused by carbon dioxide. For the GWPs of reported greenhouse gases, see Table 2.1.

14 In the context of registering emissions with an independent registry (such as the California Climate Action Registry), emissions that fall under the significance threshold are called *de minimis*. This term, however, is not used in LGOP and was not used in this inventory.

A.1.5.3 Information Items

Information items are emissions sources that, for a variety of reasons, are not included as Scope 1, 2, or 3 emissions in the inventory. In order to provide a more complete picture of emissions from the Town of Portola Valley's operations, however, these emissions should be quantified and reported.

In this report, Portola Valley did not have any informational item emissions to report.

A common emission type that is categorized as an information item is carbon dioxide emissions released by the combustion of biogenic fuels. Local governments will often burn fuels that are of biogenic origin (wood, landfill gas, organic solid waste, biofuels, etc.) to generate power. Common sources of biogenic emissions are the combustion of landfill gas from landfills or biogas from wastewater treatment plants, as well as the incineration of organic municipal solid waste at incinerators.

Carbon dioxide emissions from the combustion of biogenic fuels are not included in Scope 1 based on established international principles**.** [15] These principles indicate that biogenic fuels (e.g., wood, biodiesel), if left to decompose in the natural environment, would release CO_2 into the atmosphere, where it would then enter back into the natural carbon cycle. Therefore, when wood or another biogenic fuel is combusted, the resulting CO_2 emissions are akin to natural emissions and should therefore not be considered as human activity-generated emissions. The CH_4 and N_2O emissions, however, would not have occurred naturally and are therefore included as Scope 1 emissions.

A.2 Baseline Years

Part of the local government operations emissions inventory process requires selecting a "performance datum" with which to compare current emissions, or a base year. Local governments should examine the range of data they have over time and select a year that has the most accurate and complete data for all key emission sources. It is also preferable to establish a base year several years in the past to be able to account for the emissions benefits of recent actions. A local government's emissions inventory should comprise all greenhouse gas emissions occurring during a selected *calendar* year.

For the Silicon Valley Climate Protection Partnership inventories, 2005 was chosen as the baseline year, since this year is increasingly becoming the standard for such inventories; the 1990 baseline year for California is usually difficult for most local governments to meet and would not produce the most accurate inventory.

15 Methane and nitrous oxide emissions from biogenic fuels are considered Scope 1 stationary combustion emissions and are included in the stationary combustion sections for the appropriate facilities.

After setting a base year and conducting an emissions inventory for that year, local governments should make it a practice to complete a comprehensive emissions inventory on a regular basis to compare to the baseline year. ICLEI recommends conducting an emissions inventory at least every five years.

Appendix B:
LGOP Standard Report

1. Local Government Profile

Jurisdiction Name:	Town of Portola Valley
Street Address:	765 Portola Road
City, State, ZIP, Country:	Portola Valley, CA 94028 USA
Website Address:	www.portolavalley.net
Size (sq. miles):	10
Population:	4,462
Annual Budget:	$5,500,000 (FY 09/10)
Employees (Full Time Equivalent):	14.5
Climate Zone:	CA Climate Zone 3 (www.energycodes.gov/implement/pdfs/climate_paper_review_draft_rev.pdf)
Annual Heating Degree Days:	3649 (www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#)
Annual Cooling Degree Days:	292 (www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#)
Lead Inventory Contact Name:	Brandi de Garmeaux
Title:	Sustainability & Resource Efficiency Coordinator
Department:	
Email:	bdegarmeaux@portolavalley.net
Phone Number:	(650) 851-1700 x 222

Services Provided:

☐ Water treatment	☐ Mass transit (buses)	☐ Hospitals
☐ Water distribution	☐ Mass transit (light rail)	☐ Airport
☐ Wastewater treatment	☐ Mass transit (ferries)	☐ Seaport/shipping terminal
☐ Wastewater collection	☐ Schools (primary/secondary)	☐ Marina
☐ Electric utility	☐ Schools (colleges/universities)	☐ Stadiums/sports venues
☐ Fire Protection	☐ Solid waste collection	☐ Convention center
☐ Police	☐ Solid waste disposal	☐ Street lighting and traffic signals

Local Government Description:

Surrounded by wooded hills, this pristine and picturesque town of 4500 residents is located just west of Stanford University in a green and gold valley astride the world-famous San Andreas Fault. The Town values its environmental and historic heritage, its excellent public schools and its economical Town government supported by a multitude of volunteers. An extensive trail system, scenic roads, open space and natural views contribute to one's feeling of being in the country, as do architectural guidelines that stress "blending in." Commercial activity is encouraged to the extent that it primarily meets needs of residents of the community. These factors have enabled the town to retain a rural ambiance reminiscent of earlier days.

2. GHG Inventory Details

Reporting Year:	2005
Protocol Used:	Local Government Operations Protocol, Version 1.0 (September 2008)
Control Approach:	Operational Control

GHG Emissions Summary (All Units in Metric Tons Unless Stated Otherwise)

Note: CO_2e totals listed here are summed totals of the estimated emissions of each inventoried gas based upon their global warming potentials (Appendix E of LGOP)

BUILDINGS & OTHER FACILITIES

SCOPE 1

	CO_2e	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6
Stationary Combustion	38.933	38.833	0.004	0.000			
Total Direct Emissions from Buildings & Facilities	38.933	38.833	0.004	0.000			

SCOPE 2

	CO_2e	CO_2	CH_4	N_2O
Purchased Electricity	20.231	20.066	0.001	0.000
Total Indirect Emissions from Buildings & Facilities	20.231	20.066	0.001	0.000

STREETLIGHTS AND TRAFFIC SIGNALS

SCOPE 2

	CO_2e	CO_2	CH_4	N_2O
Purchased Electricity	0.003	0.003	0.000	0.000
Total Indirect Emissions from Streetlights and Traffic Signals	0.003	0.003	0.000	0.000

WATER DELIVERY FACILITIES

SCOPE 2

	CO_2e	CO_2	CH_4	N_2O
Purchased Electricity	0.059	0.059	0.000	0.000
Total Indirect Emissions from Water Delivery Facilities	0.059	0.059	0.000	0.000

WASTEWATER FACILITIES

SCOPE 1

	CO_2e	CO_2	CH_4	N_2O
Fugitive Emissions	6.090	0.000	0.290	0.000

VEHICLE FLEET

SCOPE 1

	CO_2e	CO_2	CH_4	N_2O	HFCs	PFCs
Mobile Combustion	18.035	17.626	0.001	0.001		
Total Direct Emissions from Vehicle Fleet	18.035	17.626	0.001	0.001	0.000	0.000

INDICATORS	Number of Vehicles	4
	Vehicle Miles Traveled	24,027
	Number of Pieces of Equipment	21
	Equipment Operating Hours	

WASTE GENERATION

SCOPE 3

	CO_2e	CO_2	CH_4	N_2O
Waste All Facilities	3.198	0.000	0.152	0.000

INDICATORS	Short tons of solid waste accepted for disposal	28.4

EMPLOYEE COMMUTE

SCOPE 3

	CO_2e	CO_2	CH_4	N_2O
Mobile Combustion	73.880	72.455	0.004	0.004

INDICATORS	Vehicle Miles Traveled	149,613
	Number of Vehicles	15

Total Emissions

	CO_2e	CO_2	CH_4	N_2O	HFC	PFC	SF_6
SCOPE 1	63.058	56.459	0.295	0.001	0.0	0.0	0.0
SCOPE 2	20.293	20.128	0.001	0.000	0.0	0.0	0.0
SCOPE 3	77.078	72.455	0.156	0.004			

3. Activity Data Disclosure

BUILDINGS & OTHER FACILITIES (Chapter 6)

SCOPE 1

Stationary Combustion

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Natural Gas	CO_2e					
	CO_2	Primary	Known fuel use	7,313	therms	PG&E
	CH_4					
	N_2O					
	HFC					
	PFC					
	SF_6					
Diesel	CO_2e					
	CO_2	Alternate	Estimated run time and fuel efficiency	3	gallons	Brandi de Garmeaux
	CH_4					
	N_2O					
	HFC					
	PFC					
	SF_6					

SCOPE 2

Purchased Electricity

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Electricity	CO_2e					
	CO_2	Primary	Known Electricity Use	90,436	kWh	PG&E
	CH_4					
	N_2O					
	HFCs					
	PFCs					
	SF_6					

STREETLIGHTS AND TRAFFIC SIGNALS (Chapter 6.2)

SCOPE 2

Purchased Electricity

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Electricity	CO_2e					
	CO_2	Primary	Known Electricity Use	14	kWh	PG&E
	CH_4					
	N_2O					
	HFC					
	PFC					
	SF_6					

WATER DELIVERY FACILITIES (Chapter 6)

SCOPE 2-Purchased Electricity

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Electricity	CO_2e					
	CO_2	Primary	Known Electricity Use	264	kWh	PG&E
	CH_4					
	N_2O					
	HFCs					
	PFCs					
	SF_6					

WASTEWATER FACILITIES (Chapters 6 & 10)

SCOPE 1- Fugitive Emissions

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Unit	Data Sources and References
Septic Systems	CH_4	Default	Population Served	29.03	Daily Users	Brandi de Garmeaux, Sustainability & Resource Efficiency Coordinator

VEHICLE FLEET (Chapter 7)

SCOPE 1-Mobile Combustion

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Gasoline	CO_2e					
	CO_2	Primary and Alternate	Known Fuel Use; Vehicle miles traveled and fuel efficiency estimates	1,974	gallons	Scott Weber; Stacie Nerdahl; Gary Fitzer
	CH_4		Known or estimated vehicle miles traveled	24,027	miles	
	N_2O					
	HFC					
	PFCs					
	SF_6					
Diesel	CO_2e					
	CO_2	Primary	Known Equipment Fuel Use	24	gallons	Scott Weber
	CH_4					
	N_2O					
	HFCs					
	PFCs					
	SF_6					

WASTE GENERATION (Scope 3)

SCOPE 3

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Generated Waste	CH_4	Alternate	Estimated waste weight based upon volume and number of containers	14	tons	Valerie Enyart, Greenwaste Recovery; Chase Harris, Clean Street

EMPLOYEE COMMUTE (Scope 3)

SCOPE 3

Mobile Combustion

Emissions Source Name	GHG	Methodology Type	Methodology Name and Description	Resource Quantity	Fuel Unit	Data Sources and References
Gasoline	CO_2e					
	CO_2	Alternate	Proxy Year Estimated Fuel Use-based upon daily vehicle miles traveled for all respondents extrapolated to represent all local government employees	6,791	gallons	Online and paper surveys of all employees; see Appendix C of Narrative report for examples; Data in possession of Brandi de Garmeaux at Town of Portola Valley
	CH_4					
	N_2O					
	HFCs					
	PFCs					
	SF_6					
Diesel	CO_2e					
	CO_2	Alternate	Proxy Year Estimated Fuel Use-based upon daily vehicle miles traveled for all respondents extrapolated to represent all local government employees	1,248	gallons	Online and paper surveys of all employees; see Appendix C of Narrative report for examples; Data in possession of Brandi de Garmeaux at Town of Portola Valley
	CH_4					
	N_2O					
	HFCs					
	PFCs					
	SF_6					

4. Calculation Methodology Disclosure

BUILDINGS & OTHER FACILITIES (Chapter 6)

SCOPE 1

Stationary Combustion

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Natural Gas	CO_2e			
	CO_2	Default	53.06 kg/MMBtu	LGOP v1 Table G.1
	CH_4	Default	5 g/MMBtu	LGOP v1 Table G.3
	N_2O	Default	0.1 g/MMBtu	
	HFCs			
	PFCs			
	SF_6			
Generators-Diesel	CO_2e			
	CO_2	Default	73.15 kg/MMBtu	LGOP v1 Table G.1
	CH_4	Default	11 g/MMBtu	LGOP v1 Table G.3
	N_2O	Default	.6 g/MMBtu	
	HFCs			
	PFCs			
	SF_6			

SCOPE 2

Purchased Electricity

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Electricity	CO_2e			
	CO_2	Default	489.2 lbs/MWh	PG&E (2005); LGOP v1 Table G.5
	CH_4	Default	0.029 lbs/MWh	PG&E (2004 proxy); LGOP v1 Table G.6
	N_2O	Default	0.011 lbs/MWh	
	HFCs			
	PFCs			
	SF_6			

STREETLIGHTS AND TRAFFIC SIGNALS (Chapter 6.2)

SCOPE 2

Purchased Electricity

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Electricity	CO_2e			
	CO_2	Default	489.2 lbs/MWh	PG&E (2005); LGOP v1 Table G.5
	CH_4	Default	0.029 lbs/MWh	PG&E (2004 proxy); LGOP v1 Table G.6
	N_2O	Default	0.011 lbs/MWh	
	HFCs			
	PFCs			
	SF_6			

WATER DELIVERY FACILITIES (Chapter 6)

SCOPE 2

Purchased Electricity

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Electricity	CO_2e			
	CO_2	Default	489.2 lbs/MWh	PG&E (2005); LGOP v1 Table G.5
	CH_4	Default	0.029 lbs/MWh	PG&E (2004 proxy); LGOP v1 Table G.6
	N_2O	Default	0.011 lbs/MWh	
	HFCs			
	PFCs			
	SF_6			

WASTEWATER FACILITIES (Chapters 6 & 10)

SCOPE 1

Fugitive Emissions

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Septic System	CH_4	Default	See LGOP equation	LGOP v1 Equation 10.6

VEHICLE FLEET (Chapter 7)

SCOPE 1

Mobile Combustion

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Gasoline	CO_2e			
	CO_2	Default	8.81 kg/gallon	LGOP v1 Table G.9
	CH_4	Default	Varies by model year	LGOP v1 Table G.10; Table G.12 for other equipment
	N_2O	Default	Varies by model year	
	HFCs			
	PFCs			
	SF_6			
Diesel	CO_2e			
	CO_2	Default	10.15 kg/gallon	LGOP v1 Table G.9
	CH_4	Default	Varies by model year	LGOP v1 Table G.10; Table G.12 for other equipment
	N_2O	Default	Varies by model year	
	HFCs			
	PFCs			
	SF_6			

WASTE GENERATION (Scope 3)

SCOPE 3

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Generated Waste	CH_4	Alternate	Varies by waste type	EPA Waste Reduction Model http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html; Public Administration waste characterization provided by CIWMB

EMPLOYEE COMMUTE (Scope 3)

SCOPE 3

Mobile Combustion

Emissions Source Name	GHG	Default/ Alternate	Emission Factor	Emission Factor Sources and References
Gasoline	CO_2e			
	CO_2	Default	8.81 kg/gallon	LGOP v1 Table G.9
	CH_4	Default	0.02990 g/mi	LGOP v1 Table G.13
	N_2O	Default	.03413 g/mil	
	HFCs			
	PFCs			
	SF_6			

Diesel	CO_2e			
	CO_2	Default	10.15 kg/gallon	LGOP v1 Table G.9
	CH_4	Default	.0005g/mi	LGOP v1 Table G.13
	N_2O	Default	.001 g/mi	
	HFCs			
	PFCs			
	SF_6			

Appendix C: Employee Commute

Emissions from employee commutes make up an important optional source of emissions from any local government's operations. The scale of emissions from employee commutes is often large in comparison with many other facets of local government operations, and local governments can affect how their employees get to and from work through a variety of incentives. For this reason, ICLEI recommends estimating emissions from employee commutes as part of a complete government operations greenhouse gas emissions inventory.

To assist in the data collection process, ICLEI provided the Town with both an online and a paper copy of an employee commute survey.[16] The questions in the survey were aimed at finding three categories of information:

- **Activity data** to calculate emissions from employee commute (vehicles miles traveled, vehicle type, vehicle model year) both current and in 2005.
- **Indicator data** to help the Town understand how much time and money employees spend as they commute, as well as how many employees use alternative modes of transportation to get to work.
- **Policy data** that will serve as guidance for the Town as it adopts policies aimed at reducing emissions from employee commutes. These questions asked employees for their interest in alternative modes of transportation as well as what policies would be most effective in allowing them to switch modes of transportation away from driving alone.

This section provides the emissions estimation methodology and both surveys. Individual survey results are in the possession of Portola Valley staff.

C.1 Methodology Summary

The methodology for estimating the employee commute emissions portion of the inventory is similar to the mobile emissions methodology outlined in the mobile emissions section of Appendix B. The Town of Portola Valley administered the employee commute survey to fifteen current employees working for the Town, and thirteen

16 The paper survey was administered only to employees that do not have access to a computer. The survey asked slightly different questions but was aimed at garnering the same emissions and policy-relevant data as the electronic survey.

employees responded to the survey (a response rate of 87 percent). The survey was administered in 2008 and current data was used as a proxy for 2005 data. Both full time and part-time employee data were included.

To calculate emissions, the survey collected the following information:

- The number of days and number of miles employees drive alone to work (one-way) in an average week
- The number of days they carpooled and how often they drove the carpool in an average week
- The vehicle type of their vehicle and the type of fuel consumed

These weekly data were then converted into annual VMT estimates by the following equation:

Number of days driven to work/week x to-work commute distance x 2 x 48 weeks worked/year

Actual CO_2e emissions from respondents' vehicles were calculated by converting vehicle miles traveled per week by responding employees into annual fuel consumption by fuel type (gasoline, diesel). The VMT data collected were converted to fuel consumption estimates using fuel economy of each vehicle type.

ICLEI then extrapolated estimated fuel consumption to represent all fifteen of the Town's employees in 2005. This was a simple extrapolation, multiplying the estimated fuel consumption number by the appropriate factor to represent all current employees. For example, if 33.3 percent of employees responded, fuel consumption numbers were tripled to estimate fuel consumption for all employees. This is not a statistical analysis and no uncertainty has been calculated as there is uncertainty not only at the extrapolation point but also in the calculation of actual emissions. Therefore, the resulting calculated emissions should be seen as directional and not as statistically valid.

C.2 Electronic Employee Commute Survey

1. Introduction
The purpose of this survey is to gather information on your commute to work so your employer can offer the best transportation options to you while reducing the jurisdiction's impact on the environment. The survey should take no more than 15 minutes.

Unless otherwise indicated, all questions refer to a ONE-WAY commute TO WORK only. Please do not include any traveling you do during work hours (meetings, site visits, etc). Any question with an asterisk (*) next to it requires an answer in order to proceed.

Please note that this survey is completely anonymous. We will not collect or report data on any individuals who respond to the survey.

Thank you very much.

2. Workplace
Please provide the following information regarding your workplace. Click "Next" at the bottom when finished or click "Prev" to go back.

*1. What local government do you currently work for?
Atherton
Belmont
Brisbane
Burlingame
Campbell
Colma
Cupertino
Daly City
East Palo Alto
Foster City
Gilroy
Half Moon Bay
Los Altos
Los Gatos
Milpitas
Mountain View
Pacifica
Portola Valley
Redwood City
San Bruno
San Carlos
San Mateo County
Santa Clara
Santa Clara County
Santa Cruz County
Saratoga
South San Francisco
Woodside

*2. What department do you work in?

3. Commuter Background Information
Please provide the following information regarding your background. Click "Next" at the bottom when finished or click "Prev" to go back.

*1. What city/town do you live in?

*2. How many miles do you live from your place of work?
(please enter a whole number)

3. How many minutes does your commute to work typically take?
(please enter a whole number)

4. In a typical week, how much money do you spend on your ROUND TRIP commute? (transit fees, gas, tolls, etc-please enter a number)

5. If you drive to work, what type of vehicle do you usually drive?
Full-size auto
Mid-size auto
Compact/hybrid
Light truck/SUV/Pickup
Van
Heavy Truck
Motorcycle/scooter

6. What year is your vehicle?
(please enter a four digit year)

7. What type of fuel does your vehicle use?
Gas
Diesel
Biodiesel (B20)
Biodeisel (B99 or B100)
Electric
Other (please specify-if Ethanol please indicate grade)

4. Employment Information
Please provide the following information regarding your employment. Click "Next" at the bottom when finished or click "Prev" to go back.

1. Do you typically travel to work between 6-9 am Monday-Friday?
Yes
No
If No, please specify what time of day you commute:

2. Does your position allow you to have flexible hours or to telecommute?
Yes
No

*3. Are you a full time employee or part time employee?
Full
Part

5. Part Time Employees
Please provide the following information regarding your part time employment. Click "Next" at the bottom when finished or click "Prev" to go back.

*1. What is the average number of days you work per week?
(please enter a number)

6. Current Daily Commute
Please provide the following information regarding your current daily commute. Click "Next" at the bottom when finished or click "Prev" to go back.

*1. In a typical week, do you drive to work alone at least once?
Yes
No

7. Drive Alone
Click "Next" at the bottom when finished or click "Prev" to go back.

*1. How many DAYS a week do you drive alone to work?
(please enter a number)

*2. How many MILES PER DAY do you drive TO WORK ONLY?
(please enter a number)

8. Carpool
Click "Next" at the bottom when finished or click "Prev" to go back.

*1. In a typical week, do you carpool to work at least once?
Yes
No

9. Carpool
*1. How many DAYS a week do you carpool?
(please enter a number)

*2. How many MILES do you drive TO WORK ONLY when you carpool?
(please enter a number)

3. How many PEOPLE are in your carpool?
(please enter a number)

*4. How many DAYS a week are you the driver of the carpool?
(please enter a number)

10. Public Transit
*1. In a typical week, do you take public transit to work at least once?
Yes
No

11. Public Transit
*1. How many DAYS a week do you take public transit TO WORK?
(please enter a number)

2. What type of public transit do you take TO WORK?
SamTrans
BART
Caltrain
VTA Bus
VTA Rail
ACE Train
Capitol Corridor
City Operated Transit
Paratransit
Other (please specify)

12. Bike/Walk
*1. In a typical week, do you bike or walk to work at least once?
Yes
No

13. Bike/Walk
1. How many DAYS a week do you bike to work?
(please enter a number)

2. How many DAYS a week do you walk to work?
(please enter a number)

14. Telecommute

1. If you telecommute:
How many DAYS do you telecommute in a typical week?
(please enter a number)
If you do not telecommute, leave this question blank.

15. Commute in Base Year
Please provide the following information regarding your commute in 2005.

*1. Did you work for us in 2005?
Yes
No

16. Commute in Base Year
Please provide the following information regarding your commute in your base year.

*1. In 2005, did you typically commute by the same mode(s) as you do now?
Yes
No

17. Commute in Base Year
Please provide the following information regarding your commute change.

1. Why did you change your commute mode?

18. 2005 Daily Commute
Please provide the following information regarding your 2005 daily commute.

*1. In 2005, did you typically drive to work alone at least once a week?
Yes
No

19. Drive Alone
*1. In 2005, how many DAYS a week did you typically drive alone?
(please enter a number)

*2. In 2005, how many MILES a day did you typically drive TO WORK ONLY?
(please enter a number)

20. Carpool
*1. In 2005, did you carpool at least once in a typical week?
Yes
No

21. Carpool
*1. In 2005, how many DAYS did you typically carpool in a week?
(please enter a number)

*2. In 2005, how many MILES did you typically drive TO WORK when you carpooled?
(please enter a number)

*3. In 2005, how many DAYS in a typical week were you the driver of your carpool?
(please enter a number)

22. Public Transit
*1. In 2005, did you typically take public transit to work at least once a week?
Yes
No

23. Public Transit
*1. In 2005, how many days in a typical week did you take public transit TO WORK?
(please enter a number)

2. In 2005, what type of public transit did you take TO WORK?
SamTrans
BART
VTA Bus
VTA Rail
ACE Train
Capitol Corridor
City Operated Transit
Paratransit
Other (please specify)

24. Bike/Walk
*1. In 2005, did you typically bike or walk to work at least once a week?
Yes
No

25. Bike/Walk
1. In 2005, how many DAYS did you typically bike to work in a week?
(please enter a number)

2. In 2005, how many DAYS did you typically walk to work in a week?
(please enter a number)

26. Telecommute
1. If you telecommuted in 2005:
How many DAYS in a typical week in 2005 did you telecommute?
(please enter a number)
If you did not telecommute in 2005, leave this question blank.

27. Commute Preference Information
Please answer the following questions regarding your CURRENT commute.

1. Why have you chosen your current commute mode?

2. Would you consider taking any of the following transportation modes? (check all that apply):
Public Transportation
Carpooling
Vanpooling
Bicycling
Walking
Other (please specify)

*3. Is there a transit route that you would use to commute by public transit?
Yes
No

4. If no to question 3, please explain why not.

5. If you drive alone, which, if any, of the following benefits would encourage you to take alternative forms of transportation? (check all that apply)
Vanpool/carpool incentives
Pre-tax transit checks
Parking cash-out (reimbursement to give up your parking spot)
Improved transit options
Improved walking routes/conditions
Telecommuting option
Free/inexpensive shuttle
Free public transit benefit
Subsidizing bicycle purchase
Improved bike routes/conditions
Better information about my commute options
None of the above
Other (please specify)

28. Comments

1. If you have other concerns or issues related to your commute, or if something we should know about was not captured in any survey questions, please describe below.

29. Thank You
Thank you for responding to this survey!

C.3 Paper Employee Commute Survey

<Insert Logo Here>

< Jurisdiction name> Employee Commute Survey

<Date>:

To all of our employees:

As you may be aware, *<local government name>* is actively working to reduce its impact on the environment. As part of this effort, we are collecting information on our employee's commuting patterns and preferences. This will help us to better understand what impact our employees' commutes are having on climate change *and* to provide ways to make your commute easier and less expensive.

Please take 15 minutes to fill out this survey created by ICLEI-Local Governments for Sustainability. **Please complete the survey by *<due date>* and return to *<name>* in the *<department>.***

This survey is completely anonymous. We will not be collecting or reporting any individual responses.

If you have any questions regarding the survey, please feel free to contact me at *<phone number>.*

Thank you very much,

<Your name>

< Jurisdiction name> Employee Commute Survey

Unless otherwise indicated, all questions refer to a one-way commute to work only. Please do not include any traveling you do during work hours (e.g., meetings, site visits, etc). Asterisks (*) indicate questions that require an answer.

A. Commuter Background Information

1. About how many miles do you live from work?
   _____
2. What city/town do you live in?
   _____

* *3.* If you drive to work, what type of vehicle do you usually drive? (check one) If you don't drive to work, skip to Section B.

❑ Full size auto ❑ Compact/hybrid ❑ Heavy truck

❑ Mid size auto ❑ SUV/Pickup ❑ Other_____

* 4. What year was your vehicle manufactured?
_____

* 5. What type of fuel does your vehicle use? (if biodiesel or ethanol, specify grade)_____

B. Estimate Your Current Commute for a typical work week.

* 1. Please enter below the number of days per week you use each type of commute mode and the number of miles you travel each day ***to work only*** in a typical week:

Commute Mode	Drive Alone	Carpool	Vanpool	Public Transit	Bike	Walk	Other (specify)
Days per week you travel *to work* by this mode (max 7)							
Miles Traveled *to work per day* in this mode							

2. How much does your ***round trip*** commute cost per week?
   $_____
3. How many minutes does your commute to work typically take?
   _____
4. If you take public transit, what transit agency do you use?
   _____

*5. If you carpool to work, how many days in a typical week are you the driver?
_____

6. How many days do you telecommute in a typical week?

_____

C. Employment Information (check one answer for each question)

1. Are you a full time or part time employee? ❑ Full ❑ Part
2. Do you typically travel to work between 6-9 a.m.? ❑ Y ❑ N
3. Does your position allow you to have flexible hours or to telecommute? ❑ Y ❑ N
4. What department do you work for?

_____

5. **D. Your Commute *in 2005***

*1. Did you work for us in 2005? ❑ Y ❑ N

*2. If yes to Q.1, did you typically commute by the same mode(s) as you do now? ❑ Y ❑ N

*3. If no to Q.2, please enter the number of miles you traveled (*to work only*) in a typical week in 2005 below*:*

Commute Mode	Drive Alone	Carpool	Vanpool	Public Transit	Bike	Walk	Other
Days per Week (max 7)							
Miles Traveled *to Work* per Day							

If you commute differently now than in 2005, why did you change your commute mode?

_____

E. <u>Current</u> Commute Preference Information

1. Why have you chosen your <u>current</u> commute mode?

_____

2. Would you consider taking any of the following transportation modes?(check all that apply):

❑ Carpooling ❑ Vanpooling ❑ Bicycling

❑ Public transit ❑ Walking ❑ Other_____

3. a. Is there a transit route that you would use to commute by public transit? ❑ Y ❑ N

b. If not, please explain:

_____

_____

4. If you drive alone, which, if any, of the following benefits would encourage you to take alternative forms of transportation? (check all that apply)

❑ Vanpool/carpool incentives	❑ Free/inexpensive shuttle
❑ Pre-tax transit checks	❑ Free public transit benefit
❑ Parking cash-out (reimbursement to give up your parking spot)	❑ Subsidized bicycle purchase
❑ Improved transit options	❑ Improved bike routes/conditions
❑ Improved walking routes/conditions	❑ Better information about my commute options
❑ Telecommuting option	❑ Other_____

5. Other comments?

_____

_____

Appendix D: Government-Generated Solid Waste Methodology

Emissions from the waste sector are an estimate of methane generation that will result from the anaerobic decomposition of all organic waste sent to landfill in the base year. It is important to note that although these emissions are attributed to the inventory year in which the waste is generated, the emissions themselves will occur over the 100+ year timeframe that the waste will decompose. This frontloading of emissions is the approach taken by EPA's Waste Reduction Model (WARM). Attributing all future emissions to the year in which the waste was generated incorporates all emissions from actions taken during the inventory year into that year's greenhouse gas release. This facilitates comparisons of the impacts of actions taken between inventory years and between jurisdictions. It also simplifies the analysis of the impact of actions taken to reduce waste generation or divert it from landfills.

D.1 Estimating Waste Tonnages from Portola Valley's Operations

Like most local governments, the Town of Portola Valley does not directly track the amount of waste generated from its operations. Therefore, to estimate the amount of waste generated, the Town worked with Green Waste Recovery's Valerie Enyart and Zanker Road Landfill's Chase Harris. The amount of waste was estimated by compiling pick-up accounts owned by the Town. Garbage trucks do not weigh waste at each pick-up, therefore, it is not possible to directly track disposal figures in mass per facility. Mass of waste generation was estimated using volumetric container size (gallons, yards, etc.) data, along with pick-up frequency and average fill of containers. These data produced a comprehensive annual volumetric figure, which was then converted to mass using standard conversion factors supplied by the California Integrated Waste Management Board (CIWMB). Estimated waste *generation* was converted to final *disposal* (quantity sent to landfill) by applying average waste diversion percentages for each account. Where applicable, self-haul waste (waste brought directly from the local government to landfills) was included as part of this total.

D.2 Emissions Calculation Methods

As some types of waste (e.g., paper, plant debris, food scraps, etc.) generate methane within the anaerobic environment of a landfill and others do not (e.g., metal, glass, etc.), it is important to characterize the various components of the waste stream. Waste characterization for government-generated solid waste was estimated using the CIWMB's 2004 statewide waste characterization study.[17]

Most landfills in the Bay Area capture methane emissions either for energy generation or for flaring. EPA estimates that 60 percent to 80 percent[18] of total methane emissions are recovered at the landfills to which the Town sends its waste. Following the recommendation of LGOP, ICLEI adopted a 75 percent methane recovery factor.

Recycling and composting programs are reflected in the emissions calculations as reduced total tonnage of waste going to the landfills. The model, however, does not capture the associated emissions reductions in "upstream" energy use from recycling as part of the inventory.[19] This is in-line with the "end-user" or "tailpipe" approach taken throughout the development of this inventory. It is important to note that, recycling and composting programs can have a significant impact on greenhouse gas emissions when a full lifecycle approach is taken. Manufacturing products with recycled materials avoids emissions from the energy that would have been used during extraction, transporting and processing of virgin material.

D.2.1 Methane Commitment Method

CO_2e emissions from waste disposal were calculated using the methane commitment method outlined in the EPA WARM model. This model has the following general formula:

$CO_2e = W_t * (1\text{-}R)A$

Where:

W_t is the quantify of waste type "t"

R is the methane recovery factor,

A is the CO_2e emissions of methane per metric ton of waste at the disposal site (the methane factor)

While the WARM model often calculates upstream emissions, as well as carbon sequestration in the landfill, these dimensions of the model were omitted for this particular study for two reasons:

17 CIWMB Waste Characterization Study-Public Administration Group available at http://www.ciwmb.ca.gov/WasteChar/BizGrpCp.asps.
18 AP 42, section 2.4 Municipal Solid Waste, 2.4-6, http://www.epa.gov/ttn/chief/ap42/index.html
19 "Upstream" emissions include emissions that may not occur in your jurisdiction resulting from manufacturing or harvesting virgin materials and the transportation of them.

This inventory functions on an end-use analysis, rather than a life-cycle analysis, which would calculate upstream emissions), and this inventory solely identifies emissions sources, and no potential sequestration “sinks.”

Appendix E: Conducting a Monitoring Inventory

The purpose of this appendix is to assist Portola Valley staff in conducting a monitoring inventory to measure progress against the baseline established in this inventory report. Conducting such an inventory represents milestone five of the Five-Milestone Process, and allows a local government to assess how well it is progressing toward achieving its emissions reduction targets.

This inventory was conducted by ICLEI in conjunction with Brandi de Garmeaux, Sustainability Efficiency Coordinator at the Town of Portola Valley, who served as the lead data gathering coordinator for the inventory. To facilitate a monitoring inventory, ICLEI has documented all of the raw data, data sources, and calculation methods used in this inventory. Future inventories should seek to replicate or improve upon the data and methods used in this inventory. Wherever possible, however, ICLEI strongly recommends institutionalizing internal data collection in order to be able to meet the recommended methods outlined in LGOP.

E.1 ICLEI Tools for Local Governments

ICLEI has created a number of tools for the Town to use to assist them in future monitoring inventories. These tools were designed specifically for the Silicon Valley Climate Protection Partnership, and comply with the methods outlined in LGOP. These tools are designed to work in conjunction with LGOP, which is, and will remain, the primary reference document for conducting an emissions inventory. These tools include:

- A “master data sheet” that contains most or all of the raw data (including emails), data sources, emissions calculations, data templates, notes on inclusions and exclusions, and reporting tools (charts and graphs and the excel version of LGOP reporting tool).
- A copy of all electronic raw data, such as finance records or Excel spreadsheets.
- LGOP reporting tool (included in the master data sheet and in Appendix B) that has all activity data, emissions factors, and methods used to calculate emissions for this inventory.

- Sector-specific instructions that discuss the types of emissions, emissions calculations methods, and data required to calculate emissions from each sector, as well as instructions for using the data collection tools and calculators in the master data sheet.
- The appendices in this report include detailed methodologies for calculating emissions from Scope 3 employee commute and government-generated solid waste, as well as two versions of the employee commute survey.

It is also important to note that all ICLEI members receive on-demand technical assistance from their ICLEI liaison, which local staff should feel free to contact at any point during this process.

E.2 Relationship to Other Silicon Valley Climate Protection Partnership Inventories

While the emissions inventories for the 27 participating local governments were conducted simultaneously using the same tools, a local government operations inventory is based on data specific to each local government's operations. For this reason, data must be collected internally within each local government, and the availability of data (and thus emissions estimation methods) will vary between local governments.

That said, local governments in the Silicon Valley Climate Protection Partnership may benefit by cooperating during the re-inventorying process. For example, by coordinating inventories, they may be able to hire a team of interns to collectively perform the inventories – saving money in the process. In addition, local staff may be able to learn from each other during the process or conduct group training sessions if necessary. As a whole, the Silicon Valley Climate Protection Partnership provides the basis for a continuing regional platform for climate actions, and ICLEI recommends taking advantage of this opportunity during all climate actions, including conducting future greenhouse gas emissions inventories.

E.3 Improving Emissions Estimates

One of the benefits of a local government operations inventory is that local government staff can identify areas in their current data collection systems where data collection can be improved. For example, a local government may not directly track fuel consumption by each vehicle and instead will rely upon estimates based upon VMT or purchased fuel to calculate emissions. This affects both the accuracy of the emissions estimate and may have other implications for government operations as a whole.

During the inventory process, ICLEI and local government staff identified the following gaps in data that, if resolved, would allow Portola Valley to meet the recommended methods outlined in LGOP in future inventories.

- Direct tracking of fuel consumed by vehicle fleet and mobile equipment
- Direct tracking of miles traveled by vehicles, both in fleet and personal vehicles used for business

- Direct tracking of refrigerants recharged into HVAC and refrigeration equipment
- Direct tracking of fire suppressants recharged into fire suppression equipment
- Fuel consumption by diesel and other generators
- Refrigerants recharged into vehicles in the vehicle fleet

ICLEI encourages staff to review the areas of missing data and establish data collection systems for this data as part of normal operations. In this way, when staff are ready to re-inventory for a future year, they will have the proper data to make a more accurate emissions estimate.

E.4 Conducting the Inventory

ICLEI recommends the following approach for Silicon Valley Partnership local governments that wish to conduct a monitoring inventory:

Step 1: Identify a Climate Steward

This steward will be responsible for the Town's climate actions as a whole and could serve as an ICLEI liaison in all future climate work. In the context of a monitoring inventory, the steward will be responsible for initiating discussions on a new inventory.

Step 2: Determine which Sectors to Inventory

There are many ways to determine which sectors apply to a local government's operations, but the easiest to review will be LGOP Standard Report, which is located both in Appendix B and in the master data sheet. This document clearly delineates which sectors will need to be inventoried within a local government's operations and which LGOP sectors do not apply to a jurisdiction.

Step 3: Gather Support: Identify Data Gathering Team and Leads

Coordination and acceptance among all participating departments is an important factor in coordinating a successful inventory. To that end, the inventory coordinator should work with the Town administrator to identify all staff who will need to be part of the inventory. To facilitate this process, ICLEI has documented all people associated with the inventory in the master data sheet—these names are located in the final completed data form for each sector. Once this team has been identified, the inventory coordinator should hold a kickoff meeting with the administrator, all necessary staff, and relevant department heads which clearly communicates the priority of the inventory in relationship to competing demands. At this meeting, the roles of each person, including the inventory coordinator, should be established.

Step 4: Review Types of Emissions and Available Methodologies for Applicable Sectors

Local staff should then review LGOP and the instructions documents provided through this inventory to better understand the types of emissions for each sector (for example, within Mobile Emissions, CO_2 emissions and CH_4/N_2O emissions represent two different data requirements and emissions calculations methodologies). Each emissions type may have more than one possible estimation methodology, and it is important that the inventory coordinator understands all possible methodologies and be able to communicate this to all parties assisting in the data gathering.

Step 5: Review Methodologies Used for the 2005 Inventory to Determine Data to Collect

In order to duplicate or improve upon the methods used in this inventory, local staff should again review the methods used for this inventory—these methods are again located in Appendix B—and within the master data sheet. These methods reflect the data limitations for each local government (as many local governments could not obtain data necessary to meet the recommended methods in LGOP). Wherever possible, these methods should be duplicated or, if it is possible, replaced with the recommended methods outlined in LGOP. Using these methodologies, staff will determine what data needs to be collected and communicate this effectively to the data gathering team.

Step 6: Begin Data Collection

With the exception of electricity and natural gas for stationary sources, all data collection will be internal. To obtain stationary source energy consumption data, staff will need to contact the ICLEI representative to determine who the contact is for PG&E data (other utilities will need to be contacted directly).

Step 7: Use the Data Forms as a Resource During Data Gathering

A number of questions will come up during the data gathering process that may be difficult to answer. ICLEI has attempted to capture all of the questions that arose during the 2005 inventory and how they were addressed through the master data sheet. Within the master data sheet, staff should review the raw data, working data, and completed data forms to review how raw data was converted to final data, and also to review any notes taken by ICLEI staff during the 2005 inventory process.

For example, reviewing the stationary sources PG&E data within the master data sheet will allow local staff to review how individual accounts were separated into each category and which counts may have been excluded from the inventory.

Step 8: Use Emissions Software to Calculate Emissions

ICLEI has provided the staff lead on the 2005 inventory with a backup of the software used to calculate many of the emissions included in this report. Staff should use this (or more current ICLEI software) to calculate emissions by inputting the activity data into the software. ICLEI staff and ICLEI trainings are available to assist local government staff in calculating emissions.

Step 9: Report Emissions

The master data sheet also contains the LGOP Standard Reporting Template, which is the template adopted by ARB as the official reporting template for government operations emissions inventory. This tool, as well as the charts and graphs tool provided by ICLEI can be used to report emissions from government operations. Also, local government staff should utilize this narrative report as guide for a narrative report if they so choose.

Step 10: Standardize and Compare to Base Year

Conducting a monitoring inventory is meant to serve as a measuring point against the baseline year represented in this report. In order to make a more accurate comparison, it is necessary to standardize emissions from stationary sources based upon heating and cooling degree days (staff can use a ratio of heating /cooling degree days to standardize across years).

In addition, it is important, when comparing emissions across years, to clearly understand where emissions levels may have changed due to a change in methodology or due to excluding an emissions source. For example, if the default method was used to estimate refrigerant leakage in 2005 (this method highly overestimates these emissions), and the recommended method was available in a monitoring year, this would appear as a dramatic reduction in these emissions even though actual leaked refrigerants may be similar to the base year. Changes such as these should not be seen as progress toward or away from an emissions reduction target, but emissions estimates should be adjusted to create as much of an apples-to-apples comparison as possible. If such an adjustment is not possible, staff should clearly note the change in methodology between years when comparing emissions.