City of Gardena

Municipal Greenhouse Gas Emissions Inventory Report

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Table of Contents

Appendices

List of Tables

List of Figures

How to read this report:

The following emissions inventory report includes data for the years 1990, 2005, and 2007. It is organized however starting with the year 2005 because it is the baseline year that will be used to set emission goals. The next year discussed is 2007, an interim year that shows progress made since the baseline year. Lastly, 1990 data is included to review historical GHG levels. Emissions data located in the appendix D is organized in the same way to maintain consistency.

I. Executive Summary

A. Project Background

There are a number of actions taking place in the State of California with respect to climate change and the reduction of greenhouse gas emissions (GHG). With the passage of the California Global Warming Solutions Act of 2006 Assembly Bill (AB) 32 the State of California established a 'first-in-the-world' comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHG emissions. The legislation directs the California Air Resources Board (CARB) to oversee its implementation, requiring California to reduce its GHG emissions to 1990 levels by 2020. Local governments in the State of California have an important role to play in helping the State reach its reduction goals.

Since the passage of AB 32 the framework of emissions reduction strategies have been adopted in the AB 32 Scoping Plan. The Scoping Plan includes a range of actions both mandated and voluntary, providing the main strategies for California to meet its reduction goal. The plan encourages local governments to set a GHG reduction target and develop a plan of action for government and community-wide emissions. More recently, Senate Bill (SB) 375 provides a path to achieve AB 32 through transportation (one of the largest sources of GHG emissions) and land use strategies.[1] The bill takes a regional approach to achieving results and establishes a process for CARB to develop GHG emissions reduction targets for each region. While there is no specific number that a local government must reduce its emissions to, it is still crucial that local governments develop strategies to reduce their emissions and comply with regional targets as they develop.

The increasing interest in climate change has engendered South Bay communities to form active, involved citizen groups that have advocated that their cities begin the process of creating Climate Action Plans.[2] A number of South Bay cities signed the "Cool Cities" pledge.[3] By committing to reduce global warming emissions cities will be implementing solutions to make themselves more sustainable and energy efficient. In the spring of 2008 the South Bay Cities Council of Governments (SBCCOG) coordinated efforts to respond to AB 32 by assisting South Bay cities with the process of conducting a GHG emissions inventory. In this way, South Bay cities will be in a better position to respond to the challenges and impact legislation related to climate change. Additionally, GHG inventories will be a useful tool to help South Bay cities measure their progress to meet regional reduction goals.

South Bay cities began the process of assessing their GHG emissions by joining ICLEI—Local Governments for Sustainability, an international association of city and county governments that have made a commitment to sustainable development.[4] Through ICLEI, South Bay cities gained access to tools and resources such as the Clean Air Climate Protection (CACP) software, which enables cities to quantify their emissions. By joining ICLEI and adopting a resolution, South Bay cities have committed to ICLEI's Five Milestone Climate Protection Methodology, which includes: conducting a baseline emissions inventory and forecast, adopting an emissions reduction target for the forecast year, developing a local Climate Action Plan, implementing the local Climate Action Plan, and monitoring and verifying results. These milestones are the five steps the City of Gardena will take to reduce its impact on the environment and promote change within the community.

1 See appendix F for more information on Climate Change legislation.

2 ICLEI-Local Governments for Sustainability was formerly known as the International Council for Local Environmental Initiatives, defines a Climate Action Plan (CAP) as a set of policies and measures designed to meet emissions reduction targets by a designated target year. A CAP must include a timeline, breakdown of actions and estimated benefits of each action compared to the baseline, a description of financing mechanisms, and an assignment of responsibility to departments and staff, and should incorporate public awareness and education efforts.

3 The Cool Cities Pledge was developed to encourage cities to endorse the U.S. Mayors Climate Protection Agreement and create their own greenhouse gas reduction activities.

4 Visit the ICLEI website to learn more about the organization at http://www.icleiusa.org/about-iclei/iclei-by_region/california-region

Another resource utilized to conduct the municipal inventory was the Local Government Operations Protocol (LGOP).[5] The protocol was developed in partnership by ICLEI, the California Air Resources Board (CARB), the California Climate Action Registry (CCAR), and The Climate Registry (TCR) to enable local governments to measure and report emissions in a consistent and transparent way. The protocol is a program neutral guide that was developed so that cities can follow internationally recognized GHG accounting and reporting principles.

B. Purpose of Conducting a GHG Emissions Inventory

One of the first steps a city takes towards protecting the environment from global warming and promoting environmental stewardship is to identify and account for the sources of emissions in its own backyard including municipal and community-wide emissions. Conducting an emissions inventory creates a pathway for cities to develop emissions documentation to better manage foreseeable regulatory programs at the Federal, State or regional levels. By being proactive and creating this documentation cities can begin to refine the collection and management of emissions data thereby improving the quality of future inventories. A municipal inventory allows a city to quantify the emissions it is responsible for from individual buildings and facilities, vehicle fleet, transit, waste, etc., giving the City insight into the relationship between improving efficiency and reducing emissions. Once a municipal inventory has been completed a city can identify and evaluate specific areas within municipal operations that are inefficient to then target. Utilizing the inventory to document and formulate a plan of action to address these inefficiencies gives the City an opportunity to lead by example, and promote education and outreach within the community.

C. Scope of the GHG Emissions Inventory

To create an inventory, data was gathered for the years 1990, 2005, and 2007. The year 2005 was selected as the baseline year and will serve as a reference year to measure future progress and establish short-term and long-term reduction target years. Although an estimate of 1990 data is shown to capture historical GHG emissions, and where possible, to be used for the purpose of comparing data between years, a reduction target should be set from the baseline year. The year 2005 was chosen because it allowed the City to gather the earliest, most accurate and reliable data. Data was also collected for the year 2007. This year is considered an interim year to monitor energy use changes that may have occurred since the baseline year 2005. It is useful to review data from this year because it shows progress made that will count towards any reduction goal set. Additionally and where available, data was also collected from the year 1990 to estimate the City's historical GHG emissions at that time. The year 1990 is significant in that it represents a reference year for several key pieces of climate change legislation such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol agreement, and the U.S. Mayors' Climate Protection Agreement.[6] However, it was difficult to find accurate data going back as far as 1990 and so comparisons have been made in areas where data is reliable. The precise emissions emitted in 1990 were unable to be determined, thus the decision was made to use the baseline year 2005 data as the benchmark for setting targets.

Following the LGOP guidance for local governments, the City selected an operational control approach to define its organizational boundaries. What this means is that the City identified what emissions it should account for in its municipal inventory based on what facilities and operations it owns or controls. The City's operational boundaries are used to establish and organize its emissions by "scopes."[7] In this way, a city can separately account for its direct and indirect emissions in a tiered fashion. It also establishes a foundation for following reporting standards in the LGOP.

5The Local Government Operations Protocol can be viewed with this link http://www.climateregistry.org/resources/docs/protocols/industry/local-gov/lgo_protocol_september2008.pdf

6 See appendix F for descriptions on climate change legislation.

7 See section 3, Inventory Results Introductions for more information on scopes of emissions.

The City gathered information from a variety of sources, including consumption data from utility companies, fuel data from internal city records, data on waste and other services from contract service providers. A characterization study from the California Integrated Waste Management Board was utilized to capture waste composition and employee commute surveys were administered to capture emissions data from vehicle miles traveled[8] where no records were available. This data was then utilized to quantify GHG emissions. Following ICLEI program-specific requirements, this report is considered to be a Quick Action Report[9] which entails reporting on 3 of the 6 internationally-recognized GHGs regulated under the Kyoto Protocol.[10] The benefit of this reporting option is that it allows a city to capture the majority of its emissions while familiarizing staff with the process of conducting an inventory so that in the future a more detailed level of reporting can be accomplished. The more comprehensive report entails accounting for all 6 Kyoto Protocol Gases. When the City conducts its re-inventory to ensure that it is inline with its emission reduction goals, the City will be able to consider producing a comprehensive report by adding data on the additional gases.

D. Inventory Methodology

This Quick Action report includes municipal results for the three years inventoried; including detailed reports, located in appendix A, for each year, which shows the GHGs separately as prescribed by ICLEI in the LGOP. As a framework for this report, the LGOP was utilized as a resource as was the Local Government Operations Standard Inventory Report Template. ICLEI provided the technical assistance and the software to accomplish the municipal inventory. The CACP 2009 software is consistent with LGOP standards with respect to the emission coefficients[11] and methodology employed by the software to calculate the equivalent GHGs. It is important to note that GHG emissions with different global warming potential are shown as one roll-up number known as a carbon dioxide equivalent unit (CO_2e).[12] It helps to simplify by looking at just one number for climate action planning; however, ICLEI believes that the most accurate description of emissions requires separate accounting by scope,[13] which can be found in appendix A of this report.

The inventory results should be thought of as an approximation of the GHG emissions emitted in the years inventoried. The results should be used as a policy and planning tool rather than a precise measurement of GHGs. All the data sources used to capture the equivalent emissions emitted, also referred to as activity data, have been noted in the appendix B. This shows transparency when accounting for emissions. Similarly, appendix C discloses the formulas and emissions factors used to arrive at the equivalent GHG emissions. To the extent possible, recommended data and methods in the LGOP were used, but in some cases the suggested alterative methods were necessary to use when recommended data could not be found, appendices B and C give a description of the data and methodologies used.

E. Key Highlights and Findings

- The City of Gardena generated approximately 7,868 metric tons of CO_2e in the baseline year, 2005; this is equivalent to the GHG emissions generated by electricity use of 1,091 homes for one year.[14]
- GHG emissions increased 18.4% between the baseline year 2005 and the interim year 2007. This was largely

8 See Appendices B and C for a description of data sources and methodologies used.

9 To read more about ICLEI's Quick Action Report see Appendix C in the Local Government Operations Protocol. The Quick Action Report entails reporting only on Carbon dioxide (CO2); Methane (CH4); Nitrous oxide (N2O).

10 The internationally-recognized greenhouse gases regulated under the Kyoto Protocol are Carbon dioxide (CO2); Methane (CH4); Nitrous oxide (N2O); Hydrofluorocarbons (HFCs); Perfluorocarbons (PFCs); and Sulfur hexafluoride (SF6), Local Government Operations Protocol, page 11.

11 Coefficients or emissions factors as they are known are multiplied by the data in order to arrive at an equivalent GHG emissions number.

12 Equivalent Carbon Dioxide (CO2e) the universal unit for comparing emissions of different GHGs expressed in terms of the GWP of one unit of carbon dioxide, Local Government Operation Protocol, Glossary.

13 See ICLEI Reporting Requirements, Appendix C, Local Government Operations Protocol.

14 The EPA Greenhouse Gas Equivalencies Calculator was utilized to help visualize and understand GHG emission results.

due to the additional scope 1 transportation related sources from transit vehicles.

- Emissions resulting from electricity use decreased 2.3% and emissions resulting from natural gas consumption decrease 12.6% between the years 2005 and 2007.
- Results from the employee commute survey indicate 46.1% of respondents are interested in participating in a ridesharing program.
- Under a business-as-usual scenario, the City can expect emissions to rise to 10,244 metric tons of CO2e by 2012 that is equivalent to the annual GHG emissions from 1,876 passenger vehicles; and 10,323 metric tons of CO2e by 2015, equivalent to the annual GHG emissions from 1,891 passenger vehicles if the City does nothing to reduce its emissions.

E. Future Steps

The next step will be to conduct a community-scale inventory to assess GHG emissions related to residential, commercial, industrial, transportation, and waste sectors. Once completed, these inventories provide the basis for the creation of a Climate Action Plan, which will include measures and policies to reduce emissions in both municipal operations and through community actions.

Climate action work is important and with the municipal inventory complete, the City can select a short and long-term reduction target for municipal operations. Before deciding on a target, the City should review the business-as-usual forecast graph, located in section three, to see what its emissions will look like in the years 2012 and 2015. The City will also want to think about measures and policies that might be included in the climate action plan to reach an adopted goal. Located in section four, is a summary of the City's existing and planned efforts to get the process started. It is important to anticipate and leave enough time to achieve whatever goal is set. An example of a short-term reduction target might be 20% below 2005 baseline levels by the year 2012. In general, ICLEI recommends the further away a target year the more emissions the City will want to reduce. A good example of an end date of a long-term target that is in-line with the State's AB 32 target would be 2020. How the City goes about adopting a reduction target depends on what works best for the City.

Being proactive is the best way to curb GHG emissions and positively influence change within the community. The Climate Action Plan development requires several steps and may include creating a review committee, defining current measures, developing new measures, developing an implementation plan, community outreach strategies, and developing ongoing tracking. Now is a good time to consider what municipal measures and policies planned or existing should be included in the climate action plan. It is important to consider time, resources, cost, and the possible GHGs reduction scenario of each individual measure, as they will all be factors in the decision-making process for the City to reach its goals. The Environmental Advisory Committee is a good place to get the development of this process started.

Now that the first step has been taken, it is vital to continue to develop inventory reporting skills. It is up to the City how often they re-inventory GHG emissions, but ICLEI recommends doing so every few years to make sure the City stays on target to reach short and long-term goals. Refining the gathering and management of data for the next inventory should start with good internal communication between departments working together to ensure that the appropriate records are set aside or entered into the new ICLEI data collection forms. Working together is the best way to fine tune reporting skills and work towards creating a comprehensive report as outlined in the LGOP under ICLEI program requirements.

II. Local Government Profile Information

A. Local Government Description

The City of Gardena is committed to maintaining an efficient and effective government that ensures the highest quality of life, a safe and attractive environment, and a sound economic future. The City is approximately 5.82 square miles and has a population of 61,781.[15]

Gardena has the distinction of being located in the center of transportation access. It is 20 minutes away from the Los Angeles Airport, which has a major economic impact on Southern California business. In addition, Gardena boasts easy access to every major Los Angeles County Freeway - the 405, 105, 710, the 110 and the Artesia or 91 Freeway. This freedom allows fast and easy access to the ports of Los Angeles, Long Beach and San Pedro.

Local Government History

The City of Gardena was incorporated on September 11, 1930. It combined the rural communities of Gardena, Moneta, and Strawberry Park into a Municipal Corporation, Sixth Class City. At that time Gardena was a small farming community of about 20,000 people however, today Gardena is an active and progressive residential and business community with a City government that prides itself in providing a full range of qualified services to the community.

Primary Services

Department	Primary Services
Administration	General Administration –City Clerk, City Manager, City Council and Finance.
Police Department	The Gardena Police Department and Los Angeles County Fire Department provide services.
Fire Services	Contracted with Los Angeles County Fire District.
Parks and Recreation	Park and City Facilities and events.
Planning	Commercial and Residential zoning and planning.
Building & Safety	On-site Services-Inspections.
Public Works	Off-site Services-Engineering, Streets, Parks and Trees, Administrative Services and Home Improvement.
Transit	Bus Transportation Services.

15 Per 2008 Southern California Association of Governments (SCAG) profile.

III. Municipal Emissions Inventory Results

A. Inventory Introduction and Results

Depicted in this section are tables and graphs that represent and illustrate an approximation of the GHG emissions levels for the three years of data collected. As mentioned in the executive summary, the data findings are expressed in CO_2-equivalent, which is an estimated sum or roll-up number for GHGs with different global warming potential,[16] to make it easier to review, plan, and set targets. Appendix A gives a detailed account of individual GHGs separately, by scope, for the purpose of establishing good reporting habits. Based on LGOP reporting standards, GHG emissions are organized according to their scope.[17] Scopes are determined based on what control approach[18] a local government chooses to define its boundaries. The LGOP recommends an operational approach for local governments wherein a city defines its scopes by what they own and operate. In this way, the City can account for direct and indirect emissions separately.

Direct emissions are associated with scope 1 and are deemed within the City's control. They are generated by fixed equipment used to produce heat or power from the stationary combustion process and mobile combustion of fuels from city fleet vehicles.

Cities also have a level of control over activities that are associated with indirect emissions, known as scope 2. These emissions are associated with the consumption of purchased electricity, steam, heating, or cooling.[19] The difference between the scopes is that these sources are owned or controlled by another entity. Still, a city will want to develop measures to reduce emissions within this scope. Indirect emission are also associated with scope 3, however scope 3 emissions are related to activities that the City does not own or operate, such as emissions from contracted services, employee commuting, or waste disposal. As an ICLEI member, scope 3 reporting is considered optional, but good to include as it may be policy relevant. City staff decided what data to include for contract provides (Scope 3 emissions) based on whether the information was obtainable, reliable, and relevant.

Tables 1 through 3 are organized by scope, sector, and source of emissions. The data is shown in metric tons of CO_2-equivalent, adjacent is the percentage represented by each sector, source of emissions, energy and fuel use, the equivalent one million British thermal units, and the cost where data was available. This information is shown for the purpose of targeting, planning, and then tracking energy and cost-saving measures. To learn where specific data was obtained and how it was computed, refer to the appendices sections B and C.

2005

Baseline Year

Results from the 2005 municipal inventory represent the year chosen as a baseline year, which will serve as a foundation for setting short and long-term emissions reduction targets. For this year, there was adequate data available to conduct an accurate inventory. It is important to keep in mind that scope 3 emissions included in the baseline year are estimates based upon information provided by contract service providers and from surveying employees and should not be thought of as a precise measurement of GHGs, but rather as policy relevant information that the City may want to consider when developing or evaluating measures or policies.

16 Each greenhouse gas has a different global warming potential based on its ability to trap heat in the atmosphere, CO_2e is the universal unit for comparing emissions of different GHGs global warming potential, see LGOP appendix E, page 166 for more details.

17 The Local Government Operations Protocol follows categorization standards developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

18 Definitions of inventory approaches are discussed in the LGOP, page 14.

19 See Local Government Operations Protocol for details, page 22.

In 2005, the City of Gardena GHG emissions totaled 7,868 metric tons of CO_2e. This number includes both direct and indirect sources of emissions, as shown in Table 1. This total is equivalent to the GHG emissions emitted from the electricity use of 1,091 homes for one year. Looking at the scopes within the table, the largest portion 59% (scope 1 total) were emissions generated from a combination of natural gas use for buildings and facilities, fuel for city and transit vehicles, and generators. Approximately 105 vehicles including non-highway vehicles and equipment from the Public Works and the Police Department and 50 transit vehicles were included in the make up of this total.[20] Electricity usage accounted for 22.9% (scope 2 total), 11% of electricity generated emissions were from buildings and facilities, 11.8% of emissions were from the streetlights & traffic signals sub sector. The remaining 0.1% of electricity generated emissions were related to water delivery. The smallest portion 18.1% (scope 3 total) were emissions related to employee commute (see appendix E for employee commuting details) and waste (refuse collected from City bins).

Energy/Fuel use and cost information has been listed for the purpose of planning and tracking energy measures' cost effectiveness. During 2005, the City of Gardena used 5,919,877 kWh of electricity at a cost of $823,101. In this same year, the City used 74,581 therms of natural gas and spent $ 77,978.

Table 1. Municipal Inventory Summary 2005[21]

Gardena Municipal GHG Emissions 2005						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities	576	7.3%	Natural Gas	74,581 therms	$ 77,978	10,820
Generators	0.1224			12 gal	$ 36	2
City Vehicle Fleet						
City Vehicle Fleet[22]	**1,329**	**16.9%**				**18,328**
	1,247		Gasoline	138,491 gal	n/a	17,204
	77		Diesel	7,593 gal	n/a	1,053
	5		Propane	779 gal	n/a	71
Transit Fleet						
NOVA[23]	2,741	34.8%	Diesel	269,943 gal	n/a	37,434
Total Scope 1 Emissions	**4,646**	**59%**	**-**	**-**	**$ 78,014**	**66,584**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	867	11.0%	Electricity	2,854,017 kWh	$ 362,995	20,563
Streetlights & Traffic Signals						
Traffic Signals/Controllers	119	1.5%	Electricity	392,982 kWh	$ 44,424	1,341
Streetlights[24]	699	8.9%	Electricity	2,302,485 kWh	$ 383,269	7,858
Park Lighting	92	1.2%	Electricity	301,916 kWh	$ 19,503	1,030

20 Fuel data was unknown for approximately five vehicles and six pieces of equipment therefore these items were excluded from the 2005 inventory.

21 For each inventory summary see appendix D, Emissions Data, to review individual energy use and cost per item.

22 See appendix D, Emissions Data, to review fuel emissions per department; both highway vehicles, non-highway vehicles, agricultural and/or construction equipment have been included in the city fleet category.

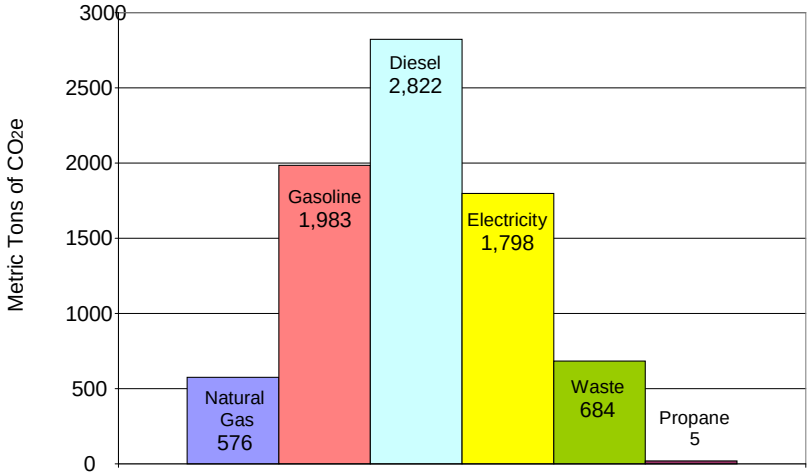
23 Approximately 50 Nova buses were included in the total. See appendix D, Emissions Data, to review emissions in the Transit Fleet category.

24 City owned streetlights and Southern California Edison owned streetlights have been combined in the total shown here. See appendix D, Emissions Data, to review individual emissions in the Streetlights and Traffic Signals category.

Other Outdoor Lighting[25]	14	0.2%	Electricity	45,333 kWh	$ 8,138	154
Water Delivery						
Sprinkler/Irrigation Control	6	0.1%	Electricity	20,456 kWh	$ 4,213	70
Wastewater						
Sewer Pump Station	1	0.0%	Electricity	2,688 kWh	$559	9
Total Scope 2 Emissions	**1,798**	**22.9%**	**-**	**5,919,877 kWh**	**$ 823,101**	**31,025**
Scope 3 Emissions						
Employee Commute						
Employee Commute	**740**	**9.4%**		**1,370,127 VMT**	n/a	**10,136**
	736		Gasoline	1,364,105 VMT		10,136
	4		Diesel	6,022 VMT		55
Solid Waste						
Waste	684	8.7%		2,698.76 tons	n/a	n/a
Total Scope 3 Emissions	**1,424**	**18.1%**	-	-	-	**10,136**
Total Emissions	**7,868**	**100%**	-	**-**	**$ 901,115**	**107,745**

Figure 1 illustrates emissions by source. Diesel was the highest source of emissions, largely from transit buses. Gasoline was the second highest source of emissions followed by electricity. The lowest sources of emissions were from propane followed by natural gas. Waste resulted in the second lowest source of emissions. It was estimated that 2,698.76 tons of waste generated by city operated and owned facilities was sent to a landfill. A breakdown of the waste composition can be found in appendix D, based on a solid waste characterization study for public administration from the California Integrated Waste Management Board website.

Figure 1. Emissions by Source 2005
(including all direct and indirect sources)



Figures 2 and 3 illustrate a percentage breakdown of each sector from Table 1. ICLEI asks its members to report on scopes 1 and 2 where scope 3 is optional; therefore, data below is organized to reflect this criteria. Figure 2 shows all scopes, where as Figure 3 concentrates only on scopes 1 and 2 – functions that a city has more influence on. Figure 2 indicates 9.4% of emissions are the result of employee commuting and 8.7% are from waste. While a city may not have the same degree of control over this source, there is still an opportunity to create initiative programs or policies that will engender climate-friendly practices. Figure 3 is comprised of natural gas, fuels, and electricity emissions,

25 Parking lot lighting, and other outdoor lighting have been combined in the total shown here. See appendix D, Emissions Data, to review individual emissions in the Streetlights and Traffic Signals category.

27.8% of which were the result of electricity consumption (scope 2). In scope 1, fuels and natural gas contributed to the remaining 72% of emissions.

Figure 2. Emissions by Sector 2005
(including all direct and indirect sources from scopes 1, 2, & 3)

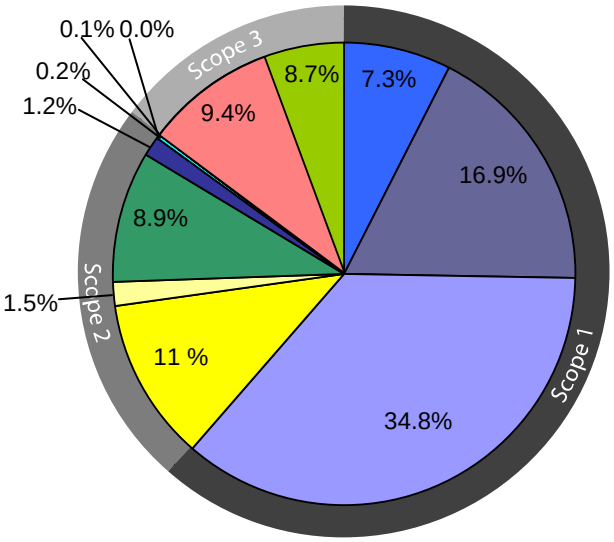
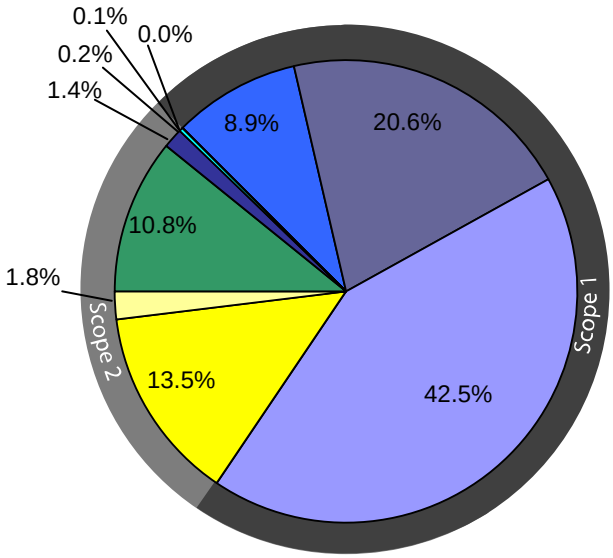


Figure 3. Emissions by Sector 2005
(including only direct and indirect sources from scopes 1 and 2)



Buildings & Facilities
Traffic Signals & Controls
Sprinkler/Irrigation Control
City Vehicle Fleet
Streetlights
Wastewater
Transit Fleet
Park Lighting
Employee Commute
Buildings & Facilities
Other Outdoor Lighting
Waste

2007

Interim Year

The year 2007 was chosen as an interim year to review any energy use changes that may have occurred since the baseline year. ICLEI recommends cities re-inventory every year or two (or as often as possible) to ensure the City is keeping on track with its target. As with the data in 2005, the table below is organized by scope, sector, source of emissions, energy and fuel use, and cost to capture a broad picture of the data.

In 2007, the City of Gardena GHG emissions totaled 9,316.5 metric tons of CO_2e including both direct and indirect sources of emissions—this number is equivalent to the emissions produced from 1,057,491 gallons of gasoline consumed. The year 2007 represents an overall 18.4% increase in emissions from the baseline year. Looking at the scopes within the table, the largest portion of emissions came from natural gas and fuel for fleet and generator use at 65.5% (scope 1 total), emissions from electricity were the second highest at 19% (scope 2 total), and the smallest portion came from the employee commute and waste categories at 15.6% (scope 3 total). Emissions from scope 1 increased from the baseline year due to the inclusion of nine additional buses in the transit fleet category and nine vehicles in the City fleet category. In this same year, the total emissions from the consumption of electricity decreased by 2.3% and the emissions from natural gas use decreased 12.6%. Scope 3 emissions related to employee commute increased while waste related emissions decreased from the baseline year.

Table 2. Municipal Inventory Summary 2007

Gardena Municipal GHG Emissions 2007						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities	503	5.4%	Natural Gas	67,561 therms	$ 65,133	9,460
Generators	0.1224		Diesel	12 gal	$ 36	2
City Vehicle Fleet						
City Vehicle Fleet[26]	**1,308**	**14%**			n/a	**18,097**
	1,196		Gasoline	131,827 gal	n/a	16,547
	108		Diesel	10,710 gal	n/a	1,485
	4		Propane	710 gal	n/a	65
Transit Fleet						
Transit Fleet[27]	**4,296**	**46.1%**				**59,052**
NOVA	2,048		Gasoline	228,263 gal	n/a	28,356
New Flyer	2,248		Diesel	221,354 gall		30,696
Total Scope 1 Emissions	**6,107**	**65.5%**	**-**	**-**	**$ 65,169**	**86,611**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	847	9.1%	Electricity	2,892,013 kWh	$ 385,407	9,870
Streetlights & Traffic Signals						
Traffic Signals/Controllers	119	1.3%	Electricity	405,040 kWh	$ 51,994	1,382
Streetlights[28]	677	7.3%	Electricity	2,313,490 kWh	$ 465,695	7,896
Park Lighting	91	1.0%	Electricity	310,856 kWh	$ 25,298	1,061
Other Outdoor Lighting[29]	16	0.2%	Electricity	53,342 kWh	$ 5,911	178
Water Delivery						
Sprinkler/Irrigation Control	6	0.1%	Electricity	19,657 kWh	$ 4,606	67
Wastewater						
Sewer Pump Station	0.5	0.0%	Electricity	1,644 kWh	$487	6
Total Scope 2 Emissions	**1,756.5**	**19%**	**-**	**5,996,042 kWh**	**$ 939,398**	**20,460**
Scope 3 Emissions						
Employee Commute						
Employee Commute	**811**	**8.7%**		**1,481,825 VMT**	n/a	**11,207**
	807		Gasoline	1,475,804 VMT		11,152
	4		Diesel	6,021VMT		55
Solid Waste						
Waste	642	6.9%		2,529.57 tons	n/a	n/a
Total Scope 3 Emissions	**1,453**	**15.6%**	-	-	-	**11,207**
Total Emissions	**9,316.5**	**100%**	-	**-**	**$ 1,004,567**	**118,278**

26 See appendix D, Emissions Data, to review fuel emissions per department; both highway vehicles, non-highway vehicles, agricultural and/or construction equipment have been included in the city fleet category. Fuel data was unknown for four vehicles therefore these items were excluded from the 2007 inventory.

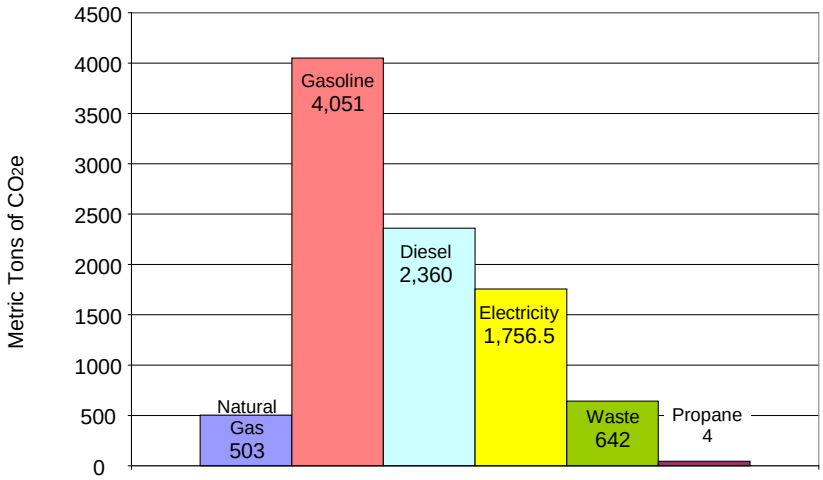
27 Approximately 41 Nova buses and 18 New Flyer buses have been combined in the total shown here. See appendix D, Emissions Data, to review individual emissions in the Transit Fleet category.

28 City owned streetlights and Southern California Edison owned streetlights have been combined in the total shown here. See appendix D, Emissions Data, to review individual emissions in the Streetlights and Traffic Signals category.

29 Parking lot lighting and other outdoor lighting have been combined in the total shown here. See appendix D, Emissions Data, to review emissions per item.

Figure 4 shows an increase in emissions from gasoline sources and a decrease in emissions from diesel sources. Natural gas, electricity, and propane sources have decreased from the baseline year. It was estimated that 2,529.57 tons of waste generated by city operated and owned facilities was sent to a landfill.

Figure 4. Emissions by Source 2007
(including all direct and indirect sources)



Similar to 2005, Figures 5 and 6 illustrate a percentage breakdown of each sector from Table 2. Figure 5 indicates 8.7% of emissions resulted from employee commuting, 6.9% from waste. Figure 6 shows electricity in scope 2 accounts for 22.4% of emissions and fuels and natural gas from scope 1 contributed to the remaining 77.6% of emissions.

Figure 5. Emissions by Sector 2007
(including all direct and indirect sources from scopes 1, 2, & 3)

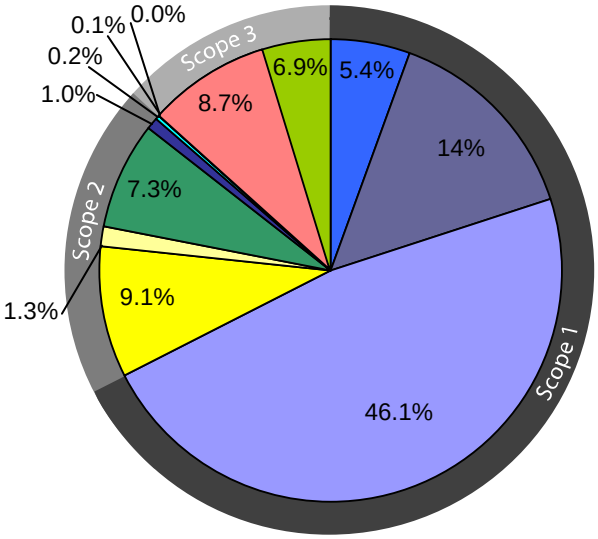
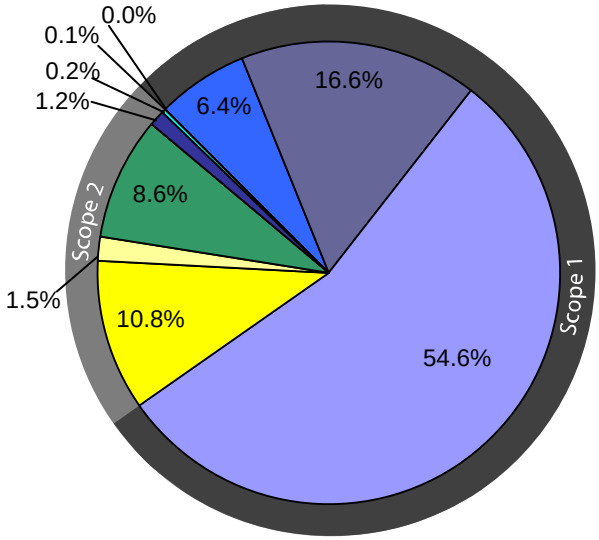
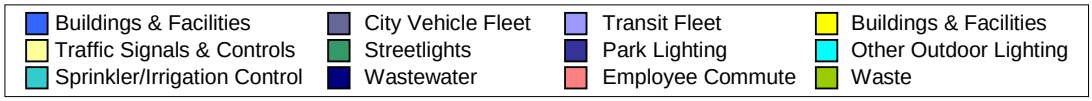


Figure 6. Emissions by Sector 2007
(including only direct and indirect sources from scopes 1 and 2)





1990

Historical Year

Looking back to 1990, this year is a benchmark for several key pieces of climate change legislation, such as the Kyoto Protocol as mentioned in the executive summary. Located in appendix F are brief descriptions pertaining to some of the historical policies that have set 1990 as a benchmark for reducing GHG emissions. Data was collected, where possible for 1990 to review the historical GHG levels; however, it was difficult to find accurate data, with the exception of electricity, and "back-casting" or creating a rough estimate of emissions is not recommended in the LGOP.[30] Therefore comparisons have been made in areas where data is reliable. As suggested in the protocol, it is better to concentrate on developing a high-quality, comprehensive inventory with reliable data rather then back-casting to 1990 and therefore the reduction target will be set from 2005 levels.

Based on the data that was available for 1990, the GHG emissions identified totaled 4,135 metric tons of CO2e, as shown in Table 3. This number is equivalent to the annual GHG emissions from 757 passenger vehicles. Looking at the scopes within the table, emissions generated from natural gas and fuel sources contributed 34.1% (scope 1) to the total emissions. Emissions emitted from electricity use accounted for 44.7% (scope 2). The smallest portion of emissions came from waste at 21.5% (scope 3). It was estimated that roughly 3,507.40 tons of waste generated by city operated and owned facilities was sent to a landfill.

Table 3. Municipal Inventory Summary 1990

Gardena Municipal GHG Emissions 1990						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities[31]	5	0.1%	Natural Gas	871 therms	n/a	87
City Vehicle Fleet						
City Vehicle Fleet[32]	**1,386**	**34%**			n/a	**19,090**
	1,319		Gasoline	145,740 gallons	n/a	18,106
	19		Diesel	1,904 gallons	n/a	264
	48		Propane	7,855 gallons	n/a	720
Total Scope 1 Emissions	**1,391**	**34.1%**	**-**	**-**	**-**	**19,177**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	1,237	29.9%	Electricity	3,130,719 kWh	$ 288,912	8,979
Streetlights & Traffic Signals						
Traffic Signals/Controllers	374	9.0%	Electricity	795,800 kWh	$ 84,500	2,716
Park Lighting	208	5.0%	Electricity	442,146 kWh	$ 50,895	1,509
Other Outdoor Lighting	22	0.5%	Electricity	46,321 kWh	$ 5,388	158
Water Delivery						

30 See LGOP inventory guidelines, page 12.

31 Due to Southern California Gas Company document retention policies official 1990 customer records are no longer available only casual records were located.

32 Approximately 111 highway vehicles, non-highway vehicles, agricultural and/or construction equipment have been combined in the total shown here. See appendix D, Emissions Data, to review fuel emissions per department in the Vehicle Fleet category.

Sprinkler/Irrigation Control	12	0.3%	Electricity	25,842 kWh	$ 3,799	88
Wastewater						
Sewer Pump Station	1	0.0%	Electricity	1,744 kWh	$305	6
Total Scope 2 Emissions	**1,854**	**44.7%**	**-**	**4,442,572 kWh**	**$ 433,799**	**13,456**
Scope 3 Emissions						
Solid Waste						
Waste	890	21.5%		3,507.40 tons	n/a	n/a
Total Scope 3 Emissions	**890**	**21.5%**	-	-	-	**-**
Total Emissions[33]	**4,135**	**100%**	-	**-**	**$ 433,799**	**32,633**

33 The summed totals shown here do not reflect the total emissions emitted in the year 1990 as not all of the data from that year was available.

B. Emissions Trends

Represented in Table 4 are the emissions trends from 1990 to 2005 (where reliable data existed) and emissions trends from 2005 to 2007 organized by source of emission.

Between a 15 year span from 1990 to 2005 electricity emissions have decreased by 3%. Improvements shown in buildings and facilities, traffic signals/controllers, park and other outdoor lighting categories may be the result of energy efficiency technology upgrades—1990, electricity use per occupant in the Civic Center was equivalent to 15.7 metric tons of CO_2e, 114.3 MMBtu, and cost $2,805.5 and in 2005, usage per occupant was equal to 8.4 metric tons of CO_2e, 94.8 MMBtu, and cost $3,179.9 (refer to appendix D, indicator inputs, for additional analysis based on statistics provided by the City and from consumption data). Although emissions have slightly declined since 1990, electricity use has expanded to include streetlights, both City and Southern California Edison owned. As for natural gas, since only casual records were found for 1990 it was difficult to compare with 2005 where complete records could be located, therefore the percentage change was not listed. Gasoline emissions from city vehicles declined 5.4% while emissions from diesel vehicles increased by 305.2%. Based on waste estimates from the service provider, emissions from waste decreased by 23.1%.

Overall emissions from electricity use decreased 2.3% from 2005 to 2007 resulting in fewer emissions. Natural gas use related to buildings and facilities also declined by 12.6%. City vehicle emissions from gasoline and propane continued to decline while diesel emissions rose 40.2%. In 2005, the sector average emissions per City vehicle was 13.3 metric tons of CO_2e. In 2007, the sector average emissions per City vehicle was 20.5 (refer to appendix D, indicator inputs for additional results). Transit fleet emissions from diesel decreased and hybrid-electric gasoline buses where added to the 2007 inventory. There was a 9.6% increase in the employee commute category (see appendix E for employee commuting details). Waste emissions went down 6.1% from 2005 to 2007.

Table 4. Emissions Trends 1990-2005 and 2005-2007

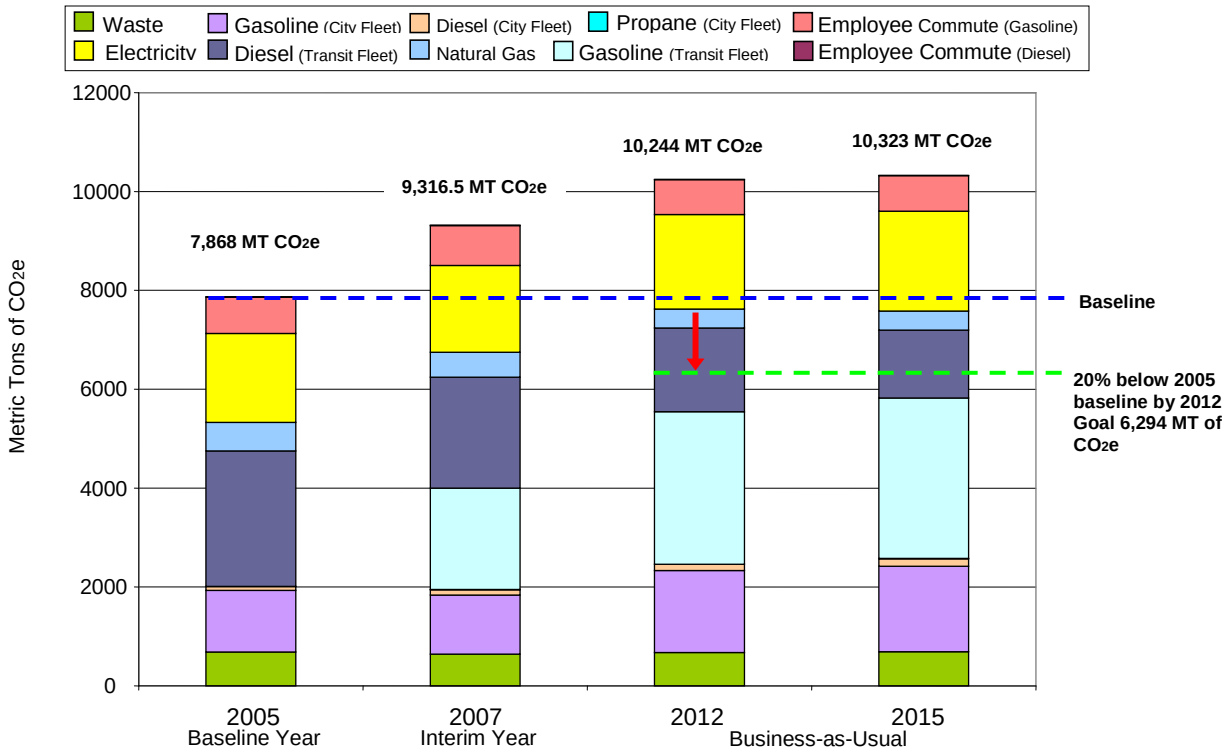
Electricity	**MTCO_2e 1990**	**MT CO_2e 2005**	**Percentage Change**	**MT CO_2e 2005**	**MT CO_2e 2007**	**Percentage Change**
Buildings & Facilities	1,237	867	**-29.9%**	867	847	**-2.3%**
Traffic Signals & Controllers	374	119	**-68%**	119	119	**--**
Streetlights	--	699	**--**	699	677	**-3.1%**
Park Lighting	208	92	**-55.7%**	92	91	**-1.0%**
Other Outdoor Lighting	22	14	**-36.3%**	14	16	**+14.2%**
Sprinkler/Irrigation Control	12	6	**-50%**	6	6	**--**
Wastewater	1	1	**--**	1	0.5	**-50%**
Total	**1,854**	**1,798**	**-3.0%**	**1,798**	**1,756.5**	**-2.3%**
Natural Gas						
Buildings & Facilities	5	576	--	576	503	**-12.6%**
Fuel						
Gasoline, City Vehicle Fleet	1,319	1,247	**-5.4%**	1,247	1,196	**-4.0%**
Diesel, City Vehicle Fleet	19	77	**+305.2%**	77	108	**+40.2%**
Propane, City Vehicle Fleet	48	5	**-89%**	5	4	**-20%**
Gasoline, Transit Fleet	--	--	**--**	--	2,048	**--**
Diesel, Transit Fleet	--	--	**--**	2,741	2,248	**-17.9%**
Gasoline, Employee Commute	--	--	**--**	736	807	**+9.6%**
Diesel, Employee Commute	--	--	**--**	4	4	**--**
Waste						
Waste Resources	890	684	**-23.1%**	684	642	**-6.1%**

C. Forecasting and Setting GHG Emissions Reduction Targets

The business-as-usual forecast shown in Figure 7 is a prediction of the likely increase in GHG emissions from municipal operations and services. The emissions shown here represent the business-as-usual forecast for the years 2012 and 2015 if the City does nothing to decrease its GHG emissions. The City can expect GHG emissions levels to increase to 10,244 metric tons of CO_2e by 2012 and 10,323 metric tons of CO_2e by 2015. Several indicators are taken into consideration for predicting anticipated emissions growth, such as, energy usage trends between the baseline year and the interim year (where possible historical year data is taken into account), assumptions about future energy consumption based on the expansion of municipal facilities and operations, new programs that may increase the use of energy, and any anticipated increase in municipal staff. By developing a business-as-usual forecast of emissions, the City can identify a target year to reduce emissions and develop the appropriate measures and policies to target specific areas.

Before deciding on an emissions target it may be helpful to look at individual measures that are planned for implementation and quantify those measures in order to see how much of a reduction can be expected from a given measure. Figure 7 illustrates a possible reduction scenario if the City were to set a reduction goal of 20% below the 2005 baseline levels by 2012. ICLEI recommends setting a long-term target (15-20 years) from the baseline year and a short-term or interim target every 2-3 years to help ensure the City continues to reduce its emissions. The further away the goal, the larger amount of reductions should be targeted. The blue line represents the baseline year 2005 calculations from which a reduction target can be determined. The green line represents a possible reduction scenario. If the City were to set an emission target 20% below 2005 levels the goal would be to reduce emissions to 6,294 metric tons of CO_2e.

Figure 7. Business-as-Usual Forecast[34]



34 The Business-as-Usual (BAU) forecast includes emissions from scopes 1, 2, and 3. A compound annual growth rate formula and the weighted averages between data sets were used to forecast municipal operation growth. Emission factors from 2007 were used to determine the equivalent CO_2e emissions. The metric tons of CO2e totals listed here are summed totals of the estimated emissions of each gas based on their global warming potential.

IV. Summary of Measures and Policies

There are a variety of ways in which the City of Gardena is moving towards becoming a more sustainable city. Policies, measures and plans the City is currently working on will help the City reach its adopted emissions reduction goals. Below is a summary of historic and current measures organized into categories to help with the planning of the climate action document.

A. Energy Efficiency

Lighting retrofit: The City has recently completed a $540,000 project which replaces the aging high energy traffic signals with high efficiency LED lights. In addition most street lights have been replaced with energy efficient High Pressure Sodium lamps. Other energy saving technologies are constantly explored such as induction lighting.

Solar Energy: The City will soon be using solar energy to illuminate signage at several key locations within the City.

B. Solid Waste and Recycling

Recycling and Green Waste: Implemented a three can automated system to include recyclables and green waste which allows Users and Maintenance personnel to easily separate and dispose or recycle refuse materials.

C. Sustainable Development

Gardena Municipal Bus Lines: Gardena just completed its new state-of-the-art "green" transportation facility which uses the LEED standards of construction. This facility has an abundant number of features such as solar panels, controllable lighting and thermal systems and parking areas with special materials used which reflect heat.

D. Urban Forests

City Parks: The City maintains approximately 10,000 trees located at the City parks and along City pathways. Hazardous, sick or dying trees are replaced with low maintenance trees that produce very little green waste and do minimal damage to sewer systems.

E. Water Usage and Conservation

Water Conservation: Exploring various ways to conserve water such as using recycled water for irrigation and retrofitting sinks and toilets with low flow devices.

F. Storm Water Management

Trash Excluding Devices: Installed over 200 various type Trash Excluding Devices over storm drain inlets which greatly reduced trash content from entering the storm drain system.

G. Vehicle Fleet

Green Transportation: In 2006 the Gardena Municipal Bus Lines began construction on its new $29 million state-of-the-art "green" transportation facility.

H. Community Involvement

Planning and Environmental Commission: Creation of the Planning and Environmental Commission which is comprised of five members. Its responsibilities are to make investigations and reports on the design and improvement of proposed subdivisions, and to submit reports and recommendations to the City Council on matters relating to zoning, land use, environment, the City's General Plan and other related matters.

I. Education and Outreach

Recycling Program: Developed annual elementary school recycling collection program.

Used Oil Program: used oil container/educational literature distribution at all city events and all public counters.

Household Hazardous Waste Program: Joined with LA County Household Hazardous Waste Program. The combined efforts resulted in a more streamlined process that reduced duplication of effort allowing for a quicker response time to the residents and thus reducing the potential for hazardous waste from entering the landfills.

Gardena Beautiful Day: An annual event in which City personnel and citizens participate to clean up and beautify the City.

Appendix A—Greenhouse Gas Municipal Inventory Details

A. Greenhouse Gas Report 2005—Baseline Year

The year 2005 represents the baseline year for the GHG inventory and will be used to set an emissions reduction target and track progress of emissions goals. Below are the GHG inventory details. This level of reporting is referred to as a quick action report wherein three of the six internationally-recognized GHGs regulated under the Kyoto Protocol (carbon dioxide, methane, and nitrous oxide) are reported separately in metric tons and aggregated with other gases not listed here to show the CO_2e summed totals of the estimated emissions of gases with different global warming potentials (see appendix E of LGOP). The control approach was utilized to define the City's scopes of emissions.

Reporting year: 2005
Protocol Used Local: Government Operation Protocol, version 1.0
Control Approach: Operational Control

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**576**	**574.25215**	**0.05412**	**0.00108**
Scope 2	Purchased Electricity	**867**	**861.81470**	**0.03754**	**0.01424**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**924**	**918.79529**	**0.04002**	**0.01518**

Water Delivery Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**6**	**6.17700**	**0.00026**	**0.00010**

Wastewater Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**1**	**0.81168**	**0.00003**	**0.00001**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**1,329**	**1296.51866**	**0.07627**	**0.08274**

Transit Fleet					
Scope1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**2,741**	**2738.33261**	**0.00865**	**0.00814**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**684**	**684**	**0.01478**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**740**	**722.44419**	**0.04449**	**0.05207**

Total Emissions	CO_2e	CO_2	CH_4	N_2O
Scope 1	**4,646**	**4609.10343**	**0.13905**	**0.09198**
Scope 2	**1,798**	**1787.59869**	**0.07787**	**0.02953**
Scope 3	**1,424**	**1406.4442**	**0.05927**	**0.05207**

B. Greenhouse Gas Report 2007— Interim Year

The year 2007 represents data collected from an interim year to review any changes in GHG emissions that may have occurred since the baseline year. The recommended operational control approach was used to define the City's boundaries. Below are the GHG inventory details. This level of reporting is referred to as a quick action report wherein three of the six internationally-recognized GHGs regulated under the Kyoto Protocol (carbon dioxide, methane, and nitrous oxide) are reported separately in metric tons and aggregated with other gases not listed here to show the CO_2e summed totals of the estimated emissions of gases with different global warming potentials (see appendix E of LGOP). The control approach was utilized to define the City's scopes of emissions.

Reporting year: 2007
Protocol Used Local: Government Operation Protocol, version 1.0
Control Approach: Operational Control

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**503**	**502.06402**	**0.04731**	**0.00094**
Scope 2	Purchased Electricity	**847**	**841.25415**	**0.03804**	**0.01442**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**903**	**896.44011**	**0.04053**	**0.01537**

Water Delivery Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**6**	**5.71800**	**0.00025**	**0.00009**

Wastewater Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**0.5**	**0.47822**	**0.00002**	**0.000008**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**1,308**	**1285.68111**	**0.07074**	**0.07125**

Transit Fleet					
Scope1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**4,296**	**4255.30657**	**0.14397**	**0.12094**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**642**	**642**	**0.01385**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**811**	**794.46553**	**0.04602**	**0.05050**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**6,107**	**604305170**	**0.26203**	**0.19314**
	Scope 2	**1,756.5**	**1743.89049**	**0.07885**	**0.02991**
	Scope 3	**1,453**	**1436.4655**	**0.05987**	**0.0505**

C. Greenhouse Gas Report 1990—Historical Year

The year 1990 represents a reference year for several key pieces of climate change legislation such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol agreement, and the U.S. Mayors' Climate Protection Agreement. Where available and reliable information could be found historical GHG emissions have been recorded below. Carbon dioxide, methane, and nitrous oxide are reported separately in metric tons and aggregated with other gases not listed here to show the CO_2e summed totals of the estimated emissions of gases with different global warming potentials (see appendix E of LGOP). The control approach was utilized to define the City's scopes of emissions.

Reporting year: 1990
Protocol Used Local: Government Operation Protocol, version 1.0
Control Approach: Operational Control

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**5**	**4.61622**	**0.00043**	**0.000008**
Scope 2	Purchased Electricity	**1,237**	**1230.43262**	**0.04773**	**0.01670**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**604**	**600.67381**	**0.02330**	**0.00815**

Water Delivery Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**12**	**12.08674**	**0.00046**	**0.00016**

Wastewater Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**1**	**0.81569**	**0.00003**	**0.00001**

Vehicle Fleet

Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**1,386**	**1348.12398**	**0.11582**	**0.12162**

Solid Waste

Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**890**	**890**	**0.01921**	**-**

Total Emissions

	CO_2e	CO_2	CH_4	N_2O
Scope 1	**1,391**	**1352.74020**	**0.11625**	**0.12163**
Scope 2	**1,854**	**1844.00888**	**0.07153**	**0.02503**
Scope 3	**890**	**890**	**0.01921**	**-**

Appendix B—Activity Data Disclosure

Listed below are the data sources. Activity data refers to consumption data such as fuel or electricity use which results in GHG emissions. In an effort to establish good reporting habits, improve the quality of future inventories, and to comply with the overarching reporting principles mentioned in the LGOP - relevance, completeness, consistency, transparency, and accuracy - this information has been recorded. This information is grouped by scope and source of emission. Descriptions of data sources and the methodology used to obtain information are listed here. Indicated in the upper right-hand corner is the methodology used and whether or not it is a recommended or alternative method as prescribed by the LGOP. In this way, the City will be able to improve its data collection process if an alternative method is listed. It is important to note that scope 3 emissions are considered optional reporting.

A. Buildings & Other Facilities

Scope 1 Stationary Combustion

Description:	**Recommended Method**
Consumption data was obtained from Southern California Gas Company. Southern California Gas no longer possesses official customer records going back to 1990 due to document retention policies. SoCalGas located some casual records that go back to 1990 which was the basis for the gas information provided for 1990. Fuel use data from other stationary combustion sources was provided by city staff.	Known Natural Gas use
Reference: Chauncy Tou, Energy Programs Advisor Customer Programs, Southern California Gas Company, 213-244-2833, ctou@semprautilities.com. John Felix, Public Works Department, 310-217-9643.	

Scope 2 Purchased Electricity

Description:	**Recommended Method**
Consumption data was obtained from Southern California Edison.	Known electricity use
Reference: Larry Sutton, Account Executive, Southern California Edison, 714-973-5660 PAX 52660 Maya R. Aubrey, Analyst-Program/Project, Southern California Edison, (909) 357-6536 PAX 16036, Maya.Aubrey@sce.com.	

B. Street Lighting and Traffic Signals

Scope 2 Purchased Electricity

Description:	**Recommended Method**
Consumption data was obtained from Southern California Edison. Note: Accounts owned by SCE were included but recorded separately.	Known electricity use
Reference: Larry Sutton, Account Executive, Southern California Edison, 714-973-5660 PAX 52660 Maya R. Aubrey, Analyst-Program/Project, Southern California Edison, (909) 357-6536 PAX 16036, Maya.Aubrey@sce.com.	

C. Water Delivery and Wastewater

Scope 2 Purchased Electricity

Description:	**Recommended Method**
Consumption data was obtained from Southern California Edison.	Known electricity use

Reference: Larry Sutton, Account Executive, Southern California Edison, 714-973-5660 PAX 52660
Maya R. Aubrey, Analyst-Program/Project, Southern California Edison, (909) 357-6536 PAX 16036, Maya.Aubrey@sce.com.

D. Vehicle Fleet

Scope 1 Mobile Combustion

Description:	**Recommend Method**
City staff provided fuel data based on a combination of known fuel use from accounts payable, department records, and the City Hall fuel tracking system.	Accounts payable, department records, and fuel tracking system **Alternative Method 1990** 1994 proxy year fuel use data

Reference: Public Works vehicle data was provided by John Felix, Public Works Department, 310-217-9643; Police Department data was prepared by Thomas Kang, 310 217-9677.

E. Scope 3 Employee Commute

Scope 3 Employee Commute

Description:

Employee commute results were determined by conducting a survey of employee commute distance, mode and frequency for the years 2007 and 2005. The online website Survey Monkey was utilized to conduct the survey www.surveymonkey.com

Reference: John Felix, Public Works Department, 310-217-9643 and Judy R. Sutton, Transportation Administrative Analyst, Gardena Municipal Bus Lines, 310-217-9547.

F. Transit Fleet

Scope 1 Mobile Combustion

Description:	**Recommend Method**
Transit fuel data was provided by the Judy R. Sutton, Transportation Administrative Analyst with the Gardena Municipal Bus Lines. Fuel data based on a combination of known fuel use from accounts payable, department records and fuel tracking system.	Accounts payable, department records, and fuel tracking system

Reference: Data was provided by John Felix, Public Works Department, 310-217-9643
and Judy R. Sutton, Transportation Administrative Analyst, Gardena Municipal Bus Lines, 310-217-9547.

Appendix C—Methodology/Emissions Factors Disclosure

It is considered good practice to disclose all methodologies employed to calculate emissions. Listed below are the formulas used to determine the equivalent emissions. Emissions factors refer to a unique value used to determine the amount of a GHG emitted on a per unit activity basis. They are used to convert activity data, like energy usage, into the associated GHG emissions.[35] In compliance with the LGOP and ICLEI program reporting requirements listed below and organized by scope are descriptions of computational methods and emission factors used to arrive at the equivalent GHG emissions. Indicated in the top right corner is the method used and whether it is considered to be a recommended or alternate method based on the LGOP standards. In this way, the City will be able to improve its data collection where an alternative method is listed. It is important to note that scope 3 emissions are considered optional reporting.

A. Scope 1 Stationary Combustion

Description of Computational Method:	**Recommended Method**
Table G.1 of the LGOP, Default factors for CO2 emissions, pg. 170 and Table G.3 of the LGOP, Default CH4 and N2O emissions factors by fuel type and sector, pg. 172.	Default emission factors, Table G.1 and Table G.3 of the LGOP

Criteria Air Pollutants, Table 3. NERC Western Systems Coordinating Council/CNV 1990- 2005
2007 inventory-2005 CAP emissions factors
2005 inventory-2005 CAP emissions factors
1990 inventory-1990-2003 emissions factors

Reference: Data was provided by Chauncy Tou, Energy Programs Advisor Customer Programs, Southern California Gas Company, 213-244-2833, ctou@semprautilities.com.

Fuel data from other stationary sources was provided by John Felix, Public Works Department, 310-217-9643.

B. Scope 1 Mobile Combustion

Description of Computational Method:	**Alternative Method**
City staff provided fuel data based on a combination of known fuel use from accounts payable, department records, and City Hall fuel tracking system.	Alternative emissions factors, Table G.13 of the LGOP

Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.

Reference: Public Works vehicle data was provided by John Felix, Public Works Department, 310-217-9643; Police Department data was prepared by Thomas Kang, 310 217-9677; Transit Fleet data was prepared by Judy R. Sutton Transportation Administrative Analyst, Gardena Municipal Bus Lines, (310) 217-9547.

C. Scope 2 Purchased Electricity

Description of Computational Method:	**Recommended Method**
Table G.5 Utility-Specific Verified Electricity CO2 Emissions Factors (2000-2006), LGOP pg. 174.	Utility-Specific verified emission factors used

For 2005 inventory Southern California Edison, 2005 emission factors were used; For 2007, inventory Southern California Edison, 2006 emissions factors were used.

TableG.6 California Grid Average Electricity Emissions Factors (1990-2004) emissions factors from the year 2004 was used for both 2005 and 2007.

35 A full description of emissions factor can be found on page 27 of the Local Government Operations Protocol. Emission factors are determined by means of direct measurement, laboratory analyses or calculations based on representative heat content and carbon content.

The year 1990 emissions factors from Table G.6 were used for the 1990 inventory.

Reference: Larry Sutton, Account Executive, Southern California Edison, 714-973-5660 PAX 52660
Maya R. Aubrey, Analyst-Program/Project, Southern California Edison, (909) 357-6536 PAX 16036, Maya.Aubrey@sce.com.

D. Scope 3 Waste Related Emissions

Description of Computational Method:

Tommy Gendal, with Waste Resources of Gardena provided the waste data information. Waste was taken to the Puente Hills (LA County Sanitation District) and El Sobrante (Waste Management). And there is Methane Recovery at both sites. There was an estimated 75% methane recovery at the landfill where the waste was taken.

City of Gardena
2007 Tons = 2529.57
2005 Tons = 2698.76
1990 Tons = 3507.40 (Guesstimate)
Mr. Gendal provided a rough estimate for 1990 waste from City operated and owned facilities.

Solid Waste Characterization for public administration was obtain from the California Integrated Waste Management Board http://www.ciwmb.ca.gov/wastechar/BizGrpCp.asp

Reference: Data was provided by John Felix, Public Works Department, 310-217-9643 and Ledra Sanchez, Administrative Analyst, Public Works Department, 310-217-6151.

E. Scope 3 Employee Commute

Description of Computational Method:

Alternative Method
Alternative emissions factors, Table G.13, LGOP

The online website Survey Monkey was utilized to conduct an employee commute the survey http://www.surveymonkey.com

Utilizing employee benefits information, it was estimated that on average employees worked 46.5 weeks, which means 28 days were deducted from the 260 possible working days in a year. It was assumed that these absences were due to vacation, sick, personal, and holiday.

Respondents who drove city vehicles, or were not employed by the City in the years surveyed, walked, bicycled, or used another form of transportation were excluded from the emissions inventory.

VMT calculations for public transit were based on information from Scott Greene of LA County Metropolitan Transportation Authority (Metro). In 2005 and 2007 the standard transit bus had 40 seats per bus. The standard for the Green Line is 76 seats per rail car.

Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.

2007--458 employees (FTE) with 292 responses is a 64% response rate. The remaining 36% of VMT was estimated based on survey responses for a total VMT of 1,481,825.28. Assumptions: gasoline, drove alone, passenger vehicle (1.56 x 949,888=1,481,825.28 Total VMT)

2005--453 employees (FTE) with 242 responses is a 53.4% response rate. The remaining 71% of VMT was estimated based on survey responses for a total VMT of 1,370,126.56. Assumptions: gasoline, drove alone, passenger vehicle (1.87 x 732,688=1,370,126.56 Total VMT)
Reference: John Felix, Public Works Department, 310-217-9643.

Appendix D—Emissions Data

The municipal inventory report was based on data collected from electricity, natural gas consumption, fuels, and other sources listed in the tables below as reference. Information is organized to be consistent with the order of the report, e.g., baseline year, interim year, and historical year. Emissions sources are organized according to source, equivalent metric tons of carbon dioxide emissions, energy equivalent in MMBtu, energy/ fuel use, and cost where known.[36]

Sources of Emissions 2005	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost ($)
Buildings and Facilities						
Bell Park Building	Natural Gas	1	0	13	125 therms	$262
Civic Center	Electricity	388	7.9	4,360	1,277,512 kWh	$146,275
	Natural Gas	61	0.8	1,143	11,432 therms	$11,935
Johnson Park Building	Natural Gas	3	0	50	496 therms	$688
Mas Fukai Park Building	Natural Gas	3	0	52	524 therms	$731
One Stop	Electricity	7	0.1	79	23,260 kWh	$3,711
	Natural Gas	0	0	3	31 therms	$398
Police (1718 162nd St.)	Natural Gas	297	3.8	5,581	33,623 therms	$57,102
Police Dept. Annex (1734 162nd St.)	Electricity	1	0	13	3,923 kWh	$522
Police Generators	Diesel	0	0	2	12 gal	$36
Public Works Building (Hobart)	Electricity	21	0.3	231	67,600 kWh	$10,261
	Natural Gas	10	0.1	186	1,861 therms	$2,261
Public Works Building 162nd St	Electricity	26	0.3	295	86,460 kWh	$11,910
	Natural Gas	19	0.3	360	3,597 therms	$4,063
Rowley Park Building	Electricity	53	0.7	593	173,830 kWh	$25,467
	Natural Gas	10	0.1	185	1,848 therms	$2,431
Rush Gym	Electricity	111	1.4	1,249	366,080 kWh	$45,904
	Natural Gas	19	0.2	348	3,478 therms	$4,070
Senior Citizens Bureau (Nakaoka Community Center)	Electricity	121	1.5	1,364	399,600 kWh	$48,098
	Natural Gas	84	1.1	1,583	15,826 therms	$15,883
Thornburg Park Building	Electricity	4	0.1	45	13,088 kWh	$1,929
	Natural Gas	0	0	7	72 therms	$203
Transportation Bldg. (Van Ness)	Electricity	113	1.4	1,272	372,824 kWh	$48,035
	Natural Gas	70	0.9	1,310	13,100 therms	$13,055
Transportation Office (Western)	Electricity	21	0.3	238	69,840 kWh	$20,882

36 Source of data CACP software output.

Streetlights & Traffic Signals						
Traffic Signals/Controllers	Electricity	119	1.5	1,341	392,982 kWh	$44,424
Streetlights:						
Streetlight	Electricity	76	1.0	854	250,308 kWh	$18,658
Streetlight SCE Owned	Electricity	623	7.9	7,004	2,052,177 kWh	$364,611
Park Lighting:						
Park Lighting	Electricity	92	1.2	1,030	301,916 kWh	$19,503
Other Outdoor Lighting:						
Parking Lot Lighting	Electricity	2	0	19	5,637 kWh	$1,485
Outdoor Lighting	Electricity	12	0.2	135	39,696 kWh	$6,653
Water Delivery						
Sprinkler/Irrigation Control	Electricity	6	0.1	70	20,456 kWh	$4,213
Wastewater						
Sewer Pump Station	Electricity	1	0	9	2,688 kWh	$559
Vehicle Fleet						
Police Department	Gasoline	967	12.3	13,322	107,245 gal	n/a
	Gasoline (OFF ROAD)	123	1.6	1,718	13,832 gal	n/a
Public Works Department	Gasoline	151	1.9	2,086	16,790 gal	n/a
	LPG	5	0.1	71	779 gal	n/a
	Diesel	72	0.9	980	7,065 gal	n/a
	Diesel (OFF ROAD)	5	0.1	73	528 gal	n/a
	Gasoline (OFF ROAD)	6	0.1	78	624 gal	n/a
Transit Fleet						
Nova	Diesel ULSD	2,741	34.8	37,434	269,943 gal	n/a
Employee Commute						
Drove Alone	Diesel	3	0	39	5,301 VMT	n/a
	Gasoline	698	8.9	9,613	1,299,170 VMT	n/a
Carpool	Gasoline	38	0.5	523	64,935 VMT	n/a
Public Transportation	Diesel	1	0	16	721 VMT	n/a
Waste						

Waste Resources of Gardena	Carbon Dioxide	684	8.7	2,698.76 tons	n/a
	Methane	32.5920	n/a		
Sources:	Food Waste	73	n/a		
	Paper Products	516	n/a		
	Plant Debris	71	n/a		
	Wood/Textiles	25	n/a		

Sources of Emissions 2007	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost ($)
Buildings and Facilities						
Bell Park Building	Natural Gas	1	0	18	184 therms	$324
Civic Center	Electricity	373	4.0	4,351	1,274,755 kWh	$163,252
	Natural Gas	49	0.5	919	9,193 therms	$9,139
Johnson Park Building	Natural Gas	3	0	47	473 therms	$641
Mas Fukai Park Building	Natural Gas	3	0	52	515 therms	$686
One Stop	Electricity	7	0.1	81	23,851 kWh	$4,280
	Natural Gas	0	0	4	37 therms	$412
Police (1718 162nd St.)	Natural Gas	239	2.6	4,488	27,038 therms	$24,365
Police Dept. Annex (1734 162nd St.)	Electricity	9	0.1	109	31,859 kWh	$5,401
Police Generators	Diesel	0	0	2	12 gal	$36
Public Works Building (Hobart)	Electricity	21	0.2	241	70,540 kWh	$11,467
	Natural Gas	11	0.1	211	2,114 therms	$2,401
Public Works Building 162nd St	Electricity	31	0.3	367	107,490 kWh	$15,891
	Natural Gas	28	0.3	531	5,312 therms	$5,261
Rowley Park Building	Electricity	57	0.6	659	193,108 kWh	$28,373
	Natural Gas	20	0.1	372	3,717 therms	$4,026
Rush Gym	Electricity	115	1.3	1,344	393,797 kWh	$52,741
	Natural Gas	11	0.1	207	2,069 therms	$2,429
Senior Citizens Bureau	Electricity	113	1.2	1,320	386,813 kWh	$52,154
(Nakaoka Community Center)	Natural Gas	66	0.7	1,236	12,362 therms	$11,633
Thornburg Park Building	Electricity	4	0	51	15,054 kWh	$2,525
	Natural Gas	1	0	14	136 therms	$273
Transportation Bldg. (Van Ness)	Electricity	116	1.3	1,347	394,746 kWh	$49,321
	Natural Gas	72	0.8	1,360	13,604 therms	$12,682
Streetlights & Traffic Signals						

Traffic Signals/Controllers	Electricity	119	1.3	1,382	405,040 kWh	$51,994
Streetlights:						
Streetlight	Electricity	80	0.9	931	272,720 kWh	$25,187
Streetlight SCE Owned	Electricity	597	6.4	6,965	2,040,770 kWh	$450,508
Park Lighting:						
Park Lighting	Electricity	91	1.0	1,061	310,856 kWh	$25,298
Other Outdoor Lighting:						
Parking Lot Lighting	Electricity	3	0	31	9,142 kWh	$2,376
Outdoor Lighting	Electricity	13	0.1	147	43,200 kWh	$3,535
Water Delivery						
Sprinkler/Irrigation Control	Electricity	6	0.1	67	19,657 kWh	$4,606
Wastewater						
Sewer Pump Station	Electricity	0.5	0	6	1,644 kWh	$487
Vehicle Fleet						
Police Department	Gasoline	948	10.2	13,103	105,477 gal	n/a
	Gasoline(OFF ROAD)	124	1.3	1,733	13,950 gal	n/a
Public Works Department	Gasoline	121	1.3	1,664	13,397 gal	n/a
	Diesel	95	1.0	1,303	9,398 gal	n/a
	LPG	4	0	65	710 gal	n/a
	Diesel(OFF ROAD)	13	0.1	182	1,312 gal	n/a
	Gasoline(OFF ROAD)	3	0	47	378 gal	n/a
Transit Fleet						
New Flyer	Gasoline	2,048	22.0	28,356	228,263 gal	n/a
Nova	Diesel ULSD	2,248	24.1	30,696	221,354 gal	n/a
Employee Commute						
Drove Alone	Diesel	3	0	39	5,301 VMT	n/a
	Gasoline	743	8.0	10,266	1,361,301.98 VMT	n/a
Carpool	Gasoline	64	0.7	886	114,502 VMT	n/a
Public Transportation	Diesel	1	0	16	721 VMT	n/a
Waste						

Waste Resources of Gardena	Carbon Dioxide	642	6.9	n/a	2,529.57 tons	n/a
	Methane	30.5488	n/a	n/a		n/a
Sources:	Food Waste	68	n/a			
	Paper Products	483	n/a			
	Plant Debris	67	n/a			
	Wood/Textiles	23	n/a			

Sources of Emissions 1990	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost ($)
Buildings and Facilities						
Bell Park Building	Natural Gas	0	0	0	3 therms	n/a
Civic Center	Electricity	724	17.5	5,259	1,540,80 kWh	$129,053
Johnson Park Building	Natural Gas	0	0	4	40 therms	n/a
Mas Fukai Park Building	Natural Gas	0	0	3	33 therms	n/a
Los Angeles County Fire Station	Electricity	26	0.6	191	56,000 kWh	6,391
Police (1718 162nd St.)	Natural Gas	0	0	0	1 therms	n/a
Public Works Building (Hobart)	Electricity	30	0.7	219	64,060 kWh	$7,358
	Natural Gas	1	0	11	109 therms	n/a
Public Works Building 162nd St	Electricity	37	0.9	269	78,840 kWh	$9,525
	Natural Gas	0	0	0	4 therms	n/a
Rowley Park Building	Electricity	69	1.7	501	146,706 kWh	$15,333
	Natural Gas	0	0	3	30 therms	n/a
Rush Gym	Electricity	221	5.3	1,602	469,260 kWh	$45,331
	Natural Gas	0	0	3	26 therms	n/a
Senior Citizens Bureau	Electricity	6	0.1	42	kWh	$49,938
(Nakaoka Community Center)	Natural Gas	1	0	14	therms	n/a
Thornburg Park Building	Electricity	6	0.1	41	11,891 kWh	$1,436
	Natural Gas	1	0	15	146 therms	n/a
Transportation Bldg. (Van Ness)	Electricity	118	2.8	856	250,762 kWh	$24,547
	Natural Gas	2	0	34	343 therms	n/a
Streetlights & Traffic Signals						
Traffic Signals/Controllers	Electricity	374	9.0	2,716	795,800 kWh	$84,500
Park Lighting:						
Park Lighting	Electricity	208	5.0	1,509	442,146 kWh	$50,895
Other Outdoor Lighting:						

Parking Lot Lighting	Electricity	0	0	0	121 kWh	$123
Outdoor Lighting	Electricity	22	0.5	158	46,200 kWh	$5,264
Water Delivery						
Sprinkler/Irrigation Control	Electricity	12	0.3	88	25,842 kWh	$3,799
Wastewater						
Sewer Pump Station	Electricity	1	0	6	1,744 kWh	$305
Vehicle Fleet						
Police Department	Gasoline	967	23.4	13,218	106,400 gal	n/a
	Gasoline (OFF ROAD)	147	3.6	2,075	16,700 gal	n/a
Public Works Department	Gasoline	187	4.5	2,559	20,596 gal	n/a
	Diesel	5	0.1	72	518 gal	n/a
	LPG	48	1.2	720	7,655 gal	n/a
	Diesel (OFF ROAD)	14	0.3	192	1,366 gal	n/a
	Gasoline (OFF ROAD)	18	0.4	254	2,044 gal	n/a
Waste						
Waste Resources of Gardena	Carbon Dioxide	890	23.4		3,507.4 tons	n/a
	Methane	42.35778	n/a			n/a
Sources:	Food Waste	94	n/a			n/a
	Paper Products	670	n/a			n/a
	Plant Debris	93	n/a			n/a
	Wood/Textiles	32	n/a			n/a

Criteria Air Pollutants[37]

Municipal operations are also responsible for emitting criteria air pollutants which have been linked to various environmental and public health problems. The CACP software generates data on these emissions as shown in the tables below.[38] Actions taken to reduce emissions will also reduce criteria air pollutants as well.

Criteria Air Pollutants 2005	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	4,355	1,761	2,073	281	1,449
Streetlights & Traffic Signals	2,697	1,799	1,708	192	1,485
Water Delivery	18	12	11	1	10
Wastewater	2	2	2	0	1
Vehicle Fleet	8,434	445	79,054	8,136	213
Employee Commute	4,590	259	49,678	5,097	106
Transit Fleet	46,711	1,824	35,797	4,593	1,850
Total	66,859	4,337	168,444	18,326	5,023

Criteria Air Pollutants 2007	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	4,160	1,774	2,036	271	1,461
Streetlights & Traffic Signals	2,732	1,823	1,730	194	1,504
Water Delivery	17	12	11	1	10
Wastewater	1	1	1	0	1
Vehicle Fleet	8,316	439	77,867	7,901	215
Employee Commute	4,755	276	54,286	5,477	113
Transit Fleet	45,664	477	124,675	13,232	1,446
Total	65,645	4,801	260,606	27,077	4,750

Criteria Air Pollutants 1990	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	2,271	1,830	1,458	166	1,379
Streetlights & Traffic Signals	1,102	893	710	81	673
Water Delivery	22	18	14	2	14
Wastewater	1	1	1	0	1
Vehicle Fleet	9,251	385	102,339	10,921	186
Total	12,647	3,127	104,522	11,170	2,252

37 To review definitions and acronyms for criteria air pollutants refer to appendices sections G and H.

38 Source of data CACP software output.

Indicator Inputs

Indicator inputs is a term used by ICLEI to describe statistics such as the number of employees that work in a building or how many streetlights are in the City. The CACP software is able to provide an additional analysis based on the statistics entered such as energy use per square foot. These statistics are not necessary to calculate GHGs but they are able to provide additional information which can be useful for tracking progress over time.[39]

Sources of Emissions 2005		Equiv CO_2 (tonnes)	Energy (MMBtu)	Cost ($)
Buildings and Facilities				
Civic Center– Electricity				
	Per 1000 sq. ft.	0	0.2	$5.6
	Per hour of operation	0.2	1.9	$65.3
	Per occupant	8.4	94.8	$3,179.9
Civic Center– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.5
	Per hour of operation	0	0.5	$5.3
	Per occupant	1.3	24.9	$259.5
Public Works Building 162nd St.– Electricity				
	Per 1000 sq. ft.	0	0	$1
	Per hour of operation	0	0.1	$5.3
	Per occupant	2	22.7	$916.2
Public Works Building 162nd St.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.3
	Per hour of operation	0	0.2	$1.8
	Per occupant	1.5	27.7	$312.5
Public Works Bldg. (Hobart)– Electricity				
	Per 1000 sq. ft.	0	0	$1.1
	Per hour of operation	0	0.1	$4.6
	Per occupant	0.4	5	$223.1
Public Works Bldg. (Hobart)– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.3
	Per hour of operation	0	0.1	$1
	Per occupant	0.2	4	$49.2
Transportation Bldg. (Van Ness)– Electricity				
	Per 1000 sq. ft.	0	0.1	$4
	Per hour of operation	0	0.3	$12
	Per occupant	1.1	12.4	$466.4
Transportation Bldg. (Van Ness)– Natural Gas				
	Per 1000 sq. ft.	0	0.1	$1.1
	Per hour of operation	0	0.3	$3.3
	Per occupant	0.7	12.7	$126.7
Transportation Bldg. (Western)– Electricity				
	Per 1000 sq. ft.	0	0	$0.3
	Per hour of operation	0	0	$2.4
	Per occupant	0.2	2.3	$202.7
Rowley Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$1.5
	Per hour of operation	0	0.4	$17
	Per occupant	10.6	118.7	$5093.4

39 Source of data CACP software output.

Rowley Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.1
	Per hour of operation	0	0.1	$1.6
	Per occupant	2.0	37.0	$486.2
Thornburg Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$1.7
	Per hour of operation	0	0	$1.3
	Per occupant	2.0	22.3	$964.5
Thornburg Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.1
	Per occupant	0.2	3.6	$101.5
Bell Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.1
	Per occupant	0.3	6.3	$131
Johnson Park Bldg. – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.1
	Per hour of operation	0	0	$0.3
	Per occupant	0.7	12.4	$172
Mas Fukai Park Bldg. – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.3
	Per occupant	0.9	17.5	$243.7
Police Dept. Annex (1734 162nd St.)– Electricity				
	Per 1000 sq. ft.	0	0	$0.1
	Per hour of operation	0	0	$0.1
	Per occupant	0	0.1	$3.6
Police Dept. Annex (1718 162nd St.)– Natural Gas				
	Per 1000 sq. ft.	0	0.2	$2.5
	Per hour of operation	18.6	348.8	$3568.9
	Per occupant	0.1	2.7	$27.5
Senior Citizens Bureau – Electricity				
	Per 1000 sq. ft.	0	0.1	$2.8
	Per hour of operation	0.1	0.6	$21.5
	Per occupant	13.5	151.5	$5344.2
Senior Citizens Bureau, Nak. Com. Ctr – Natural Gas				
	Per 1000 sq. ft.	0	0.1	$0.9
	Per hour of operation	0	0.7	$7.1
	Per occupant	9.4	175.8	$1764.8
Rush Gym – Electricity				
	Per 1000 sq. ft.	0	0.1	$2.3
	Per hour of operation	0	0.6	$20.5
	Per occupant	55.6	624.6	$22,952.0
Rush Gym – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0.2	$1.8
	Per occupant	9.3	173.9	$2035.0
One Stop – Electricity				
	Per 1000 sq. ft.	0	0	$1.7
	Per hour of operation	0	0	$1.8
	Per occupant	0.7	7.9	$371.1
One Stop – Natural Gas				

	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.2
	Per occupant	0	0.3	$39.8
Sector Average				
	Per 1000 sq. ft.	0	0	$0
	Per hour of operation	0	0	$0.2
	Per occupant	0.5	0.9	$4.8
Streetlights & Traffic Signals				
Traffic Signals/Controllers				
	Per streetlight account	1.9	21.3	$705.1
Streetlight				
	Per streetlight	0.4	4.9	$106.0
Streetlight SCE Owned				
	Per streetlight	0.2	2.3	$118.2
Park Lighting				
	Per streetlight account	11.5	128.8	$2,437.9
Outdoor Lighting				
	Per streetlight account	4.0	45.2	$2,217.7
Parking Lot Lighting				
	Per streetlight account	0.4	4.8	$371.3
Sector Average				
	Per streetlight account	9.3	9.0	$24.3
Vehicle Fleet				
Police Department				
	Per vehicle	23.7	327	n/a
Public Works Department				
	Per vehicle	3.4	46.6	n/a
Sector Average				
	Per vehicle	13.3	38.7	n/a
Employee Commute				
Carpool Group				
	Per vehicle	0.8	11.6	n/a
Drove Alone				
	Per vehicle	1.7	23.8	n/a
Public Transportation				
	Per vehicle	0.4	5.3	n/a
Sector Average				
	Per vehicle	1.6	1.5	n/a
Transit Fleet				
NOVA				
	Per vehicle	54.8	748.7	n/a
Sector Average				
	Per vehicle	109.6	800.6	n/a
Solid Waste				
Waste Resources of Gardena				

	Per employee	1.5	0	n/a
Sector Average				
	Per employee	3.0	1.4	n/a

Sources of Emissions 2007		Equiv CO_2 (tonnes)	Energy (MMBtu)	Cost ($)
Buildings and Facilities				
Civic Center– Electricity				
	Per 1000 sq. ft.	0	0.2	$6.3
	Per hour of operation	0.2	1.9	$72.9
	Per occupant	8.1	94.6	$3549
Civic Center– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.4
	Per hour of operation	0	0.4	$4.1
	Per occupant	1.1	20	$198.7
Public Works Building 162nd St.– Electricity				
	Per 1000 sq. ft.	0	0	$1.3
	Per hour of operation	0	0.2	$7.1
	Per occupant	2.4	28.2	$1222.4
Public Works Building 162nd St.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.4
	Per hour of operation	0	0.2	$2.3
	Per occupant	2.2	40.9	$404.7
Public Works Bldg. (Hobart)– Electricity				
	Per 1000 sq. ft.	0	0	$1.3
	Per hour of operation	0	0.1	$5.1
	Per occupant	0.4	5.2	$249.3
Public Works Bldg. (Hobart)– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.3
	Per hour of operation	0	0.1	$1.1
	Per occupant	0.2	4.6	$52.2
Transportation Bldg. (Van Ness)– Electricity				
	Per 1000 sq. ft.	0	0.1	$4.1
	Per hour of operation	0	0.3	$12.3
	Per occupant	1.1	13.1	$478.8
Transportation Bldg. (Van Ness)– Natural Gas				
	Per 1000 sq. ft.	0	0.1	$1
	Per hour of operation	0	0.3	$3.2
	Per occupant	0.7	13.2	$123.1
Rowley Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$1.7
	Per hour of operation	0	0.4	$18.9
	Per occupant	11.3	131.8	$5674.6
Rowley Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0.2	$2.7
	Per occupant	4.0	74.3	$805.2
Thornburg Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$2.2
	Per hour of operation	0	0	$1.7
	Per occupant	2.2	25.7	$1262.5

Thornburg Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.2
	Per occupant	0.4	6.8	$136.5
Bell Park Bldg.– Natural Gas				
	Per 1000 sq. ft.	0	0	$0.3
	Per hour of operation	0	0	$0.2
	Per occupant	0.5	9.2	$162.0
Johnson Park Bldg. – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.1
	Per hour of operation	0	0	$0.3
	Per occupant	0.6	11.8	$160.3
Mas Fukai Park Bldg. – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.3
	Per occupant	0.9	17.2	$228.7
Police Dept. Annex (1734 162nd St.)– Electricity				
	Per 1000 sq. ft.	0	0	$0.6
	Per hour of operation	0	0	$0.6
	Per occupant	0.1	0.7	$37
Police Dept. Annex (1718 162nd St.)– Natural Gas				
	Per 1000 sq. ft.	0	0.2	$1.8
	Per hour of operation	0.1	2.2	$20.2
	Per occupant	14.9	280.5	$2631.5
Senior Citizens Bureau – Electricity				
	Per 1000 sq. ft.	0	0.1	$3
	Per hour of operation	0.1	0.6	$23.3
	Per occupant	12.6	146.7	$5794.9
Senior Citizens Bureau, Nak. Com. Ctr – Natural Gas				
	Per 1000 sq. ft.	0	0.1	$0.7
	Per hour of operation	0	0.6	$5.2
	Per occupant	7.3	137.4	$1292.6
Rush Gym – Electricity				
	Per 1000 sq. ft.	0	0.1	$2.7
	Per hour of operation	0.1	0.6	$23.5
	Per occupant	57.6	672.0	$23,370.5
Rush Gym – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.1
	Per hour of operation	0	0.1	$1.1
	Per occupant	5.5	103.5	$1,214.5
One Stop – Electricity				
	Per 1000 sq. ft.	0	0	$2
	Per hour of operation	0	0	$2.1
	Per occupant	0.7	8.1	$428
One Stop – Natural Gas				
	Per 1000 sq. ft.	0	0	$0.2
	Per hour of operation	0	0	$0.2
	Per occupant	0	0.4	$41.2
Sector Average				
	Per 1000 sq. ft.	0	0	$0
	Per hour of operation	0	0	$0.2
	Per occupant	2.2	3.4	$16.3

Streetlights & Traffic Signals				
Traffic Signals/Controllers				
	Per streetlight account	1.9	22.7	$852.4
Streetlight				
	Per streetlight	0.5	5.3	$143.1
Streetlight SCE Owned				
	Per streetlight	0.2	2.3	$146.0
Park Lighting				
	Per streetlight account	11.4	132.6	$3162.3
Outdoor Lighting				
	Per streetlight account	6.3	73.7	$1767.5
Parking Lot Lighting				
	Per streetlight account	0.5	6.2	$475.2
Sector Average				
	Per streetlight account	9.3	9.1	$33.7
Vehicle Fleet				
Police Department				
	Per vehicle	23.3	322.5	n/a
Public Works Department				
	Per vehicle	3.4	47.3	n/a
Sector Average				
	Per vehicle	20.5	139.6	n/a
Employee Commute				
Carpool Group				
	Per vehicle	1.1	15.5	n/a
Drove Alone				
	Per vehicle	1.9	25.9	n/a
Public Transportation				
	Per vehicle	0.4	5.3	n/a
Sector Average				
	Per vehicle	1.7	1.7	n/a
Transit Fleet				
New Flyer				
	Per vehicle	34.7	480.6	n/a
NOVA				
	Per vehicle	38.1	520.3	n/a
Sector Average				
	Per vehicle	55.1	294.3	n/a
Solid Waste				
Waste Resources of Gardena				
	Per employee	1.4	0	n/a
Sector Average				
	Per employee	2.8	1.3	n/a

Sources of Emissions 1990		Equiv CO_2 (tonnes)	Energy (MMBtu)	Cost ($)
Buildings and Facilities				
Civic Center– Electricity				
	Per 1000 sq. ft.	0	0.2	$5
	Per hour of operation	0.3	2.3	$57.6
	Per occupant	15.7	114.3	$2805.5
Public Works Building 162nd St.– Electricity				
	Per 1000 sq. ft.	0	0	$0.8
	Per hour of operation	0	0.1	$4.3
	Per occupant	2.9	20.7	$732.7
Public Works Bldg. (Hobart)– Electricity				
	Per 1000 sq. ft.	0	0	$0.8
	Per hour of operation	0	0.1	$3.3
	Per occupant	0.7	4.8	$160
Transportation Bldg. (Van Ness)– Electricity				
	Per 1000 sq. ft.	0	0.1	$2
	Per hour of operation	0	0.2	$6.1
	Per occupant	1.1	8.3	$238.3
Rowley Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$0.9
	Per hour of operation	0	0.3	$10.2
	Per occupant	13.8	100.1	$3066.6
Thornburg Park Bldg.– Electricity				
	Per 1000 sq. ft.	0	0	$1.2
	Per hour of operation	0	0	$1
	Per occupant	2.8	20.3	$718.0
Senior Citizens Bureau – Electricity				
	Per 1000 sq. ft.	0	0	$2.9
	Per hour of operation	0	0	$22.3
	Per occupant	0.6	4.7	$5548.7
Rush Gym – Electricity				
	Per 1000 sq. ft.	0	0.1	$2.3
	Per hour of operation	0.1	0.7	$20.2
	Per occupant	110.3	800.8	$22,665.5
Sector Average				
	Per 1000 sq. ft.	0	0	0.4
	Per hour of operation	0.1	0.2	$2.6
	Per occupant	0	0	0
Streetlights & Traffic Signals				
Traffic Signals/Controllers				
	Per streetlight account	7.1	51.2	$1594.3
Park Lighting				
	Per streetlight account	26	188.6	$6361.9
Outdoor Lighting				
	Per streetlight account	21.7	157.7	$5264
Parking Lot Lighting				
	Per streetlight account	0.1	0.4	$123
Sector Average				
	Per streetlight account	9.5	9	$11.5

Vehicle Fleet				
Police Department				
	Per vehicle	27.2	373.0	n/a
Public Works Department				
	Per vehicle	3.9	54.2	n/a
Sector Average				
	Per vehicle	22.2	149.3	n/a

Appendix E—Results from Employee Commute Survey

An employee commute survey was conducted for the years 2007 and 2005 in order to gather scope 3 GHG emissions based on vehicle miles traveled by employees. In 2007, there were approximately 458 full-time equivalent employees; however, only 292 employees that took the survey worked for the City in 2007 resulting in a 64% response rate. For 2005, there were 453 full-time equivalent employees; however, there were only 242 employees that took the survey who worked for the City in 2005 resulting in a 53.4% response rate. To capture the remaining VMT for the total number of employees that worked in those years, estimates were derived from the survey responses. Assumptions for the estimated portion include: employees drove alone in gasoline run passenger vehicles.[40]

Employee commute information is considered policy relevant and may be utilized to reduce GHG emissions through potential measures captured in the climate action plan. Additionally, this information may be useful for planning strategies to comply with SB 375.[41] For questions 5 and 15, the miles were grouped to identify individuals that were potential walkers, cyclists, carpools, public transit users, and vanpoolers: 0-1 (potential walkers), 2-3 miles (potential bicyclists; 4-8 miles (potential transit users); 9-19 (potential carpoolers); and 20-40 miles and above (long distance carpools and vanpools).

Based on information provided by respondents in the year 2007, 64% of employees traveled 949,888 vehicle miles. Within this response rate, 23% of employees carpooled to the worksite, 67.1% of them were two-person carpools; and 30% of employees lived within a range of 4 to 8.9 miles from the worksite. Results from question 11 indicate 46.1% of all respondents who were surveyed are interested in participating in a ridesharing program.

In the year 2005, 53.4% of employees traveled 732,689 vehicle miles. Within this response rate, 2% of employees carpooled to the worksite, 60% of them were two-person carpools; and 28.1% of employees lived within a range of 4 to 8.9 miles from the worksite.

A. 2007 Survey Results[42]

1. Employee Information

	Response Percent	Response Count
Name:	100.0%	310
Dept:	100.0%	310
answered question		310
skipped question		0

40 See appendix C for a description of the computational method.

41 See appendix F for description of the legislation.

42 Survey Monkey, an online survey website was utilized to conduct the survey and generate graphs www.surveymonkey.com

2. What city did you live in?

	Response Percent	Response Count
City:	100.0%	310
ZIP Code:	100.0%	310
answered question		310
skipped question		0

Cities Listed in Survey:
Anaheim, Bakersfield, Bellflower, Buena Park, Carson, Cerritos, Compton, Cypress, Dana Point, Diamond Bar, Downey, El Segundo, Fountain Valley, Fullerton, Garden Grove, Gardena, Harbor City, Hawthorne, Hermosa Beach, Huntington Park, Inglewood, La Mirada, La Palma, Lake Elsinore, Lakewood, Lawndale, Lomita, Long Beach, Los Alamitos, Los Angeles, Lynwood, Murrieta, Norwalk, Orange, Palos Verdes, Paramount, Phillips Ranch, Playa del Rey, Rancho Palos Verdes, Redondo Beach, Rosemead, Rossmore, San Pedro, Santa Ana, Seal Beach, Simi Valley, South Gate, Torrance, Trabuco Canyon, Tustin, Whittier, Wilmington.

3. Did you work for the city in 2007?

	Response Percent	Response Count
Yes	**94.2%**	**292**
No	5.8%	18
answered question		310
skipped question		0

4. What was your workweek schedule?

	Response Percent	Response Count
3/36 work week (2 days off)	10.0%	31
4/40 work week (1 day off)	10.6%	33
9/80 work week (1 day off every other week)	**29.0%**	**90**
Regular work week	21.9%	68
Part time week	22.3%	69
Other (such as fire personnel compressed schedules)	6.5%	20
answered question		310

5. On average, how many miles did you travel to work round trip each day?

949,888 vehicle miles traveled represents a 64% response rate
(1,481,825.28 estimated total VMT based on number of full-time equivalent employees)

Commute distance range from worksite (one way)	Response Percent	Response Count
0-1.9 miles	17.8%	52
2-3.9 miles	14.7%	43
4-8.9 miles	**30%**	**87**
9-19.9 miles	21.9%	64
20-40.9 miles	12.6%	37
41 miles and above	3.0%	9
Number of respondents that worked for the city in 2007		**292**

6. On average, how many days a week did you...

Day(s) a week

	1	2	3	4	5	6	7	Response Count
Drive alone to work?	3.4% (9)	2.7% (7)	21.4% (56)	16.4% (43)	**52.3% (137)**	1.5% (4)	2.3% (6)	262
Carpool/Vanpool to work?	5.2% (3)	5.2% (3)	10.3% (6)	27.6% (16)	**46.6% (27)**	1.7% (1)	3.4% (2)	58
Take public transportation to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (4)**	0.0% (0)	0.0% (0)	4
Bicycle to work?	**45.5% (5)**	18.2% (2)	0.0% (0)	9.1% (1)	18.2% (2)	0.0% (0)	9.1% (1)	11
Walk to work?	**50.0% (2)**	25.0% (1)	0.0% (0)	0.0% (0)	25.0% (1)	0.0% (0)	0.0% (0)	4
Use another form of transportation to get to work?	**50.0% (2)**	0.0% (0)	0.0% (0)	0.0% (0)	**50.0% (2)**	0.0% (0)	0.0% (0)	4
Noncommuting (such as 24 shift where you sleep at station)?	0.0% (0)	0.0% (0)	**100.0% (1)**	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1
							answered question	**310**
							skipped question	**0**

7. If you carpooled/vanpooled, how many other people traveled with you on average? (including you)

23% of respondents who worked for the city in 2007 participated in carpooling	Response Percent	Response Count
2 person	**67.1%**	**45**
3 person	15.0%	10
4 person	8.9%	6
5 person	4.4%	3
6 person	1.4%	1
10 person	1.4%	1
23 person	1.4%	1
answered question		**67**
skipped question		**243**

8. If you used Public Transportation, what is the name of the public transit system?

Gardena Public Transit, Metro, Torrance Transit	Response Count
	13
answered question	13
skipped question	297

9. If you drove, what type of vehicle did you drive most often?

	Response Frequency	Response Count
Auto-full size (e.g., Ford Taurus, Lincoln Town Car)	10.3%	32
Auto-mid size (e.g., Honda Accord, Toyota Camry)	26.5%	45
Auto-compact (e.g., Honda Civic, Toyota Corolla)	21.0%	65
Light truck / SUV (e.g., Chevy Suburban, Ford Expedition)	**35.2%**	**109**
Heavy truck (e.g., Tractor-trailer truck)	1.6%	5
Motorcycle	2.3%	7
Van	2.3%	7
City Vehicle	0.3%	1
Did not drive an automobile	2.6%	8
answered question		310
skipped question		0

10. For the vehicle you drove most often, what type of fuel does it use?

	Response Percent	Response Count
Gasoline	**96.8%**	**300**
Diesel	1.0%	3
Ultra-low sulfur diesel	0.0%	0
Bio-diesel	0.0%	0
Hybrid	0.0%	0
ethanol	0.0%	0
electric	0.0%	0
LPG	0.0%	0
CNG	0.0%	0
Did not drive an automobile	2.6%	8
answered question		310
skipped question		0

11. Would you be interested in participating in a ridesharing program i.e., carpooling, vanpooling, walking, bicycling, or using public transit to commute to work?

	Response Percent	Response Count
Yes	46.1%	143
No	**53.9%**	**167**
answered question		310
skipped question		0

B. 2005 Survey Results

12. If you worked for the city in 2005, would you say your travel to work was about the same as 2007?

	Response Percent	Response Count
Yes—Skip the 2005 section and go to the end and hit done.	**73.2%**	**227**
No—Click next and complete information for 2005.	6.8%	21
Other—Did not work for the city in 2005, skip the 2005 section and go to the end and hit done.	20.6%	64
answered question		310
skipped question		0

13. What city did you live in?

	Response Percent	Response Count
City:	100.0%	19
ZIP Code:	100.0%	19
answered question		19
skipped question		291

Cities Listed in Survey:

Bakersfield, Bellflower, Buena Park, Carson, Downey, Fullerton, Garden Grove, Gardena, Hawthorne, Lakewood, Lomita, Long Beach, Los Angeles, Paramount, Rancho Palos Verdes, Torrance, Whittier.

14. What was your workweek schedule?

	Response Percent	Response Count
3/36 work week (2 days off)	10.5%	2
4/40 work week (1 day off)	21.1%	4
9/80 work week (1 day off every other week)	21.1%	4
Regular work week	**26.3%**	**5**
Part time work	10.5%	2
Other (such as fire personnel compressed schedules)	10.5%	10
answered question		19
skipped question		291

15. On average, how many miles did you travel to work round trip each day?

732,688 vehicle miles traveled represents a 53.4% response rate
(1,370,126.56 estimated total VMT based on number of full-time equivalent employees)

Commute distance range from worksite (one way)	Response Percent	Response Count
0-1.9 miles	18.0%	43
2-3.9 miles	16.3%	39
4-8.9 miles	**28.1%**	**68**
9-19.9 miles	23.0%	55
20-40.9 miles	13.0%	31
40 miles and above	1.3%	3
Number of respondents that worked for the city in 2005		242

16. On average, how many days a week did you...

Day(s) a week

	1	2	3	4	5	6	7	Response Count
Drive alone to work?	0.0% (0)	0.0% (0)	12.5% (2)	**43.8% (7)**	**43.8% (7)**	0.0% (0)	0.0% (0)	16
Carpool/Vanpool to work?	0.0% (0)	25.0% (1)	0.0% (0)	0.0% (0)	**75.0% (3)**	0.0% (0)	0.0% (0)	4
Take public transportation to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0))	0.0% (0)	0.0% (0)	0
Bicycle to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
Walk to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
Use another form of transportation to get to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
Noncommuting (such as 24 shift where sleep at fire station)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
answered question								18
skipped question								292

17. If you carpooled/vanpooled, how many other people traveled with you on average? (including you)

Out of 242 respondents who worked for the city in 2005, 2% participated in carpooling	Response Percent	Response Count
2 person	**60.0%**	**3**
3 person	20.0%	1
5 person	20.0%	1
answered question		5
skipped question		305

18. If you used Public Transportation, what is the name of the public transit system?

Gardena Public Transit	Response Count
	1
answered question	1
skipped question	309

19. If you drove, what type of vehicle did you drive most often?

	Response Percent	Response Count
Auto-full size (e.g., Ford Taurus, Lincoln Town Car)	12.5%	2
Auto-mid size (e.g., Honda Accord, Toyota Camry)	18.8%	3
Auto-compact (e.g., Honda Civic, Toyota Corolla)	25.0%	4
Light truck/SUV (e.g., Chevy Suburban, Ford Expedition)	**31.3%**	**5**
Heavy truck (e.g., Tractor-trailer truck)	0.0%	0
Motorcycle	6.3%	1
Van	0.0%	0
City Vehicle	6.3%	1
Did not drive an automobile	0.0%	0
answered question		16
skipped question		294

20. For the vehicle you drove most often, what type of fuel does it use?

	Response Percent	Response Count
Gasoline	**88.9%**	**16**
Diesel	0.0%	0
Ultra-low sulfur diesel	0.0%	0
Bio-diesel	0.0%	0
Hybrid	5.6%	1
ethanol	0.0%	0
electric	0.0%	0
LPG	0.0%	0
CNG	0.0%	0
Did not drive an automobile	5.6%	1
answered question		**18**
skipped question		**292**

Appendix F—Climate Change Action

For reference, listed below are some of the key climate change policies that have been adopted at an international level as well as at State and Regional levels. [43]

AB 811, 2008—Gives counties and local governments authority to create benefit assessment districts which allow property owners to finance energy efficiency upgrades, such as solar panels, efficient air conditioning and ventilation systems, and tankless water heating equipment. Owners may enter a loan contract with a local government and pay it back through their property-tax bill. This legislation will help to reduce GHG emissions and stimulate energy efficiency upgrades.

SB 375 Steinberg, 2008—Advances the State's efforts to achieve the global warming goals consistent with AB 32. It aligns three critical policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve greenhouse gas emissions reductions targets for the transportation sector.

SB 97 Dutton, 2007—States that GHGs and their effects are subject to the California Environmental Quality Act (CEQA). CEQA requires that agencies identify a given project's potentially significant effects on the environment and mitigate those significant effects whenever feasible. Public agencies such as local governments are therefore obligated to determine whether a given project's climate change-related impacts are significant and to mitigate any significant effects. CARB is responsible for recommending where the threshold of "significance" lies.

SB 107 Simitian, 2006—Requires investor-owned utilities (IOUs) to increase the share of renewable energy sources (e.g., wind, solar, geothermal) in their electricity mix to 20 percent by 2010. Known as the Renewables Portfolio Standard (RPS), the law is intended to decrease California's reliance on fossil fuel and reduce GHG emissions from the electricity sector. As of 2008, about 12 percent of California's electricity demand is met with renewable resources. Governor Schwarzenegger has since called for 33 percent of California's electricity to be provided by renewable sources by 2020.

AB 32 Nunez & Pavley, 2006– Institutes a mandatory limit on greenhouse gas emissions -- reducing emissions in California to 1990 levels by the year 2020 below forecasted levels. The bill also directs the California Air Resources Board (CARB) to establish a mandatory reporting system to track and monitor emission levels and requires CARB to develop various compliance options and enforcement mechanisms.

U.S. Mayors' Climate Protection Agreement, 2005—Creates a commitment to strive to meet or beat, by 2012, the Kyoto Protocol target of a seven percent reduction in greenhouse gas emissions below 1990 levels. The agreement was initiated by Seattle Mayor Greg Nickels.

AB 1493 Pavley, 2002—Requires the State Air Resources Board to develop and adopt regulations that achieve the maximum feasible reduction of greenhouse gases from vehicles primarily used for non-commercial transportation by January 2005.

43 The California Air Resources Board website was a source of information for the legislation listed above. To find more information on the legislation visit the website at http://www.arb.ca.gov/cc/cc.htm. For more information on the U.S. Mayors' Climate Protection Agreement visit their website at http://usmayors.org/climateprotection/agreement.htm. To learn more about AB 811 visit the Los Angeles County website at http://portal.lacounty.gov/wps/portal/lac/home.

Kyoto Protocol 1997—A protocol to the United Nations Framework Convention on Climate Change (UNFCC) requiring industrialized nations to reduce their collective greenhouse gas emissions 5.2% below 1990 levels. As of January 2007, 162 countries have ratified the Protocol, with the United States and Australia most notably absent from the list.

Rio Earth Summit in 1992—Created the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC is a milestone treaty on Climate Change that provides an overall framework for international efforts to mitigate climate change.

Appendix G—Abbreviations and Acronyms[44]

Btu	British thermal unit
CH4	methane
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
FE	Fuel Economy
GHG	greenhouse gas
HFC	hydrofluorocarbon
MMBtu	1 million British thermal unit
NOx	oxides of nitrogen
N2O	nitrous oxide
PFC	perfluorocarbon
PM10	particulate matter smaller than ten microns in diameter
SF6	sulfur hexafluoride
SOx	sulfur oxides
VOC	volatile organic compounds

Appendix H—Glossary of Terms[45]

Activity data	Data on the magnitude of a human activity resulting in emissions taking place during a given period of time. Data on energy use, fuel used, miles traveled, input material flow, and product output are all examples of activity data that might be used to compute GHG emissions.
Base year	A specific year against which an entity's emissions are tracked over time.
Base year emissions	GHG emissions in the base year.
Boundaries	GHG accounting and reporting boundaries can have several dimensions, i.e., organizational, operational and geographic. These boundaries determine which emissions are accounted for and reported by the entity.
Biogenic emissions from combustion	CO2 emissions produced from combusting a variety of biofuels and biomass, such as biodiesel, ethanol, wood, wood waste and landfill gas.
Calendar year	The time period from January 1 through December 31.
Carbon dioxide (CO2)	The most common of the six primary GHGs, consisting of a single carbon atom and two oxygen atoms, and providing the reference point for the GWP of other gases. (Thus, the GWP of CO2 is equal to 1.)

44 Abbreviations and acronyms are from the Local Government Operations Protocol, version 1.0

45 Definition are from the Local Government Operations Protocol, version 1.0 and ICLEI's Cities for Climate Protection Milestone Guide.

CO2 equivalent (CO2e)	The universal unit for comparing emissions of different GHGs expressed in terms of the GWP of one unit of carbon dioxide.
Control approach	An emissions accounting approach for defining organizational boundaries in which an entity reports 100 percent of the GHG emissions from operations under its financial or operational control.
Criteria Air Pollutants	The term criteria air pollutants refers to pollutants that are regulated under the U.S. Clean Air Act. As with carbon dioxide, the major sources of these pollutants are fossil fuels. Most measures that reduce carbon dioxide emissions also reduce criteria air pollutants. Criteria air pollutants include nitrogen oxides (NOx), volatile organic compounds (VOCs), carbon monoxide (CO), sulfur oxides (SOx), and particulate matter smaller than ten microns in diameter (PM-10). The CACP software provides estimated emissions of CAPs as well as GHGs for emissions analyses and reduction benefits of measures.
Direct emissions	Emissions from sources within the reporting entity's organizational boundaries that are owned or controlled by the reporting entity, including stationary combustion emissions, mobile combustion emissions, process emissions, and fugitive emissions. All direct emissions are Scope 1 emissions, with the exception of biogenic CO2 emissions from biomass combustion.
Emission factor	A unique value for determining an amount of a GHG emitted on a per unit activity basis (for example, metric tons of CO2 emitted per million Btus of coal combusted, or metric tons of CO2 emitted per kWh of electricity consumed).
Facility	Any property, plant, building, structure, stationary source, stationary equipment or grouping of stationary equipment or stationary sources located on one or more contiguous or adjacent properties, in actual physical contact or separated solely by a public roadway or other public right-of way, and under common operational or financial control, that emits or may emit any greenhouse gas.
Global warming potential (GWP)	The ratio of radiative forcing (degree of warming to the atmosphere) that would result from the emission of one mass-based unit of a given G GHG compared to one equivalent unit of carbon dioxide (CO2) over a given period of time.
Greenhouse gases (GHGs)	For the purposes of this Protocol, GHGs are the six gases identified in the Kyoto Protocol: carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).
Indirect emissions	Emissions that are a consequence of activities that take place within the organizational boundaries of the reporting entity, but that occur at sources owned or controlled by another entity. For example, emissions of electricity used by a manufacturing entity that occur at a power plant represent the manufacturer's indirect emissions.
Inventory	A comprehensive, quantified list of an organization's GHG emissions and sources.

Inventory boundary	An imaginary line that encompasses the direct and indirect emissions included in the inventory. It results from the chosen organizational and operational boundaries.
Methane (CH4)	One of the six primary GHGs, consisting of a single carbon atom and four hydrogen atoms, possessing a GWP of 21, and produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.
Metric ton (MT, tonne)	Common international measurement for the quantity of GHG emissions, equivalent to about 2,204.6 pounds or 1.1 short tons.
Mobile combustion	Emissions from the combustion of fuels in transportation sources (e.g., cars, trucks, buses, trains, airplanes, and marine vessels) and emissions from non-road equipment such as equipment used in construction, agriculture, and forestry. A piece of equipment that cannot move under its own power but that is transported from site to site (e.g., an emergency generator) is a stationary, not a mobile, combustion source.
Nitrous oxide (N2O)	One of the six primary GHGs, consisting of two nitrogen atoms and a single oxygen atom, possessing a GWP of 310, and typically generated as a result of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
Operational boundaries	The boundaries that determine the direct and indirect emissions associated with operations within the entity's organizational boundaries.
Operational control	Full authority to introduce and implement operating policies at an operation.
Organizational boundaries	The boundaries that determine the operations owned or controlled by the reporting entity, depending on the consolidation approach taken.
Perfluorocarbons (PFCs)	One of the six primary GHGs, consisting of a group of man-made chemicals composed of one or two carbon atoms and four to six fluorine atoms, containing no chlorine. Originally introduced as alternatives to ozone depleting substances, PFCs have few commercial uses and are typically emitted as by-products of industrial and manufacturing processes. PFCs have very high GWPs and live a long time in the atmosphere.
Scope	Defines the operational boundaries in relation to indirect and direct GHG emissions.
Scope 1 emissions	All direct GHG emissions, with the exception of direct CO2 emissions from biogenic sources.
Scope 2 emissions	Indirect GHG emissions associated with the consumption of purchased or acquired electricity, heating, cooling, or steam.
Scope 3 emissions	All indirect emissions not covered in Scope 2. Examples include upstream

	and downstream emissions, emissions resulting from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, use of sold products and services, outsourced activities, recycling of used products, waste disposal, etc.
Stationary	Neither portable nor self propelled, and operated at a single facility.
Stationary combustion	Emissions from the combustion of fuels to produce electricity, steam, heat, or power using equipment (boilers, furnaces, etc.) in a fixed location.
Sulfur hexafluoride (SF6)	One of the six primary GHGs, consisting of a single sulfur atom and six fluoride atoms, possessing a very high GWP of 23,900, and primarily used in electrical transmission and distribution systems.
Therm	A measure of one hundred thousand (10^5) Btu.