City of Rolling Hills Estates

Municipal Greenhouse Gas Emissions Inventory Report

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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] including the City of Rolling Hills Estates. 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 Rolling Hills Estates will take to reduce its impact

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

on the environment and promote change within the community.

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

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.

indirect emissions in a tiered fashion. It also establishes a foundation for following reporting standards in the LGOP.

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 Rolling Hills Estates generated approximately 626 metric tons of CO_2e in the baseline year, 2005; this is equivalent to the GHG emissions generated by electricity use of 86.8 homes for one year.[14]

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 emissions results.

- There was an overall 24% increase in GHG emissions between the baseline year 2005 and the interim year 2007. This was largely due to scope 3 transportation related sources from contract vehicles.
- Emissions resulting from electricity use decreased 8.9% between the years 2005 and 2007.
- 14.2% growth of GHG emissions came from employee commute distance increases between the baseline year and the interim year; 2007 survey results showed that 32% of employees commuted from distances of 20 up to 40 miles from the worksite.
- Under a business-as-usual forecast, the City can expect emissions to rise to 809 metric tons of CO_2e by 2012 that is equivalent to the annual GHG emissions from 148 passenger vehicles; and 837 metric tons of CO_2e by 2015, equivalent to the annual GHG emissions from 153 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 Rolling Hills Estates takes an active role in maintaining the high quality of life that makes this community such an attractive place to live. As in the past, today's emphasis in managing the City is placed upon preserving its rural residential character while at the same time, providing the best possible services to its residents.

Located on the Palos Verdes Peninsula, the 4.18 square mile city has a population of 8,185 [15] With 31 full time staff members, the City of Rolling Hills Estates is a community dedicated to preserving open space, public trails and native habitat, with a high level of environmental awareness. Its policies and ordinances mandate clean streets, residences, trails, and commercial areas.

Local Government History

The City of Rolling Hills Estates officially became Los Angeles County's 60th municipality on September 18, 1957. In that first year, the City's population totaled only 3,500, but its new citizens were united in their concern over maintaining the community's rural atmosphere characterized by rolling hills, white fences, and vast open spaces.

Annexation of new areas to the City was another ongoing concern during the City's early years. In 1959, the Montecillo, Chandler Quarry, Country Club Estates and northern Masongate areas were added to the eastern and western portions of the City. Later annexation from 1960-66 included the research and development land behind the Northrop Corporation; the Peninsula Center, Harbor Sight, the Ranch, Rolling Hills Park Estates, Highridge, Hillcrest Manor, Hillcrest Meadows, Terraces, and Cresta Verdes areas. In 1982, the site of the former Palos Verdes Landfill was annexed to assure that City concerns regarding this closed facility would be recognized. The citizens of Rolling Hills Estates hold sustainable living as a high priority and have taken numerous steps to ensure the conservation of natural resources.

Primary Services

Department	Primary Services
Administration	Performs the functions of general administration, city clerk, city manager, City Council, and finance.
Community Services Department	Directs the overall administration of the City maintenance program for facilities and properties, the Municipal Stables operations and all recreation services. Specifically, the Department's maintenance division is responsible for the upkeep of public parks, parkways and equestrian trails, the Municipal Stables, flood control and other public facilities within the community.
Fire & Emergency Services	Contracted with the Los Angeles County Fire District.
Planning Department	Reviews and approves plans for development within the City, enforces subdivision and building regulations in residential and commercial areas and processes amendments to the Zoning Ordinance. Additionally, the department prepares and maintains the General Plan.
Public Works	Under the supervision of the Assistant City Manager, plans and maintains all phases of street operations including street sweeping and the maintenance of lighting, traffic signs and signals. The department has responsibility for supervising street-related capital improvement projects as well as all programs and activities associated with public transportation, trash and recycling collection, and storm water pollution.
Sheriff	Contracted with Lomita Station of the Los Angeles County Sheriff Department.
Transit	Contracted with Metro and Palos Verdes Transit Authority

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 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, CO2e 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 Rolling Hills Estates GHG emissions totaled 626 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 86.8 homes for one year. Looking at the scopes within the table, 8.3% (scope 1 total) of emissions were generated by city vehicles; seven vehicles were included in the inventory totaling approximately 77,500 vehicle miles traveled. Electricity usage accounted for 17.2% of emissions (scope 2 total) and the largest portion 74.5% (scope 3 total) were due to a combination of employee commuting (see appendix E for employee commuting details), contract service vehicles, 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 Rolling Hills Estates used 354,649 kWh of electricity at a cost of $48,877.

Table 1. Municipal Inventory 2005[20]

RHE 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						
City Vehicle Fleet						
City Vehicle Fleet	52	8.3%	Gasoline	5,766 gal	$ 14,360	716
Total Scope 1 Emissions	**52**	**8.3%**	**-**	**-**	**$ 14,360**	**716**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	52	8.3%	Electricity	171,653 kWh	$ 28,254	586
Streetlights & Traffic Signals						
Streetlights[21]	28	4.5%	Electricity	94,667 kWh	$ 7,624	323
Traffic Signals/Controllers	26	4.2%	Electricity	84,202 kWh	$ 10,756	287
Water Delivery						
Sprinkler/Irrigation Control	1	0.2%	Electricity	4,127 kWh	$ 2,243	14
Total Scope 2 Emissions	**107**	**17.2%**	**-**	**354,649 kWh**	**$ 48,877**	**1,210**
Scope 3 Emissions						
Employee Commute						
Employee Commute	77	12.3%	Gasoline	141,378 VMT	n/a	1,064
Vehicles—Contract Service Providers						
Contract Service Vehicles	**382**	**61%**			n/a	**5,298**
	59		Gasoline	5,520 gal		813
	5		Diesel	510 gal		71
	282		Diesel (ULSD)	27,724 gal		3,845
	16		CNG	2,213 gal equiv		275
	20		Propane	3,212 gal		294
Solid Waste						
Waste	8	1.3%		143.61 tons	n/a	n/a
Total Scope 3 Emissions	**467**	**74.5%**	-	-	-	**6,362**
Total Emissions	**626**	**100%**	-	**-**	**$ 63,237**	**8,288**

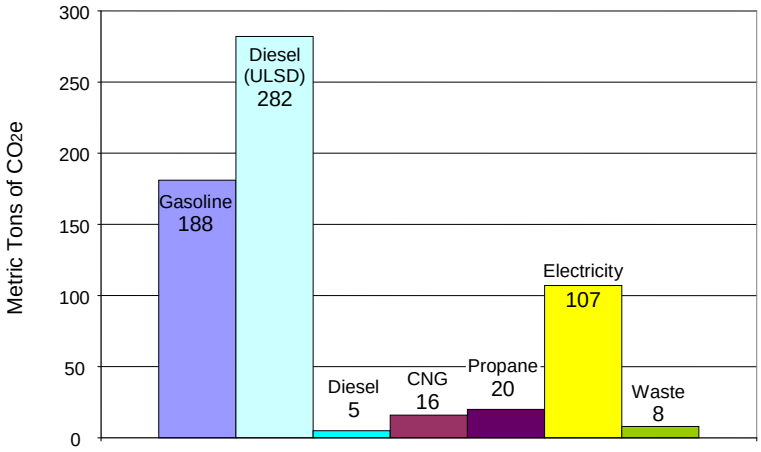
Figure 1 illustrates emissions by source. The main sources of emissions are from fuels and electricity, diesel (ULSD) ranking the highest, primarily from waste disposal vehicles. Waste resulted in one of the lowest sources of emissions.

20 See appendix D, Emissions Data, to review individual energy use and cost per item.

21 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.

It was estimated that 143.61 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 below 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 61% of emissions are from contract service vehicles that work within the City's boundaries, 1.3% from waste, and 12.3% are the result of employee commuting. While a city may not have the same degree of control over these sources, there is still an opportunity to create initiative programs or policies that will engender climate-friendly practices. Figure 3 is comprised of fuels and electricity generated emissions. Electricity in scope 2 accounts for 58.8% of emissions and scope 1 emissions from fuel sources accounts for the remaining 32.7% of emissions.

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

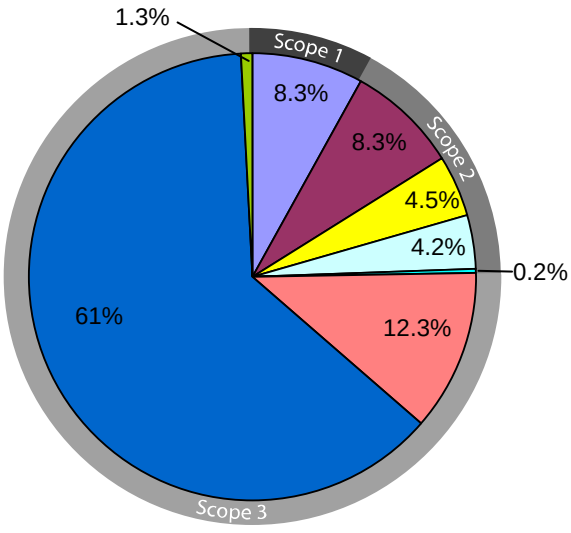
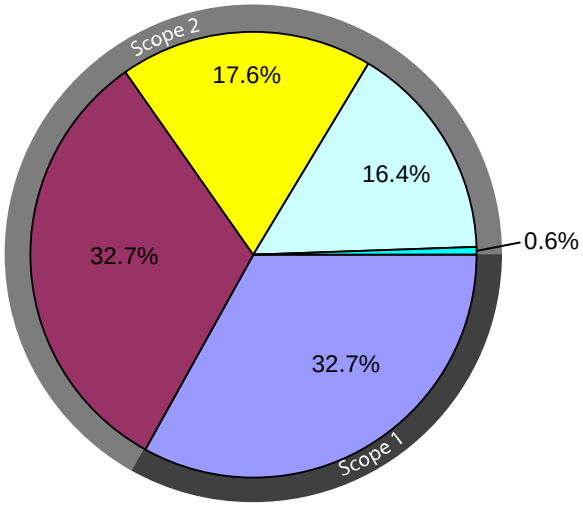


Figure 3. Emissions by Sector 2005
(including only direct and indirect sources from scopes 1 and 2)



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 Rolling Hills Estates GHG emissions totaled 777.4 metric tons of CO_2e including both direct and indirect sources of emissions—this is equivalent to the emissions produced from 88,241 gallons of gasoline consumed. The year 2007 represents an overall 24% increase in emissions from the baseline year. Looking at the scopes within the table, there was an increase in vehicle fleet fuel use at 8.6% (scope 1 total); nine vehicles were included in the inventory totaling approximately 97,674 vehicle miles traveled. Electricity usage was down at 12.6% (scope 2 total), and the largest portion was employee commute, waste, and contract service vehicles at 78.8% (scope 3 total). During 2007, the City of Rolling Hills Estates used 331,045 kWh of electricity at a cost of $ 52,138.

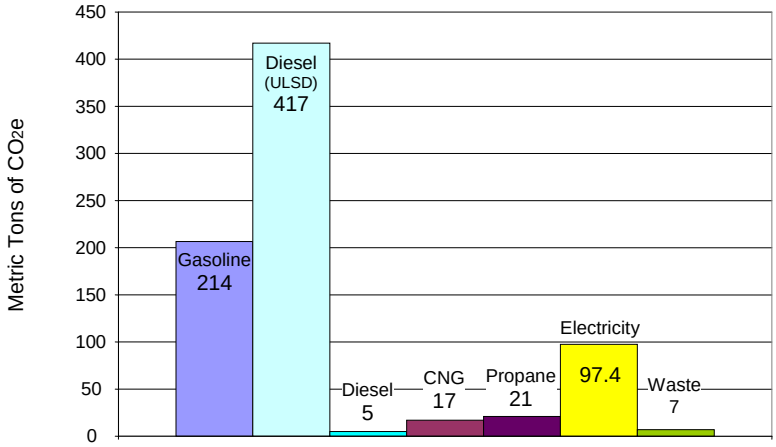
Table 2. Municipal Inventory 2007

RHE 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						
City Vehicle Fleet						
City Vehicle Fleet	67	8.6%	Gasoline	7,532 gal	$ 22,825	936
Total Scope 1 Emissions	**67**	**8.6%**	**-**	**-**	**$ 22,825**	**936**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	56	7.2%	Electricity	188,074 kWh	$ 32,703	642
Streetlights & Traffic Signals						
Streetlights[22]	26	3.3%	Electricity	90,978 kWh	$ 8,923	311
Traffic Signals/Controllers	15	2.0%	Electricity	50,564 kWh	$ 8,406	173
Water Delivery						
Sprinkler/Irrigation Control	0.4	0.1%	Electricity	1,429 kWh	$ 2,106	5
Total Scope 2 Emissions	**97.4**	**12.6%**	**-**	**331,045 kWh**	**$ 52,138**	**1,131**
Scope 3 Emissions						
Employee Commute						
Employee Commute	88	11.3%	Gasoline	162,931 VMT	n/a	1,212
Vehicles—Contract Service Providers						
Contract Service Vehicles	**518**	**66.6%**			n/a	**7,178**
	59		Gasoline	6,430 gal		799
	5		Diesel	507 gal		70
	416		Diesel (ULSD)	41,030 gal		5,690
	17		CNG	2,405 gal equiv		299
	21		Propane	3,491 gal		320
Solid Waste						
Waste	7	0.9%		133.92 tons	n/a	n/a
Total Scope 3 Emissions	**613**	**78.8%**	-	-	-	**8,390**
Total Emissions	**777.4**	**100%**	-	**-**	**$ 74,963**	**10,457**

22 City owned streetlights and Southern California Edison owned streetlights have been combined in the total shown here.

Figure 4 shows an increase in emissions from fuel sources and a decrease of emissions from electricity and waste coming from city operated and owned facilities. It was estimated that 133.92 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 a percentage change in emissions, 66.6% of emissions are from contract service vehicles, 0.9% from waste, and 11.3% resulted from employee commuting. Figure 6 shows a shift in usage within the electricity sector, as less emissions came from traffic signals/controllers and increased in the Buildings & Facilities sector. Scope 2 accounted for 59.1% of emissions and the remaining 40.9% of emissions are related to fuel use.

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

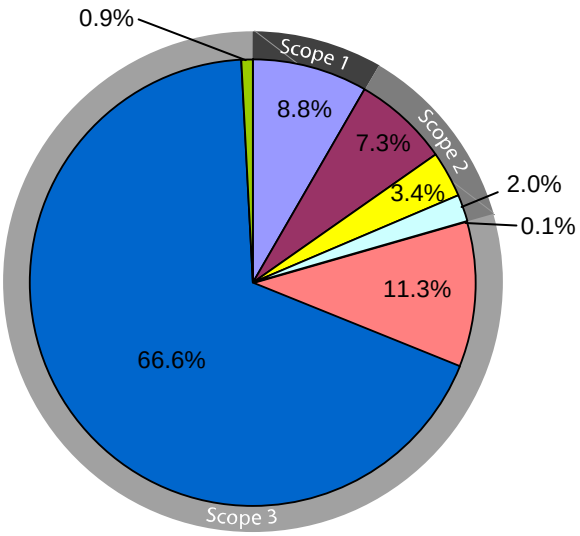
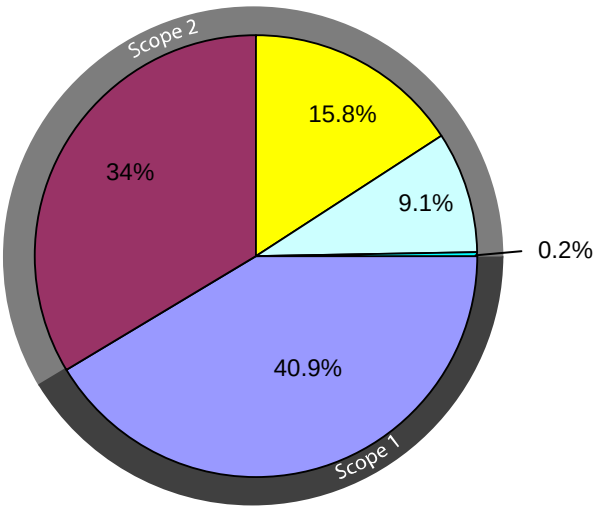


Figure 6. Emissions by Sector 2007
(including only direct and indirect sources from scopes 1 and 2)



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 for this year to review, where possible, 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.[23] 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 should be set from 2005 levels.

Based on the data that was available for 1990, the GHG emissions identified totaled 297.2 metric tons of CO2e. Scope 2 totaled 218.2 metric tons of CO_2e, as shown in Table 3. This is equivalent to the annual GHG emissions from 40 passenger vehicles. Electricity use in this year was significantly higher than in more recent years. Emissions from traffic signals and controllers are the highest equal to 126 metric tons of CO_2e. Reduction in emissions since 1990 may be the result of energy efficiency projects related to traffic signals and controllers. Employee commute results were also compared with recent years. Interviews with current employees and a review of personnel records were used to determine employee commuting habits in 1990. Only partial records were found for 1990 city vehicles. The 5 metric tons of CO_2e reflects the emissions from the one vehicle recorded.

Table 3. Municipal Inventory 1990

RHE Municipal GHG Emissions 1990						
Sector	**MT CO_2e**	**Percent CO2e (% CO2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
City Vehicle Fleet						
City Vehicle Fleet	5	1.7%	Gasoline	500 gal	$ 645	62
Total Scope 1 Emissions	**5**	**1.7%**	**-**	**-**	**$ 645**	**62**
Scope 2 Emissions						
Buildings & Facilities						
Buildings & Facilities	81	27.3%	Electricity	173,339 kWh	$ 20,317	592
Streetlights & Traffic Signals						
Streetlights	11	3.7%	Electricity	22,714 kWh	$ 2,422	78
Traffic Signals/Controllers	126	42.4%	Electricity	267,855 kWh	$ 28,028	914
Water Delivery						
Sprinkler/Irrigation Control	0.2	0.1%	Electricity	342 kWh	$ 927	1
Total Scope 2 Emissions	**218.2**	**73.5%**	**-**	**464,250 kWh**	**$ 51,694**	**1,585**
Scope 3 Emissions						
Employee Commute						
Employee Commute	74	24.9%	Gasoline	129,316 VMT	n/a	1,008
Total Scope 3 Emissions	**74**	**24.9%**	-	-	-	**1,008**
Total Emissions[24]	**297.2**	**100%**	-	**-**	**$ 52,339**	**2,655**

23 See LGOP inventory guidelines, page 12.

24 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 use has gone down significantly while staff size has remained relatively the same (there were two less employees in 2005). Additionally, electricity use has expanded to include three more facilities not listed in the electricity consumption data in 1990, including an Ernie Howlett Park facility and the Community and Nature Center. A significant improvement can be found in the traffic signals and controllers area, which may be the result of energy efficiency technology upgrades—1990, usage per streetlight account was equal to 6.6 metric tons of CO_2e and in 2005, usage per streetlight account was equal to 1.3 metric tons of CO_2e (refer to appendix D, indicator inputs, for additional analysis based on statistics provided by the City and from consumption data). Emissions from employee commuting increased 4%.[25]

Electricity use from 2005 to 2007 has continued to decline resulting in fewer emissions. However, there was a 7.6% increase in emissions in the Buildings & Facilities sector. Fuel emissions from scopes 1 and 3 increased. Fleet vehicle emissions from gasoline increased 28.8%. Emissions from contract service providers' vehicles were the highest, ULSD increased by 36.9%. Employee commute emissions rose 14.2%. In the waste category, there was a 12.5% decrease in emissions.

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	81	52	-35.8%	52	56	+7.6%
Traffic Signals & Controllers	126	26	-79.3%	26	15	-42.3%
Streetlights	11	28	+154.5%	28	26	-7.1%
Sprinkler/Irrigation Control	0.2	1	+400%	1	0.4	-60%
Total	**218.4**	**107**	**-51%**	**107**	**97.4**	**-8.9%**
Fuel						
Gasoline, City Vehicle Fleet	5	52	-	52	67	+28.8%
Gasoline, Contract Services	-	59	-	59	59	-
Diesel, Contract Services	-	5	-	5	5	-
ULSD, Contract Services	-	282	-	282	416	+47.5%
Propane, Contract Services	-	16	-	16	17	+6.2%
CNG, Contract Services	-	20	-	20	21	+5%
Gasoline, Employee Commute	74	77	+4%	77	88	+14.2%
Waste						
Waste Management	-	8	-	8	7	+12.5%

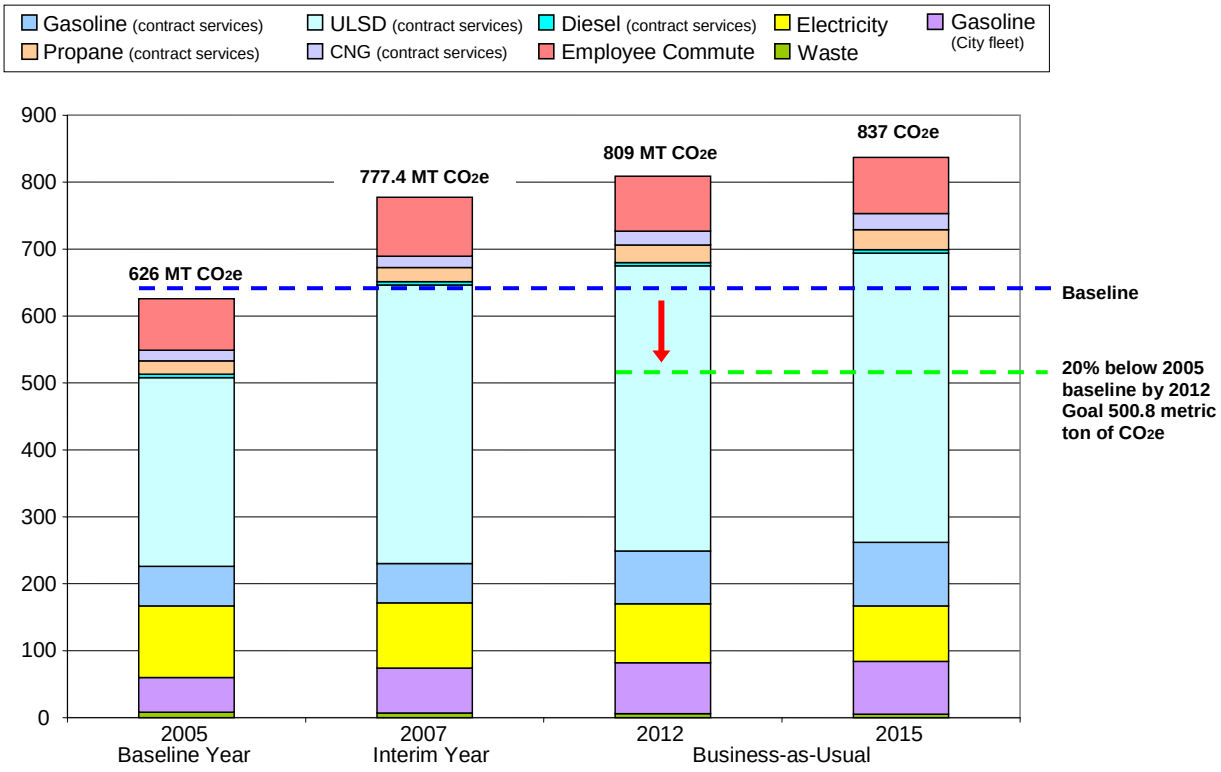
25 Employee commute data was obtained through a combination of personnel records and interviews with current staff members who were employed by the City in 1990.

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 809 metric tons of CO_2e by 2012 and 837 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 500.8 metric tons of CO_2e.

Figure 7. Business-as-Usual Forecast[26]



IV.

26 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 CO_2e totals listed here are summed totals of the estimated emissions of each gas based on their global warming potential.

Summary of Measures and Policies

There are a variety of ways in which the City of Rolling Hills Estates 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: Converted all traffic signal lights from incandescent to energy-efficient LED, a 90% energy savings.

B. Solid Waste and Recycling

Solid Waste Reduction: Achieved 50% reduction in the generation of solid waste since 1990.

Solid Waste Ordinance: Prohibited improper disposal of manure by requiring that "Manure shall be kept in an enclosed container designed for such purpose. Manure that is not used for composting must be removed completely from individual properties at least once per week. Manure used for composting must be kept in an enclosed container designed for such purposes."

Conservative Solid Waste Collection: Reduced frequency of solid waste collection to once per week to increase collection efficiency and minimize consumption of fossil fuels, air emissions, as well as wear-and-tear on roads.

Litter Abatement Program: Implemented a proactive litter abatement program for keeping public rights-of-way, streets, medians, parks, and trails free of litter and debris. All public streets are swept twice per month with accelerated sweeping in the downtown commercial area.

Public Beverage Container Recycling Bins: Placed at most City parks and many transit stops–separate beverage recycling collection containers along with trash cans.

Three-Cart Recycling and Waste System: Implemented a new state-of-the-art, three-cart system, making it easy for residents to recycle household plastic and glass containers, cans, and paper, as well as green waste. As a result, there has been a substantial increase in waste diversion, with Rolling Hills Estates residents consistently keeping more than 60% of their waste out of the trash carts and landfills.

Curbside Collection of Oil and Oil Filters: Increased curbside collection of used oil by 160% and used oil filters by 590% under the City's new residential solid waste collection service. The City provides curbside pickup of used oil and filters for recycling along with yard waste and other recyclables. Manure collection and recycling service for horse owners are available through the City's franchise hauler.

C. Sustainable Development

Habitat Enhancement and Restoration: Eradicated invasive/exotic plants and conducting habitat enhancement and restoration of the native habitat in the George F Canyon Nature Preserve in partnership with the Palos Verdes Peninsula Land Conservancy. This work was funded under a Riparian and Riverine grant by the California Department of Parks and Recreation 2000 Park Bond Act.

Alameda County New Home Construction Green Building Guidelines (Build it Green): Adopted as a City reference document and the use of The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encouraged for construction projects.

Solar Panel Fees Waived: Waived the planning fees and building & safety overhead charges for the installation of residential solar panels for a one-year trial period to encourage the use of renewable sources of energy.

D. Urban Forests

Business Inspections for Pollutants: Ensured through inspection program of industrial and commercial businesses that any outdoor activities/storage are conducted in a manner that does not discharge pollutants to the storm drain system and minimize the potential for contact of pollutants with storm water runoff.

Minimum Amounts of Fertilizer used in Parks: Established maintenance program utilizing with the minimum amount of fertilizer necessary—playing fields are fertilized twice per year and fully composted top dressing is applied once per year.

Sustainable Pest Management: Implemented integrated pest management practices which call for using physical barriers and controls first and when necessary the least toxic chemical control that is effective, e.g., wood chips are used in lieu of herbicide for weed control on horse trails.

E. Water Usage and Conservation

Water Conservation Ordinance: In an effort to address the state's ongoing drought and water shortage conditions, the City adopted a Water Conservation Ordinance and implemented the Response Level 1 water conservation measures. Additional restrictions will be required if drought conditions worsen and the Water Shortage Response Level is raised by City Council.

Ahwahnee Water Principles: Adopted the Ahwahnee Water Principles for Resource-Efficient Land Use.

Landscaping Water Conservation: Require new landscapes to be designed to conserve water using a water budget approach. These requirements apply to new landscaping for commercial, office and institutional developments and to developer-installed landscaping in residential subdivisions.

Irrigation Inspections: Inspect irrigation systems in City parks and recreational areas frequently for broken heads, overspray, and muddy areas.

F. Storm Water Management

National Pollutant Discharge Elimination System (NPDES): The City continues to be in full compliance with provisions of the NPDES Permit.

Storm Drains: The storm drain system is screened to identify and eliminate illicit connections and discharges—only clean water should be discharged to the storm drain system. Catch basins are cleaned each year and stenciled with the 'No Dumping – Drains to the Ocean' marker. The City uses a combination of grant funds and general funds to complete storm drain repairs and improvements as needed.

G. Vehicle Fleet and City-Contracted Services

Reduced Emissions from Street Sweepers: The latest street sweeping contract requires the use of state-of-the-art equipment (Air Quality Management District certified) that reduces the emission of particulate air pollution from paved roads utilizing less polluting vehicles and/or alternative fuel vehicles.

Street Sweeping: The City has increased the frequency of street sweeping from biweekly to weekly throughout the entire city. This weekly street sweeping is conducted on the two days immediately following weekly trash pickup in order to capture any incidental dispersal of trash associated with emptying the carts during collection and to reduce trash and debris deposited in catch basins.

H. Community Involvement

Environmental Advisory Committee: The Environmental Advisory Committee strives to preserve and enhance the special rural character of the community. The Environmental Advisory Committee is already hard at work establishing goals and objectives, and looking at a variety of actions to increase energy efficiency and water conservation and promote the use of clean and renewable resources. The Committee is comprised of nine members of the community, including one Council Member, one Planning Commissioner, one Park & Activities Commissioner, and six members of the public, appointed by the City Council, who represent a cross-section of interests and disciplines. The Committee will also be working on putting together an Environmental Handbook – to be made available in electronic format on the City's website – that will highlight the City's environmental programs and activities and provide information on how residents can be even better stewards of the environment.

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 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**52**	**51**	**0.00225**	**0.00085**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**54**	**54**	**0.00235**	**0.00089**

Water Delivery					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**1**	**1**	**0.00005**	**0.00002**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**52**	**50**	**0.00323**	**0.00355**
Scope 3	**Contract Services**	CO_2e	CO_2	CH_4	N_2O
	Los Angeles County Department of Public Works	**10**	**10**	**0.00027**	**0.00039**
	Waste Management	**293**	**291**	**0.00144**	**0.00162**

Transit Fleet					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Palos Verdes Peninsula Transit Authority	**79**	**75**	**0.03443**	**0.00956**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Management	**8**	**8**	**0.00011**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**77**	**75**	**0.00446**	**0.00560**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**52**	**50**	**0.00323**	**0.00355**
	Scope 2	**107**	**107**	**0.00466**	**0.00176**
	Scope 3	**467**	**460**	**0.04071**	**0.01717**

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 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**56**	**54**	**0.00247**	**0.00093**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**41**	**41**	**0.00186**	**0.00070**

Water Delivery					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**0.4**	**0.41568**	**0.00001**	**0.000007**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**67**	**66**	**0.00378**	**0.00423**
Scope 3	**Contract Services**	CO_2e	CO_2	CH_4	N_2O
	Los Angeles County Department of Public Works	**8**	**8**	**0.00016**	**0.00023**
	Waste Management	**424**	**423**	**0.00168**	**0.00174**

Transit Fleet					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Palos Verdes Peninsula Transit Authority	**86**	**82**	**0.03722**	**0.00999**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Management	**7**	**7**	**0.00014**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**88**	**85.92666**	**0.00475**	**0.00563**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**67**	**66**	**0.00378**	**0.00423**
	Scope 2	**97.4**	**96**	**0.00435**	**0.00165**
	Scope 3	**613**	**606**	**0.04395**	**0.01759**

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 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**81**	**81**	**0.00314**	**0.00110**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**137**	**135**	**0.00527**	**0.00184**

Water Delivery					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**0.2**	**0.15995**	**0.000006**	**0.000002**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**5**	**4**	**0.00032**	**0.00048**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**74**	**71**	**0.00651**	**0.00695**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**5**	**4**	**0.00032**	**0.00048**
	Scope 2	**218.2**	**217**	**0.00842**	**0.00294**
	Scope 3	**74**	**71**	**0.00651**	**0.00695**

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 2 Purchased Electricity

Description: Consumption data was obtained from Southern California Edison. 1 general service account 4100372 was excluded from the inventory because the meter use needs clarification.	**Recommended Method** 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: Consumption data was obtained from Southern California Edison. Accounts owned by SCE were included but recorded separately.	**Recommended Method** 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

Scope 2 Purchased Electricity

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

The City identified vehicle type, fuel type, and model year of each vehicle owned. An estimate of the vehicle miles traveled was provided for each vehicle.

Alternate Method
Fuel estimates based on annual mileage and vehicle fuel economy

Reference: Greg Grammer, Assistant to the City Manager, 310-377-1577 ext.107

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

For 1990, employee data was obtained through a combination of personnel records and interviews with current staff members who were employed by the City in 1990.

Reference: Greg Grammer, Assistant to the City Manager, 310-377-1577 ext.107

E. Solid Waste Facilities

Scope 3 Waste Related

Description:
Ms. Janetzke provided waste data and landfill information. Since 2004, El Sobrante Landfill has operated 3 gas-to-energy generators that transform landfill gas into energy. By converting waste gas into energy, El Sobrante Landfill is managing its waste in a more effective and efficient manner. The landfill gas is collected and processed in an environmentally responsible way and provides electricity, which would otherwise come from the use of fossil fuels. El Sobrante Landfill generates approximately 3.84 megawatts of electricity, which is then fed directly into the local Southern California Edison grid where it is used to meet the power demands of approximately 6,000 local homes a year

City of Rolling Hills Estates
2007-133.92 Refuse & 157.17 Recycle
2005-107.61 Refuse & 192.97 Recycle

There was an estimated 95% methane recovery at the landfill where the waste was taken.

No records could be found for 1990 City operated and owned facilities.

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

Reference: Crystal Janetzke, Waste Management 310-522-6593

F. Other Scope 3 Emissions

Description: Waste Management, Vehicle Fleet Ms. Janetzke provided information on vehicle type, number of vehicles, fuel quantity, and fuel cost for the Waste Management vehicles that operate within the City's boundaries.
Reference: Crystal Janetzke, Waste Management 310-522-6593, CJanetzke@wm.com

Scope 3 Emissions From Contracted Services

Description: Los Angeles County Department of Public Works, Vehicle Fleet Armond Ghazarian provided vehicle descriptions and vehicle miles traveled (VMT) and in some cases hours were provided instead of VMT for Public Works vehicles that operate within the City's boundaries.
Reference: Armond Ghazarian, P.E., Programs Development Division (626) 458-7136, aghazar@dpw.lacounty.gov

Scope 3 Emissions From Contracted Services

Description: Palos Verdes Transit, Transit Fleet John Meyer provided data on fuel quantity, fuel cost, and vehicle miles traveled for PV Transit. RHE shares this service with three other cities on the peninsula and Los Angeles County. Estimates were based on the population as per census. RHE contribution amounts to 12.55% of the total data.
Reference: John Meyer, Mobility Advancement Group, (760) 751-7061, jmco@cox.net

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.[27] 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 Mobile Combustion

Description of Computational Method:
Fuel estimates were based on distance
Gallons= Distance / [(City FE x City %) + (Highway FE x HWY %)]
Vehicle fuel economy data was obtained from the EPA website, www.fueleconomy.gov. Based on EPA fuel economy factors, it was assumed 45% of vehicle mileage was highway driving and 55% was city driving. Where no fuel economy data was available for medium trucks 8.0 mpg was used and for heavy trucks 5.8 mpg was used. The average regional cost per gallon of fuel type was obtained from the Energy Information Administration http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_cpgal_a.htm.

Alternate Method
Alternate 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: Data was provided by Greg Grammer, Assistant to the City Manager, 310-377-1577 ext.107

B. Scope 2 Purchased Electricity

Description of Computational Method:
Table G.5 Utility-Specific Verified Electricity CO_2 Emissions Factors (2000-2006), LGOP pg. 174
For 2005 inventory Southern California Edison, 2005 emission factors were used

Recommended Method
Utility-Specific verified emission factors 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.

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

27 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.

C. Scope 3 Waste Related Emissions

Description of Computational Method:

2007-133.92 Refuse & 157.17 Recycle
2005-107.61 Refuse & 192.97 Recycle
Only refuse data was included in the inventory. For 2005, the City was only able to obtain waste tonnage for the 9 months of the year that Waste Management was their hauler. An assumption was made for the 3 missing months therefore 36 tons was added to the 107.61.

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 provided by Crystal Janetzke, Waste Management 310-522-6593, CJanetzke@wm.com

D. 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

For 1990, employee data was obtained through a combination of personnel records and interviews with current staff members who were employed by the City in 1990. This information was utilized to determine commute distance, while frequency was based on a regular workweek. It was assumed that employees commuted alone in passenger vehicles.

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, were part time employees, or used another form of transportation were excluded from the emissions inventory.

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

Reference: 1990 data was provided by Greg Grammer 310-377-1577 ext.107

E. Scope 3 Emissions From Contracted Services

Description of Computational Method: Waste Management, Vehicle Fleet

Waste Management provided information on vehicle type, number of vehicles, fuel quantity, and fuel cost based on their records.

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

Reference: Data provided by Crystal Janetzke, Waste Management 310-522-6593, CJanetzke@wm.com

Scope 3 Emissions From Contracted Services

Description of Computational Method: The Los Angeles County Department of Public Works, Vehicle Fleet

The LA County Dept. of Public Works provided vehicle make and model descriptions, VMT, and hours from their for the years 2007 and 2005.

The following equations were used:
Rate (assumption 45mph) x Time= Distance (VMT). In cases where hours were given in place of VMT an assumption was made in order to arrive at an estimate.
Gallons= Distance / [(City FE x City %) + (Highway FE x HWY %)]

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

Reference: Armond Ghazarian, P.E., Programs Development Division (626) 458-7136, aghazar@dpw.lacounty.gov

Scope 3 Emissions From Contracted Services

Description of Computational Method: Palos Verdes Transit, Transit Fleet

Based on the total fuel quantity, cost, and VMT provided for the years 2007 and 2005 it was determined, based on population as per census, that RHE share of use amounts to 12.55% of the total.

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

Reference: John Meyer, Mobility Advancement Group, (760) 751-7061, jmco@cox.net

Appendix D—Emissions Data

The municipal inventory report was based on data collected from electricity consumption and other energy sources listed in the tables below as references. 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 the type of energy or source, equivalent carbon dioxide emissions, energy MMBtu, and the cost of energy where known.[28]

Sources of Emissions 2005	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost ($)
Buildings and Facilities						
City Hall & Council Chambers	Electricity	32	5.1	364	106,680 kWh	$18,568
Community Center	Electricity	1	0.1	6	1,621 kWh	$400
Ernie Howlett Park (Maintenance Yard)	Electricity	3	0.4	31	9,217 kWh	$1,432
Ernie Howlett Park (Tennis Club Office)	Electricity	2	0.4	27	7,860 kWh	$1,271
Nature Center	Electricity	3	0.5	35	10,289 kWh	$1,570
Stable Office	Electricity	11	1.7	123	35,986 kWh	$5,013
Streetlights & Traffic Signals						
Streetlights	Electricity	27	4.3	307	90,083 kWh	$7,033
Streetlights SCE Owned	Electricity	1	0.2	16	4,584 kWh	$591
Traffic Signals/Controllers	Electricity	26	4	287	84,202 kWh	$10,756
Water Delivery						
Sprinkler/Irrigation Control	Electricity	1	0.2	14	4,127 kWh	$2,243
Vehicle Fleet						
Administrative Vehicles	Gasoline	13	2.1	182	1,465 gal	$3,650
Maintenance Vehicles	Gasoline	39	6.1	534	4,301 gal	$10,710
Employee Commute						
Drove Alone	Gasoline	71	9.1	981	129,567 VMT	n/a
Carpool	Gasoline	6	0.8	83	11,811 VMT	n/a
Contract Service Providers						
LA County Dept. of Public Works Fleet	Gasoline	5	0.8	69	557 gallons	n/a
	Diesel	5	0.8	71	510 gallons	n/a
Palos Verdes Transit Fleet	CNG	16	2.6	275	2213 gal eq.	n/a
	Gasoline	43	7.1	599	4,818 gal	n/a
	Propane	20	3.2	294	3,212 gal	n/a
Waste Management Fleet	Gasoline	11	1.7	145	1,116 gal	n/a
	Diesel (ULSD)	282	46.0	3845	27,724 gal	n/a

28 Source of data CACP software output.

Waste					
Waste Management	Carbon Dioxide	8	1.3	143.61 tons	
Sources:	Food Waste	1			
	Paper Products	6			
	Plant Debris	1			
	Wood/Textiles	0			

Sources of Emissions 2007	**Source**	**Equiv CO_2 (tonnes)**	**Equiv CO_2 (%)**	**Energy (MMBtu)**	**Energy/ Fuel Use**	**Energy/ Fuel Use Cost ($)**
Buildings and Facilities						
City Hall & Council Chambers	Electricity	34	4.3	395	115,860 kWh	$20,485
Community Center	Electricity	2	0.2	21	6,204 kWh	$1,160
Ernie Howlett Park (Maintenance Yard)	Electricity	3	0.4	36	10,480 kWh	$1,824
Ernie Howlett Park (Tennis Club Office)	Electricity	3	0.3	32	9,360 kWh	$1,689
Nature Center	Electricity	3	0.4	34	9,961 kWh	$1,737
Stable Office	Electricity	11	1.3	124	36,209 kWh	$5,808
Streetlights & Traffic Signals						
Streetlights	Electricity	25	3.2	295	86,394 kWh	$8,191
Streetlights SCE Owned	Electricity	1	0.2	16	4,584 kWh	$732
Traffic Signals/Controllers	Electricity	15	1.9	173	50,564 kWh	$8,406
Water Delivery						
Sprinkler/Irrigation Control	Electricity	0.4	0.1	5	1,429 kWh	$2,106
Vehicle Fleet						
Administrative Vehicles	Gasoline	13	1.7	186	1,497 gal	$4,538
Maintenance Vehicles	Gasoline	54	6.9	750	6,035 gal	$18,287
Employee Commute						
Drove Alone	Gasoline	82	8.6	1,131	151,120VMT	n/a
Carpool	Gasoline	6	0.6	81	11,811 VMT	n/a
Contract Service Providers						
LA County Dept. of Public Works Fleet	Gasoline	3	0.4	45	365 gal	n/a
	Diesel	5	0.7	70	507 gal	n/a
Palos Verdes Transit Fleet	CNG	17	2.3	299	2,405 gal	n/a
	Gasoline	48	6.2	650	5,231 gal	n/a
	Propane	21	2.8	320	3,491 gal	n/a
Waste Management Fleet	Gasoline	8	1.0	104	834 gal	n/a
	Diesel (ULSD)	416	54.6	5690	41,030 gal	n/a

Waste				
Waste Management	Carbon Dioxide	7	0.9	133.92 tons
Sources:	Food Waste	1		
	Paper Products	5		
	Plant Debris	1		
	Wood/ Textiles	0		

Sources of Emissions 1990	**Source**	**Equiv CO_2 (tonnes)**	**Equiv CO2 (%)**	**Energy (MMBtu)**	**Energy/ Fuel Use**	**Energy/ Fuel Use Cost ($)**
Buildings and Facilities						
City Hall & Council Chambers	Electricity	62	26.6	453	132,660 kWh	$15,562
Ernie Howlett Park	Electricity	8	2.8	56	16,410 kWh	$1,941
Stable Office	Electricity	11	4.1	83	24,269 kWh	$2,814
Streetlights & Traffic Signals						
Streetlights	Electricity	11	3.9	78	22,714 kWh	$2,422
Traffic Signals/Controllers	Electricity	126	45.6	914	267,855 kWh	$28,028
Water Delivery Facilities						
Sprinkler/Irrigation Control	Electricity	0.2	0.1	1	342 kWh	$927
Vehicle Fleet						
Maintenance Vehicles	Gasoline	5	1.7	62	500 gal	$645
Employee Commute						
Drove Alone	Gasoline	74	19.3	1,008	129,316 VMT	n/a

Criteria Air Pollutants[29]

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.[30] 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	152	102	96	11	84
Vehicle Fleet	5,174	31	7,624	880	192
Employee Commute	456	27	5,093	525	10
Streetlights & Traffic Signals	159	106	100	11	87
Water Delivery	4	2	2	0	2
Transit Fleet	954	17	4,265	622	7
Total	6,898	285	17,181	2,049	382

Criteria Air Pollutants 2007	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	167	111	106	12	92
Vehicle Fleet	7,074	37	9,978	1,163	237
Employee Commute	491	31	5,826	589	11
Streetlights & Traffic Signals	125	84	79	9	69
Water Delivery	1	1	1	0	1
Transit Fleet	1,018	19	4,603	668	7
Total	8,876	281	20,592	2,441	416

Criteria Air Pollutants 1990	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	149	121	96	11	91
Vehicle Fleet	30	1	326	38	1
Employee Commute	561	24	6,522	688	11
Streetlights & Traffic Signals	249	202	161	18	152
Water Delivery	0	0	0	0	0
Total	989	348	7,105	756	255

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

30 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.[31]

Sources of Emissions 2005		Equiv CO2 (tonnes)	Energy (MMBtu)	Cost ($)
Buildings and Facilities				
City Hall & Council Chambers				
	Per 1000 sq. ft.	0	0.1	$3.1
	Per hour of operation	0	0.1	$7.3
	Per occupant	2.0	22.8	$1,161.5
Community Center				
	Per 1000 sq. ft.	0	0	$0.5
	Per hour of operation	0	0	$1.9
	Per occupant	0	0.2	$13.3
Ernie Howlett Park (Maintenance Yard)				
	Per 1000 sq. ft.	0	0	$2
	Per hour of operation	0	0	$0.6
	Per occupant	0.4	3.9	$179
Ernie Howlett Park (Tennis Club Office)				
	Per 1000 sq. ft.	0	0	$1.5
	Per hour of operation	0	0	$0.6
	Per occupant	1.2	13.4	$635.7
Nature Center				
	Per 1000 sq. ft.	0	0	$1.9
	Per hour of operation	0	0	$2.2
	Per occupant	1.6	17.6	$784.8
Stable Office				
	Per 1000 sq. ft.	0.1	0.8	$31.3
	Per hour of operation	0	0.2	$9.6
	Per occupant	10.9	122.8	$5,013.1
Sector Average				
	Per 1000 sq. ft.	0	0.1	$3
	Per hour of operation	0	0.1	$3.3
	Per occupant	0.9	9.9	$478.9
Streetlights & Traffic Signals				
Streetlights				
	Per streetlight Account	5.5	61.5	$1,406.6
Traffic Signals/Controllers				
	Per streetlight Account	1.3	15.1	$566.1
Streetlights SCE Owned				
	Per streetlight Account	0.7	7.8	$295.6
Sector Average				
	Per streetlight Account	2.1	23.5	$706.9
Vehicle Fleet				
Administrative Vehicles				

31 Source of data CACP software output.

	Per vehicle	6.6	91	$1,846.8
	Per vehicle mile	0	0	$0.1
Maintenance Vehicles				
	Per vehicle	7.7	106.9	$2,142.0
	Per vehicle mile	0	0	$0.2
Sector Average				
	Per vehicle	7.4	102.3	$2,057.6
	Per vehicle mile	0	0	$0.2
Employee Commute				
Carpool Group				
	Per vehicle	1.3	17.9	n/a
Drove Alone				
	Per vehicle	2.3	31.9	n/a
Sector Average				
	Per vehicle	2.2	30.0	n/a

Sources of Emissions 2007		**Equiv CO2 (tonnes)**	**Energy (MMBtu)**	**Cost ($)**
Buildings and Facilities				
City Hall & Council Chambers				
	Per 1000 sq. ft.	0	0.1	$3.4
	Per hour of operation	0	0.2	$8
	Per occupant	2.1	24.7	$1,280.3
Community Center				
	Per 1000 sq. ft.	0	0	$1.5
	Per hour of operation	0	0.1	$5.6
	Per occupant	0.1	0.7	$38.7
Ernie Howlett Park (Maintenance Yard)				
	Per 1000 sq. ft.	0	0	$2.5
	Per hour of operation	0	0	$0.8
	Per occupant	0.4	4.5	$228
Ernie Howlett Park (Tennis Club Office)				
	Per 1000 sq. ft.	0	0	$2
	Per hour of operation	0	0	$0.8
	Per occupant	1.4	16	$844.7
Nature Center				
	Per 1000 sq. ft.	0	0	$2.1
	Per hour of operation	0	0	$2.4
	Per occupant	1.5	17	$868.5
Stable Office				
	Per 1000 sq. ft.	0.1	0.8	$36.3
	Per hour of operation	0	0.2	$11.2
	Per occupant	10.6	123.6	$5,808.2
Sector Average				
	Per 1000 sq. ft.	0	0.1	$3.5
	Per hour of operation	0	0.1	$3.9
	Per occupant	0.9	10.9	$554.3
Streetlights & Traffic Signals				
Streetlights				
	Per streetlight	5.1	59	$1,638.2

Traffic Signals/Controllers				
	Per streetlight Account	0.8	9.1	$442.4
Streetlights SCE Owned				
	Per streetlight Account	0.7	7.8	$366.2
Sector Average				
	Per streetlight Account	1.6	18.6	$666.5
Vehicle Fleet				
Administrative Vehicles				
	Per vehicle	6.7	93	$2,268.8
	Per vehicle mile	0	0	$0.1
Maintenance Vehicles				
	Per vehicle	7.8	107.1	$2,612.4
	Per vehicle mile	0	0	$0.3
Sector Average				
	Per vehicle	7.5	104.0	$2,536.1
	Per vehicle mile	0	0	$0.2
Employee Commute				
Carpool Group				
	Per vehicle	1.2	17.2	n/a
Drove Alone				
	Per vehicle	2.5	34.6	n/a
Sector Average				
	Per vehicle	2.3	32.3	n/a

Sources of Emissions 1990		**Equiv CO2 (tonnes)**	**Energy (MMBtu)**	**Cost ($)**
Buildings and Facilities				
City Hall & Council Chambers				
	Per 1000 sq. ft.	0	0.1	$2.6
	Per hour of operation	0	0.2	$6.1
	Per occupant	3.9	28.3	$972.6
Ernie Howlett Park (Tennis Club Office)				
	Per 1000 sq. ft.	0	0.1	$2.3
	Per hour of operation	0	0	$0.9
	Per occupant	3.9	28	$970.6
Stable Office				
	Per 1000 sq. ft.	0.1	0.5	$17.6
	Per hour of operation	0	0.2	$5.4
	Per occupant	11.4	82.8	$2,814.3
Sector Average				
	Per 1000 sq. ft.	0	0.1	$2.9
	Per hour of operation	0	0.1	$4.0
	Per occupant	4.3	31.1	$1,069.3
Streetlights & Traffic Signals				
Streetlights				
	Per streetlight Account	5.3	38.8	$1,211
Traffic Signals/Controllers				
	Per streetlight Account	6.6	48.1	$1,475.2
Sector Average				

	Per streetlight Account	6.5	47.2	$1,450
Vehicle Fleet				
Maintenance Vehicles				
	Per vehicle	4.6	62.1	$645.0
	Per vehicle mile	0	0	$0.2
Sector Average				
	Per vehicle	4.6	62.1	$645.0
	Per vehicle mile	0	0	$0.2
Employee Commute				
Drove Alone				
	Per vehicle	1.8	24.2	n/a
Sector Average				
	Per vehicle	1.8	24.2	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 from vehicle miles traveled by employees. For the year 1990 information was obtained through a combination of staff interviews and a review of personnel records.[32]

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.[33] For questions 4 and 13, 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 (long distance carpools and vanpools).

Based on information provided by respondents in the year 2007 a total of 162,931 vehicle miles were traveled by employees; 13% of employees carpooled to the worksite, 75% of them were two-person carpools; 39% of employees lived within a range of 4 to 8 miles from the worksite.

In the year 2005, vehicle miles traveled totaled 141,378; 14% of employees carpooled to the worksite, essentially the same as 2007, the percentage is slightly higher because there were two less employees in that year based on survey responses; 43% of employees lived within a range of 4 to 8 miles from the worksite.

In the year 1990, it is estimated that employees traveled 129,316 vehicle miles; 54% of employees lived within 0-5 miles of the worksite.

A. 2007 Survey Results[34]

1. Employee Information

	Response Percent	Response Count
Name:	100.0%	31
Dept:	100.0%	31
answered question		31
skipped question		0

2. What city did you live in?

Costa Mesa, Glendale, Harbor City, Huntington Beach, Irvine, Lakewood, Lawndale, Lomita, Long Beach, Los Angeles, Manhattan Beach, Newport Beach, Rancho Palos Verdes, Redondo Beach, Rolling Hills Estates, San Pedro, and Torrance	Response Percent	Response Count
City:	100.0%	31
ZIP Code:	100.0%	31
answered question		31
skipped question		0

32 See appendix C for details on computational method.

33 See appendix F for description of the legislation.

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

3. Did you work a regular or compressed work week?

	Response Percent	Response Count
3/36 work week days off (2 days)	3.2%	1
4/40 work week days off (1 day)	0.0%	0
9/80 work week days off (1 day every other week)	**77.4%**	**24**
regular work week	22.6%	7
answered question		31
skipped question		0

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

Total 2007 vehicle miles traveled 162,931

Commute distance range from worksite (one way)	Response Percent	Response Count
0-1 miles	3%	1
2-3.9 miles	7%	2
4-8 miles	**39%**	**12**
9-19 miles	19%	6
20-40 miles	32%	10
answered question		31
skipped question		0

5. 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)	3.3% (1)	3.3% (1)	16.7 % (5)	**73.3% (22)**	0.0% (0)	3.3% (1)	30
Carpool/Vanpool to work?	**50% (2)**	25.0% (1)	25.0% (1)	0.0% (0)	0.0% (0)	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)	**100% (1)**	0.0% (0)	0.0% (0)	1
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
answered question								31
skipped question								0

6. If you carpooled/vanpooled, how many other people traveled with you on average?

13 % of respondents participated in carpooling during the year	Response Percent	Response Count
2 people	**75%**	**3**
3 people	25%	1
answered question		4
skipped question		27

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

	Response Count
	0
answered question	0
skipped question	31

8. 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)	16.1%	5
Auto-mid size (e.g., Honda Accord, Toyota Camry)	**25.8%**	**8**
Auto-compact (e.g., Honda Civic, Toyota Corolla)	16.1%	5
Light truck/SUV (e.g., Chevy Suburban, Ford Expedition)	22.6%	7
Heavy truck (e.g., Tractor-trailer truck)	0.0%	0
Motorcycle	3.2%	1
Van	6.5%	2
City Vehicle	9.7%	3
answered question		31
skipped question		0

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

	Response Percent	Response Count
Gasoline	**100.0%**	**31**
Diesel	0.0%	0
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
answered question		**31**
skipped question		**0**

B. 2005 Survey Results

10. For 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.	**87.1%**	**27**
No--Click next and complete information for 2005.	12.9%	4
answered question		**31**
skipped question		**0**

11. What city did you live in?

Costa Mesa, Glendale, Harbor City, Huntington Beach, Irvine, Lakewood, Lawndale, Lomita, Long Beach, Los Angeles, Manhattan Beach, Newport Beach, Rancho Palos Verdes, Redondo Beach, Rolling Hills Estates, San Pedro, and Torrance	Response Percent	Response Count
City:	100.0%	5
ZIP Code:	100.0%	5
answered question		**5**
skipped question		**26**

12. Did you work a regular or compressed work week?

	Response Percent	Response Count
3/36 work week days off (2 days)	0.0%	0
4/40 work week days off (1 day)	0.0%	0
9/80 work week days off (1 day every other week)	**60.0%**	**3**
regular work week	40.0%	2
answered question		5
skipped question		26

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

Total 2005 vehicle miles traveled 141,378

Commute distance range from worksite (one way)	Response Percent	Response Count
0-1 miles	3%	1
2-3.9 miles	7%	2
4-8 miles	**43%**	**12**
9-19 miles	18%	5
20-40 miles	29%	8
answered question		4
skipped question		27

14. 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)	0.0% (0)	0.0% (0)	**100% (4)**	0.0% (0)	0.0% (0)	4
Carpool/Vanpool to work?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
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)	**100% (1)**	0.0% (0)	0.0% (0)	1
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
answered question								5
skipped question								26

15. If you carpooled/vanpooled, how many other people traveled with you on average?

14 % of respondents participated in carpooling during the year	Response Percent	Response Count
2 people	**75%**	**3**
3 people	25%	1
answered question		4
skipped question		27

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

	Response Count
	0
answered question	0
skipped question	30

17. 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)	25.0%	1
Auto-mid size (e.g., Honda Accord, Toyota Camry)	25.0%	1
Auto-compact (e.g., Honda Civic, Toyota Corolla)	**50.0%**	**2**
Light truck/SUV (e.g., Chevy Suburban, Ford Expedition)	0.0%	0
Heavy truck (e.g., Tractor-trailer truck)	0.0%	0
Motorcycle	0.0%	0
Van	0.0%	0
City Vehicle	0.0%	0
answered question		4
skipped question		27

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

	Response Percent	Response Count
Gasoline	**100.0%**	**4**
Diesel	0.0%	0
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
answered question		4
skipped question		27

C. 1990 Survey Results

Estimate of how many miles employees traveled to work round trip each day

Total 1990 vehicle miles traveled 129,316

Commute distance range from worksite (one way)	Response Percent	Response Count
0-1 miles	0%	0
2-3.9 miles	20%	6
4-8 miles	**47%**	**14**
9-19 miles	23%	7
20-40 miles	10%	3

Estimate of the cities employees commuted from

Carson, Gardena, Harbor City, Lakewood, Lomita, Long Beach, Mar Vista, Newport Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rossmoor Orange, San Pedro, Torrance, Westchester, and Wilmington

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.[35]

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.

Kyoto Protocol 1997—A protocol to the United Nations Framework Convention on Climate Change (UNFCC)

35 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.

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[36]

Btu	British thermal unit
CH_4	methane
CO	carbon monoxide
CO2	carbon dioxide
CO_2e	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[37]

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.)

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

37 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.