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# City of Lomita



## Municipal Greenhouse Gas Emissions Inventory Report

Prepared in conjunction with:

**South Bay Cities Council of Governments**

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## Municipal Greenhouse Gas Emissions Inventory Report

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## I. Executive Summary

### A. Project Background

With the passage of the California Global Warming Solutions Act of 2006 (AB 32), the State of California has taken the lead in climate change related legislation. AB 32 is a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gas (GHG) emissions with the goal of reducing emissions to 1990 levels by 2020. The California Air Resources Board (CARB) has been tasked to oversee AB 32's implementation and they have developed a Scoping Plan as a framework of emission reduction strategies. These strategies are both mandated and voluntary, and provide the means for California to meet the reduction target created by AB 32. Furthermore, the Plan encourages local governments to set a GHG reduction target and develop implementation procedures for both government and community-wide emission reduction. In 2008, Senate Bill (SB) 375 was approved, which also provides a path to achieve AB 32 by encouraging transit oriented development. 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 specific emission reduction targets for local governments have not yet been set, it is still crucial that local governments develop strategies to reduce their emissions to comply with regional targets as they develop.<sup>1</sup>

In January 2008, Lomita signed the "Cool Cities" pledge along with a number of other South Bay cities.<sup>2</sup> 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. The GHG inventory is a useful tool that will aid the City in creating a Climate Action Plan (CAP), responding to new legislation and measuring its progress to meet regional reduction goals. A CAP is important because it contains policies and measures that are designed to meet the reduction target by the target year. The CAP must include a timeline, a breakdown of measures and the estimated benefits of each, a description of financing mechanisms, and an assignment of responsibility to departments and staff.

The City of Lomita began the process of assessing its 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. Through ICLEI, Lomita gained access to tools and resources such as the Clean Air Climate Protection (CACP) software, which will enable the City to quantify their emissions. Furthermore, the City 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.

### B. Purpose of Conducting a GHG Emissions Inventory

The first step the City is taking toward curbing the effects of climate change and promoting environmental stewardship is identifying municipal sources of emissions. A municipal inventory allows the City to quantify the emissions it is responsible for from sources such as individual buildings and facilities, vehicle fleets, transit, and waste. With the municipal inventory complete,

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<sup>1</sup> See Appendix F for more information on Climate Change legislation.

<sup>2</sup> 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.

the City can identify and evaluate specific areas within municipal operations that should be targeted for emission reductions. 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 within the community. By being proactive and documenting emissions, the City can begin to refine the collection and management of emissions data thereby improving the quality of future inventories. Lastly, conducting an emissions inventory will allow the City to manage future regulatory programs at the Federal, State or regional levels more effectively.

### *C. Scope of the GHG Emissions Inventory*

To create the inventory, data was gathered for the years 1990, 2005, and 2007. The year 2005 was selected as the baseline year to measure future progress and establish short-term and long-term reduction targets. It also allowed the City to gather the earliest, most accurate and reliable data. Additionally, data was collected for 2007, which is considered an interim year and will be used to monitor energy use changes that may have occurred since the baseline year. Data from the interim year shows progress made that will count towards any reduction goal set. Where available, data was also collected from 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.<sup>3</sup> However, it was difficult to find accurate data going back as far as 1990; therefore, comparisons were made in areas only where the data was found to be reliable.

### *D. Inventory Methodology*

The primary resource utilized to conduct the municipal inventory was the Local Government Operations Protocol (LGOP).<sup>4</sup> 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.

Following the LGOP, the City identified which emissions it should account for within its municipal inventory based on what facilities and operations it owns and/or controls. Furthermore, the City's emissions are organized by "scope". There are three different scope levels, which allow direct and indirect emissions to be accounted for separately in a tiered fashion: Scope 1 includes direct emissions that 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. Scope 2 includes emissions that are indirect, but the City maintains some control over. These emissions are associated with the consumption of electricity, steam, heating, or cooling that is purchased from entities other than the City. Scope 3 emissions are indirect emissions that are related to activities that the City does not own or operate, such as emissions from contracted services, employee commuting, or waste disposal. Since scope 3 emissions are estimates based upon information provided by contract service providers and employee surveys, they are not considered a precise measurement of GHGs. City staff decided what data to include based on whether it was obtainable and reliable.

<sup>3</sup> See Appendix F for descriptions of climate change legislation.

<sup>4</sup> The Local Government Operations Protocol is available at: [http://www.climateregistry.org/resources/docs/protocols/industry/local-gov/lgo\\_protocol\\_september2008.pdf](http://www.climateregistry.org/resources/docs/protocols/industry/local-gov/lgo_protocol_september2008.pdf)

The City gathered information from a variety of sources, including consumption data from utility companies, internal city records, and information from contract service providers. Data regarding waste composition was obtained from the California Integrated Waste Management Board and city employee commute survey was administered to evaluate emissions data from vehicle miles traveled. This data was then utilized to quantify GHG emissions. Following ICLEI program-specific requirements, this report is considered a quick action report which entails reporting on three of the six internationally-recognized GHGs regulated under the Kyoto Protocol; carbon dioxide, methane, and nitrous oxide. The gases are measured in metric tons and detailed separately in Appendix A. The quick action report allows the City to capture the majority of its emissions while familiarizing staff with the process of conducting an inventory. When the City conducts a re-inventory, a more detailed level of reporting which accounts for all six Kyoto Protocol gases will be considered.

ICLEI provided the software and technical assistance to accomplish the municipal inventory. The methodology employed by ICLEI to calculate the equivalent GHGs is consistent with LGOP standards. Within the report, GHG emissions with different global warming potential are shown as one inclusive number known as a carbon dioxide equivalent unit (CO<sub>2</sub>e).<sup>5</sup> Using the carbon dioxide equivalent until allows the data to be simplified for easy interpretation. However, the most accurate description of emissions requires separate accounting by scope and GHG, which can be found in Appendix A.

The inventory results are an approximation of the GHG emissions for 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, or activity data, used to capture the equivalent emissions emitted are noted in Appendix B. Appendix C discloses the formulas and emissions factors used to calculate the equivalent GHG emissions. Whenever possible, methods recommended in the LGOP were used, but in some cases the suggested alternative methods were utilized when the necessary data was unavailable. The data and methodologies used for these exceptions can also be found in Appendices B and C.

#### *E. Key Highlights and Findings*

- The City of Lomita generated approximately 758 metric tons of CO<sub>2</sub>e in the baseline year, 2005; this is equivalent to the GHG emissions generated by the electricity use of 105 homes for one year.
- Overall, GHG emissions increased 3.5% between 2005 and 2007.
- From 2005 to 2007, emissions resulting from the consumption of electricity increased 11.3% while emissions generated from natural gas use decreased 6%.
- Between 1990 and 2005, emissions related to electricity consumption decreased 48.8%.
- If the City does nothing to reduce its emissions, it can expect emissions to rise to 843 metric tons of CO<sub>2</sub>e by 2012 and 885 metric tons of CO<sub>2</sub>e by 2015.

#### *F. Future Steps*

The City's next step will be to conduct a community-scale inventory to assess GHG emissions related to the residential, commercial, industrial, transportation, and waste sectors. Once completed, these inventories will provide the background needed for the Climate Action Plan, which will include measures and policies to reduce emissions in both municipal and community-wide activities.

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<sup>5</sup> Equivalent Carbon Dioxide (CO<sub>2</sub>e) is used as the universal unit when comparing different emissions and is equivalent to the global warming potential of one unit of carbon dioxide.

Development of a Climate Action Plan requires several steps including defining current measures, developing new measures, preparing an implementation plan, forming community outreach strategies, and establishing emissions tracking standards. Setting short and long-term reduction targets for municipal operations is a primary component of the Climate Action Plan. An example short-term reduction target might be 20% below 2005 baseline levels by the year 2012. It is recommended that the long-term target have an end date of 2020 so it is in line with the State's AB 32 target. The business-as-usual forecast graphs for 2012 and 2015 (Section II) and potential mitigation measures and policies should also be taken into consideration. Potential measures should be prioritized according to cost effectiveness and possible GHG emissions reductions. A summary of the City's existing mitigation efforts can be found in Section III.

With the municipal inventory complete, it is vital to continue to develop inventory reporting skills for future inventories. Refining the gathering and management of data for the next inventory, including entering records into the ICLEI data collection forms, will ensure that accurate and full information is available.

## II. Municipal Emissions Inventory Results

### A. Results

This section presents the approximate GHG emissions levels for the 1990, 2005, and 2007. The results are expressed in CO<sub>2</sub>-equivalent (CO<sub>2</sub>e) to make it easier to interpret the data. A more detailed account of separate emissions for individual GHGs is located in Appendix A. Based on LGOP reporting standards, GHG emissions are organized according to their scope, which allows the City to account for direct and indirect emissions separately.

Tables 1 through 3 present GHG emissions organized by scope, sector, and source of emissions and shown in metric tons of CO<sub>2</sub>e and millions of British thermal units (MMBTU). Information on how specific data was obtained and computed is contained in Appendices B and C. Cost information has also been listed where available for the purpose of planning and tracking energy measures' cost effectiveness.

### Baseline Year – 2005

Results from the baseline year will serve as a foundation for setting short and long-term emissions reduction targets. In 2005, the City of Lomita emitted a total of 758 metric tons of CO<sub>2</sub>e, equivalent to the GHG emissions emitted from the electricity use of 105 homes for one year. A breakdown of these emissions by source is shown in Table 1. Natural gas use and fuel consumed by City vehicles generated 17.6% of total emissions (scope 1 total). This includes approximately 21 vehicles from Public Works, Parks and Recreation, and the Community Development Department. Electricity consumption accounted for 20.8% of emissions (scope 2 total), and has the highest cost to the City. In 2005, electricity consumption cost the City \$69,773. Scope 3 emissions, including employee commuting (see Appendix E for employee commuting survey results), contract service vehicles, and waste generated the largest portion of emissions at 61.6%.

**Table 1. Municipal Inventory Summary 2005**

Lomita GHG Emissions 2005						
Sector	CO <sub>2</sub> e (metric tons)	Percent (% CO <sub>2</sub> e)	Source	Energy/ Fuel Use	Cost	Energy Equivalent (MMBTU)
<b>Scope 1 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	50	6.6%	Natural Gas	9,283 therms	\$ 9,982	928
<b>City Vehicle Fleet</b>						
City Vehicle Fleet	<b>83</b>	<b>11%</b>			<b>\$ 22,317</b>	<b>1,128</b>
	67		Gasoline	7,336.6 gal	\$ 18,265	912
	16		Diesel	1,553 gal	\$ 4,052	216
<b>Total Scope 1 Emissions</b>	<b>133</b>	<b>17.6%</b>	-	-	<b>\$ 32,299</b>	<b>2,056</b>
<b>Scope 2 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	83	10.9%	Electricity	273,196 kWh	\$ 46,750	931
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	46	6.1%	Electricity	151,577 kWh	\$ 12,386	517
Parking Lot Lighting	1	0.1%	Electricity	3,649 kWh	\$ 665	12
Park Lighting	25	3.3%	Electricity	83,894 kWh	\$ 5,123	286
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	2	0.3%	Electricity	7,184 kWh	\$ 983	25

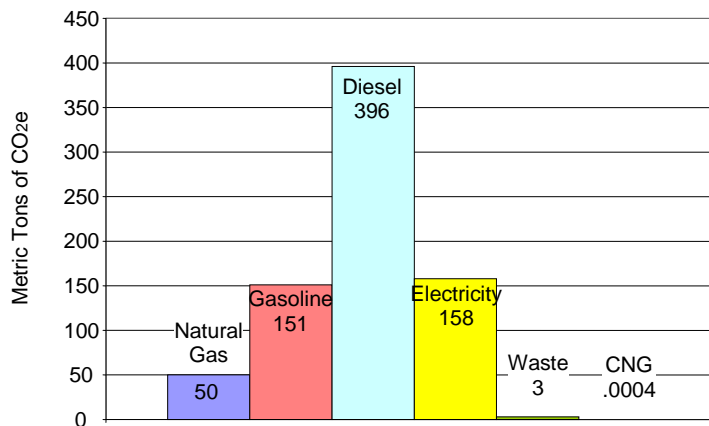


Water Pump Station/Pump	1	0.1%	Electricity	3,900 kWh	\$ 3,866	13
<b>Total Scope 2 Emissions</b>	<b>158</b>	<b>20.8%</b>	-	<b>523,400 kWh</b>	<b>\$ 69,772</b>	<b>1,784</b>
<b>Scope 3 Emissions</b>						
<b>Employee Commute</b>						
Employee Commute	42	5.5%	Gasoline	86,029 VMT	n/a	574
<b>Vehicles—Contract Service Providers</b>						
Contract Service Vehicles	<b>422</b>	<b>55.7%</b>		-	n/a	<b>5,773</b>
	42		Gasoline	4,680 gal		581
	380		Diesel	28,080 gal		5,192
	.0004		CNG	58 gal equiv.		0
<b>Solid Waste</b>						
Waste	3	0.4%		66 tons	n/a	n/a
<b>Total Scope 3 Emissions</b>	<b>467</b>	<b>61.6%</b>	-	-	-	<b>6,347</b>
<b>Total Emissions</b>	<b>758</b>	<b>100%</b>	-	-	<b>\$ 102,072</b>	<b>10,187</b>

Figure 1 illustrates emissions by source, with diesel ranking the highest, primarily from waste disposal vehicles. Compressed natural gas (CNG) emissions from street sweeping vehicles resulted in the lowest source of emissions.

**Figure1. Emissions by Source 2005**

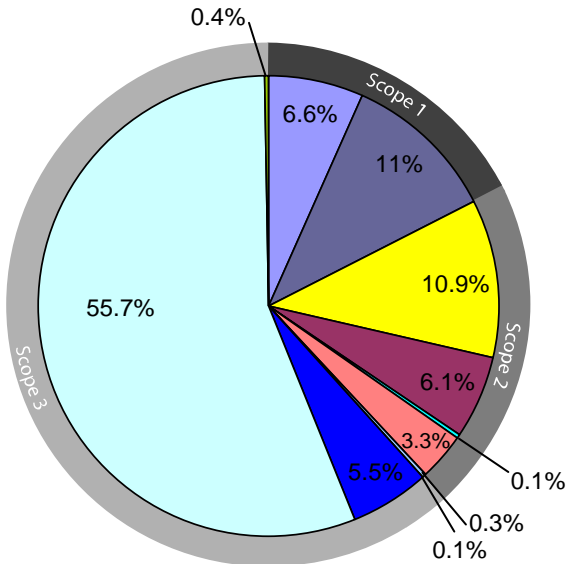
(including all direct and indirect sources)



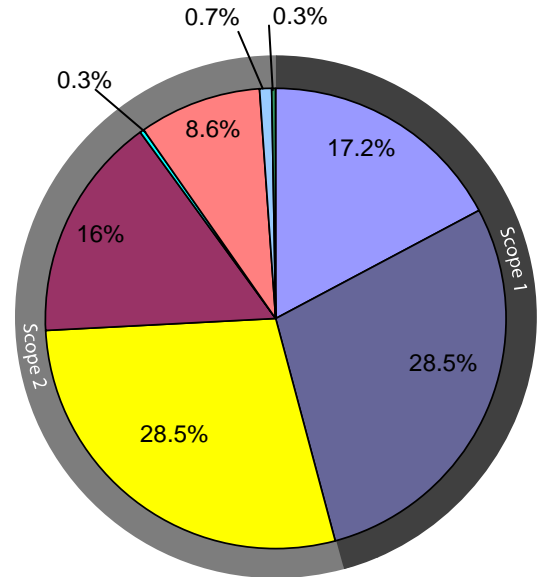
Figures 2 and 3 illustrate a percentage breakdown of each sector from Table 1. Since reporting scope 3 emissions is optional, Figure 2 shows scopes 1, 2, and 3, while Figure 3 only displays scopes 1 and 2 – functions that the City has more influence over. Figure 2 indicates 55.7% of emissions are from contract service vehicles that work within the City’s boundaries, 0.4% from waste, and 5.5% are the result of employee commuting, scope 3 emissions. Figure 3 shows that within scopes 1 and 2, natural gas accounts for 17.2% of emissions, fuel consumption accounts for 28.5%, and electricity accounts for the remaining 54.4% of emissions. Within the electricity category, buildings and facilities account for the largest percentage of emissions.

**Figures 2 & 3. Emissions by Sector 2005**

**Figure 2. Emissions by Sector 2005**  
(Scopes 1, 2, & 3)



**Figure 3. Emissions by Sector 2005**  
(Scopes 1 & 2 only)



Buildings, Natural Gas	City Vehicle Fleet	Buildings & Facilities, Electricity	Traffic Signals/Controllers
Parking Lot Lighting	Park Lighting	Sprinkler/Irrigation Control	Water Pump Station/Pump
Employee Commute	Contract Service Vehicles	Waste	

**Interim Year – 2007**

The year 2007 was chosen as an interim year to review the energy use changes that have occurred since the baseline year. ICLEI recommends cities re-inventory every year or two to ensure the City will reach its reduction targets.

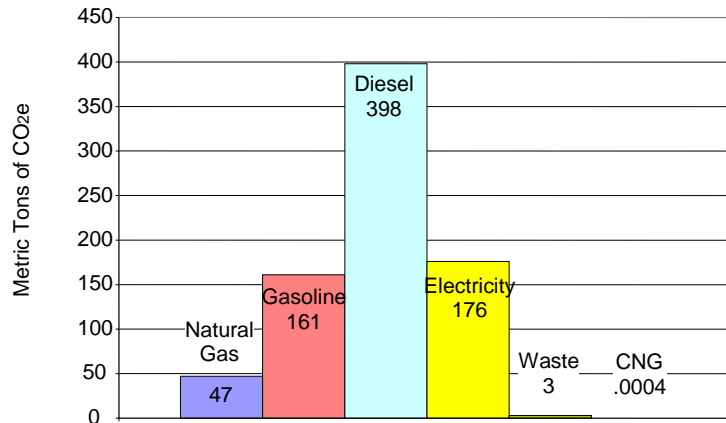
Table 2 presents emissions by scope, sector, and source. In 2007, the City of Lomita emitted a total of 785 metric tons of CO<sub>2</sub>e, which is equivalent to the emissions emitted from the electricity use of 109 homes for one year. This indicates a 3.5% or 27 metric tons of CO<sub>2</sub>e increase in emissions from 2005. Emissions related to natural gas and vehicle fleet fuel use accounted for 17.2% of total emissions (scope 1 total), while electricity emissions increased to 22.4% (scope 2 total). The largest percentage of emissions was scope 3 (60.4%), including employee commute, waste, and contract service vehicles.

**Table 2. Municipal Inventory Summary 2007**

<b>Lomita GHG Emissions 2007</b>						
<b>Sector</b>	<b>CO<sub>2</sub>e (metric tons)</b>	<b>Percent (% CO<sub>2</sub>e)</b>	<b>Source</b>	<b>Energy/ Fuel Use</b>	<b>Cost</b>	<b>Energy Equivalent (MMBtu)</b>
<b>Scope 1 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	47	6.0%	Natural Gas	8,799 therms	\$ 8,858	881
<b>City Vehicle Fleet</b>						
City Vehicle Fleet	<b>88</b>	<b>11.2%</b>			<b>\$ 29,339</b>	<b>1,129</b>
	70		Gasoline	7,792 gal	\$ 23,764	968
	18		Diesel	1,810 gal	\$ 5,575	251
<b>Total Scope 1 Emissions</b>	<b>135</b>	<b>17.2%</b>	-	-	<b>\$ 38,197</b>	<b>2,100</b>
<b>Scope 2 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	97	12.4%	Electricity	332,715 kWh	\$ 53,983	1,137
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	52	6.6%	Electricity	176,998 kWh	\$ 16,900	604
Parking Lot Lighting	1	0.1%	Electricity	4,001 kWh	\$ 809	14
Park Lighting	24	3.1%	Electricity	83,551 kWh	\$ 6,508	285
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	1	0.1%	Electricity	3,524 kWh	\$ 751	12
Water Pump Station/Pump	1	0.1%	Electricity	3,720 kWh	\$ 4,161	13
<b>Total Scope 2 Emissions</b>	<b>176</b>	<b>22.4%</b>	-	<b>604,509 kWh</b>	<b>\$ 83,122</b>	<b>2,065</b>
<b>Scope 3 Emissions</b>						
<b>Employee Commute</b>						
Employee Commute	49	6.2%	Gasoline	91,436 VMT	n/a	672
<b>Vehicles—Contract Service Providers</b>						
Contract Service Vehicles	<b>422</b>	<b>53.8%</b>			n/a	<b>5,773</b>
	42		Gasoline	4,680 gal		581
	380		Diesel	28,080 gal		5,192
	.0004		CNG	58 gal equiv.		0
<b>Solid Waste</b>						
Waste	3	0.4%		66 tons	n/a	n/a
<b>Total Scope 3 Emissions</b>	<b>474</b>	<b>60.4%</b>	-	-	-	<b>6,445</b>
<b>Total Emissions</b>	<b>785</b>	<b>100%</b>	-	-	<b>\$ 121,309</b>	<b>10,610</b>

Figure 4 shows the GHG emissions for 2007 by source. As in 2005, diesel is the largest contributor to emissions and CNG and waste contributed the least.

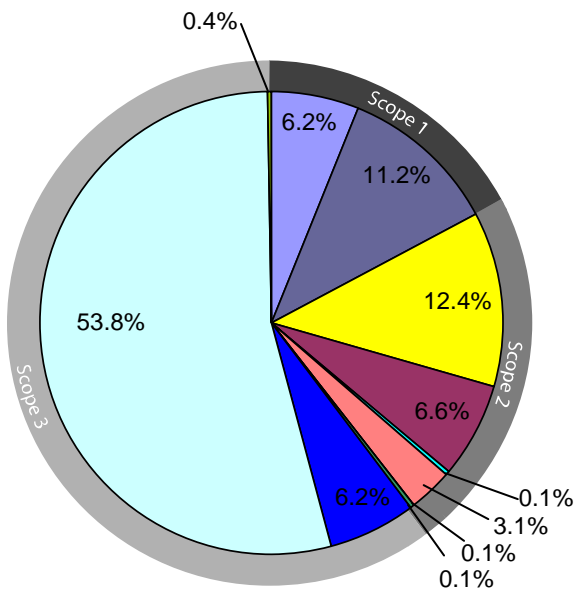
**Figure 4. Emissions by Source 2007**  
(including all direct and indirect sources)



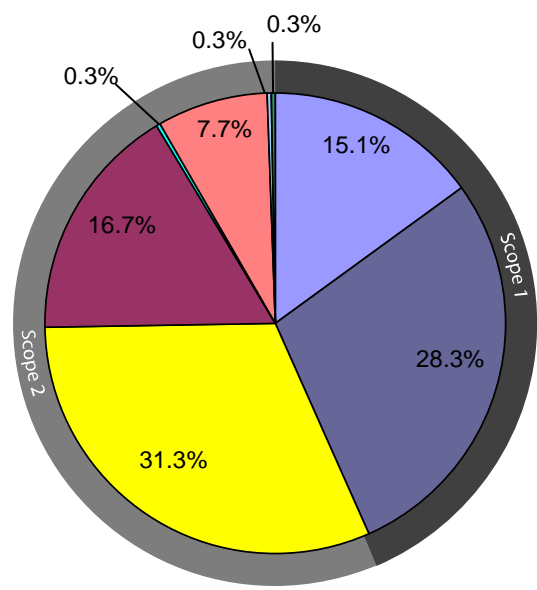
Figures 5 and 6 illustrate a percentage breakdown of each sector from Table 2. Figure 5 includes scopes 1, 2, and 3 and indicates that 60.4% of emissions are from scope 3 sources, including 53.8% from contract service vehicles, 0.4% from waste, and 6.2% from employee commuting. Figure 6 contains only scopes 1 and 2 and shows that the majority of emissions (56.6%) was the result of electricity consumption, which includes park lighting, traffic signals and buildings. Emissions from the City vehicle fleet category captured the largest portion of scope 1 emissions at 28.3%, while natural gas accounted for 15.1% of emissions.

**Figures 5 & 6. Emissions by Sector 2007**

**Figure 5. Emissions by Sector 2007**  
(Scopes 1, 2, & 3)



**Figure 6. Emissions by Sector 2007**  
(Scopes 1 & 2)



Buildings, Natural Gas	City Vehicle Fleet	Buildings & Facilities, Electricity	Traffic Signals/Controllers
Parking Lot Lighting	Park Lighting	Sprinkler/Irrigation Control	Water Pump Station/Pump
Employee Commute	Contract Service Vehicles	Waste	

### Historical Year – 1990

Since 1990 is the benchmark year for several key pieces of climate change legislation, such as AB 32, it was chosen to review the City's historical GHG emissions levels. With the exception of electricity, it was difficult to find accurate data for some sectors. Furthermore, "back-casting" or creating a rough estimate of emissions is discouraged in the LGOP. Therefore, the scope 1 emissions resulting from the City vehicle fleet and all scope 3 emissions have been excluded. As previously stated, the reduction target will be set from 2005 levels, but the 1990 information is included to make GHG level comparisons with 2005 where possible.

Based on the data that was available for 1990, the GHG emissions identified totaled 309.5 metric tons of CO<sub>2</sub>e. The total scope 2 emissions were 309 metric tons of CO<sub>2</sub>e. Electricity use in 1990 was notably higher than in 2005 and 2007. Emissions from buildings and facilities are the highest at 166 metric tons of CO<sub>2</sub>e. Only partial records were found for natural gas and the 0.5 tons of CO<sub>2</sub>e reported reflects the emissions based on casual records from the Southern California Gas Company.

**Table 3. Municipal Inventory Summary 1990 (limited data available)**

Lomita GHG Emissions 1990						
Sector	CO <sub>2</sub> e (metric tons)	Percent (% CO <sub>2</sub> e)	Source	Energy/ Fuel Use	Cost	Energy Equivalent (MMBtu)
<b>Scope 1 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	0.5	0.1%	Natural Gas	88 therms	n/a	9
<b>Total Scope 1 Emissions</b>	<b>0.5</b>	<b>0.1%</b>	-	<b>88 therms</b>	n/a	<b>9</b>
<b>Scope 2 Emissions</b>						
<b>Buildings &amp; Facilities</b>						
Buildings & Facilities	166	53.6%	Electricity	352,520 kWh	\$ 39,614	1,203
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	75	24.3%	Electricity	159,925 kWh	\$ 14,865	546
Park Lighting	58	18.7%	Electricity	124,022 kWh	\$ 12,550	423
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	4	1.5%	Electricity	8,590 kWh	\$ 1,287	29
Water Pump Station/Pump	6	1.8%	Electricity	12,297 kWh	\$ 4931	42
<b>Total Scope 2 Emissions</b>	<b>309</b>	<b>99.9%</b>	-	<b>657,354 kWh</b>	<b>\$ 69,247</b>	<b>2,243</b>
<b>Total Emissions</b>	<b>309.5</b>	<b>100%</b>	-	-	<b>\$ 69,247</b>	<b>2,252</b>

### B. Emissions Trends

The greatest benefit of conducting emissions inventories is the ability to compare years and track the City's progress. Table 4 present the emissions trends from 1990 to 2005 (where reliable data existed) and 2005 to 2007, respectively, organized by source of emission.

In the 15-year span from 1990 to 2005, electricity emissions decreased 48.8%. In 2005, electricity consumption included two more facilities not included in the 1990 inventory (the public works building and the water reservoir building). The 50% reduction in emissions may be related to buildings can be attributed to energy efficiency upgrades such as lighting retrofits. Since 1990, emissions from all other categories within electricity usage have also declined. Notably, there was a 38.6% decrease in electricity use from traffic signals and controllers and a 56.8% decrease in electricity use from park lighting. In 1990, usage per streetlight account was equal to 29.1 metric tons of CO<sub>2</sub>e and in 2005 usage per streetlight account was equal to 12.7 metric tons of CO<sub>2</sub>e (refer to appendix D, indicator inputs, for additional analysis). In 1990, City Hall electricity usage per person was equal to 5.3 metric tons of CO<sub>2</sub>e and cost \$1,242.5 per employee and in 2005 was equal to 2.2 metric tons and cost \$1,044.40 (refer to appendix D, indicator inputs, for additional analysis). Changes in natural gas emissions were not compared since complete records were unavailable for 1990.

From 2005 to 2007, overall emissions from electricity rose 11.3%. However, there was a small decrease in emissions related to irrigation and operation of the water pumping station. Natural gas emissions associated with water heater use decreased by 6%. City vehicle emissions rose between 2005 and 2007. The average emissions per City vehicle in 2005 was 4.5 metric tons of CO<sub>2</sub>e at an estimated cost of \$1,239.9 per vehicle. In 2007, the average emissions per City vehicle increased to 6.3 metric tons of CO<sub>2</sub>e while the cost rose to \$2,125.9 per vehicle although the City operated four less vehicles than in 2005. There was a 16.6% increase in emissions resulting from employee commute (refer to appendix E for employee commuting survey results).

**Table 4. Emissions Trends**

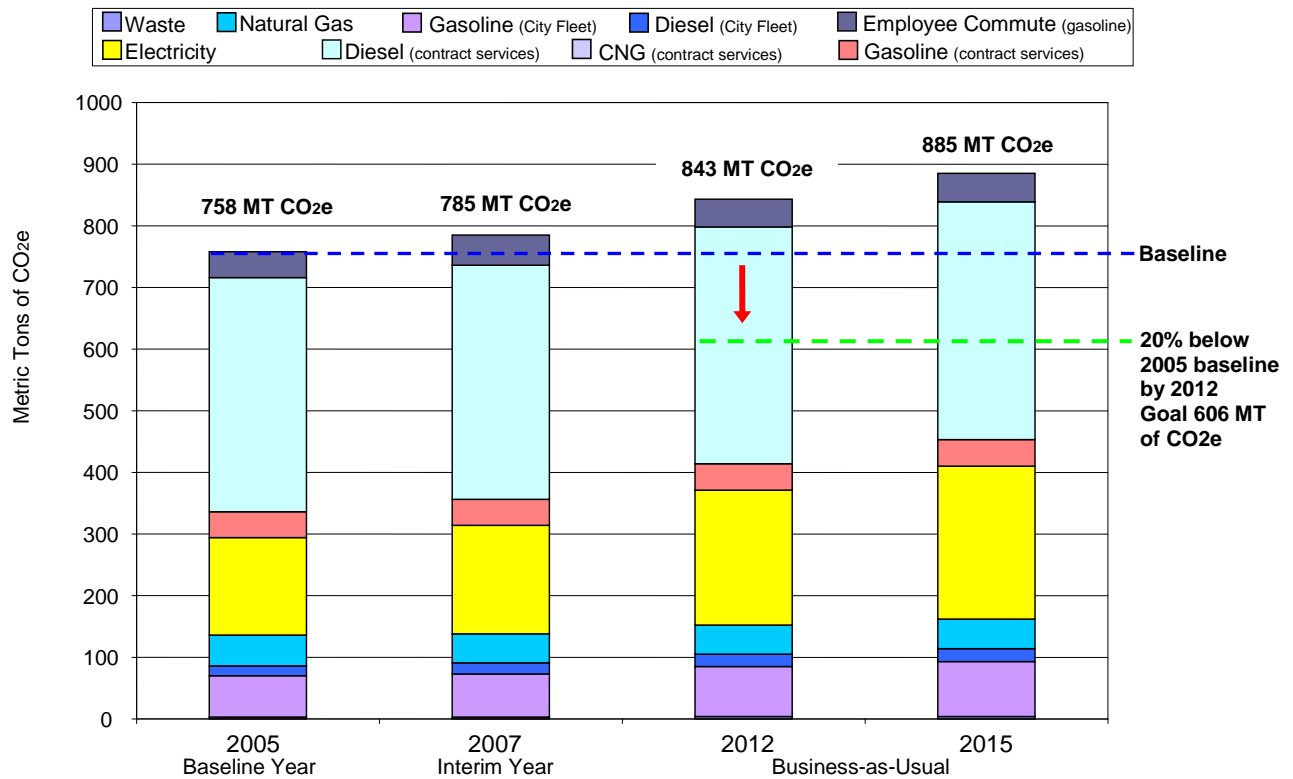
Electricity	MT CO <sub>2</sub> e 1990	MT CO <sub>2</sub> e 2005	Percentage Change	MT CO <sub>2</sub> e 2005	MT CO <sub>2</sub> e 2007	Percentage Change
<b>Buildings &amp; Facilities</b>	166	83	-50%	83	97	+16.8%
<b>Traffic Signals &amp; Controllers</b>	75	46	-38.6%	46	52	+1.3%
<b>Parking Lot Lighting</b>	-	1	-	1	1	-
<b>Park Lighting</b>	58	25	-56.8%	25	24	-4%
<b>Sprinkler/Irrigation Control</b>	4	2	-50%	2	1	-50%
<b>Water Pump Station/Pumps</b>	6	1	-83.3%	1	1	-
<b>Total</b>	<b>309</b>	<b>158</b>	<b>-48.8%</b>	<b>158</b>	<b>176</b>	<b>+11.3%</b>
<b>Natural Gas</b>						
<b>Buildings &amp; Facilities</b>	0.5	50	-	50	47	-6%
<b>Fuel</b>						
<b>Gasoline, City Vehicle Fleet</b>	-	67	-	67	70	+4.4%
<b>Diesel, City Vehicle Fleet</b>	-	16	-	16	18	+12.5%
<b>Gasoline, Employee Commute</b>	-	42	-	42	49	+16.6%
<b>Gasoline, Contract Services</b>	-	42	-	42	42	-
<b>Diesel, Contract Services</b>	-	380	-	380	380	-
<b>CNG, Contract Services</b>	-	0.0004	-	0.0004	0.0004	-
<b>Waste</b>						
<b>Solid Waste</b>	-	3	-	3	3	-

**C. Forecasting and Setting GHG Emissions Reduction Targets**

The business-as-usual (BAU) forecast shown in Figure 7 is a prediction of total GHG emissions from municipal operations and services for 2012 and 2015. Although Lomita does not anticipate any significant growth, GHG emissions are expected to increase if the City does not undertake any mitigating projects or policies. The City can expect GHG emissions levels to increase to 843 metric tons of CO<sub>2</sub>e by 2012 and 894 metric tons of CO<sub>2</sub>e by 2015. Several indicators are taken into consideration when predicting anticipated emissions growth, such as energy usage trends between the baseline year and the interim year and assumptions about future energy consumption based on the expansion of municipal facilities and operations, programs, and municipal staff. A compound annual growth rate formula and the weighted averages between data sets were used to forecast municipal operation growth. The business-as-usual forecast helps the City to identify emissions reduction goals and develop the appropriate measures to target specific areas.

The green line in Figure 7 illustrates a possible reduction scenario if the City set a reduction goal of 20% below the 2005 baseline levels by 2012. With this reduction target, the City would need to reduce emissions to 606 metric ton of CO<sub>2</sub>e. 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 ensure that the City stays on track to meet its goal. Once the City begins to implement emission reduction measures, comparisons can be drawn between the BAU forecast and the decrease in emissions that results from reduction measures.

**Figure 7. Business-as-Usual Forecast**



#### IV. Summary of Measures and Policies

The policies and measures that the City is currently working on will help the City reach its adopted emissions reduction goals. Below is a summary of past and current measures that will help with the planning of the climate action document.

##### *A. Energy Efficiency*

**Fee waiver for solar power installation:** In October, 2008 the City passed a resolution waiving the planning fees and reducing the building permit fees by 50% for the installation of photovoltaic systems.

**Compressed workweek schedule:** City hall is closed on alternative Friday's to contribute to energy conservation and cost savings at facilities.

**Lighting retrofit:** In recent years, the public facilities within the City have undergone a series of lighting retrofits. All incandescent bulbs have been replaced with fluorescent bulbs, LED "Exit" signs were installed throughout City Hall, fluorescent lights were installed in the Community Center gymnasium, and metal halide lamps were installed in the City Hall parking lot and throughout downtown.

**Heating and Air Conditioning system upgrades:** Upgrades to the City Hall heating, ventilation, and air conditioning (HVAC) system include the installation of a 50 ton condensing unit with special software that regulates the operation of the HVAC system more efficiently by specifying on/off times. In 2007, extensive cleaning was performed on the air ducts and reflective duct insulation was installed to increase efficiency. Energy efficient thermostats were also installed in all public buildings.

**Building upgrades:** In 2007, a new "Cool Roof" was installed on top of City Hall which reflects light and heat rather than absorbing it. A number of smaller upgrades have also been completed within City Hall to increase the building's efficiency, including the installation of window tint on the main entry windows, replacement of rubber seals on all windows, and the replacement of old refrigerators with new Energy Star rated models.

##### *B. Solid Waste and Recycling*

**Solid waste franchise agreement with single provider:** Since 2005, the City's solid waste diversion rate is 61%. All green waste (grass clippings and tree trimmings), plastics and paper are recycled. The solid waste provider also educates residents and businesses on the benefits of recycling through their website, mailers, and occasional visits to homes and businesses.

##### *C. Sustainable Development*

**Water Conservation Ordinance:** In early 2009, the City adopted a new Water Conservation Ordinance. The ordinance places restrictions, such as limited watering hours, on residents and businesses, as well as additional restrictions for different drought response levels. It also requires the retrofit of old fixtures, such as toilets and showerheads, with new water efficient models when a property is sold or undergoes significant improvements.

**Building and Landscaping Upgrades:** Water saving toilets and urinals were installed in City Hall and the Community Center gymnasium. A smart irrigation controller was installed at City



Hall to allow the City of be more precise with the watering schedule and many of the City's newly re-landscaped areas, such as the Rossick Plaza Project, utilize drought tolerant plants to save water.

**Lomita Drought Tolerant Garden:** In December 2008, the City was awarded a grant from West Basin Municipal Water District to replace the existing turf of an area approximately 3,400 square feet in size with drought tolerant landscaping. When completed, the project will reduce run-off to the area by 100% and reduce total water use by 90%.

#### *D. Storm Water Management*

The City actively participates in the National Pollutant Discharge Elimination System (NPDES) requirement. In addition, the Planning Department has been working with developers on reducing impervious surface area on construction projects throughout the City.

#### *E. Vehicle Fleet*

Two electric vehicles are currently in use by the City's Parks and Recreation Department.

#### *F. Community Involvement*

The City actively participates in promoting water conservation programs offered by West Basin and Metropolitan Water District of Southern California, including high efficiency toilet exchanges, free landscape audits and irrigation controllers, and free water brooms. The City also partners with Los Angeles County to hold an annual hazardous waste round-up at City Hall.

## IV. Appendices

### 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<sub>2</sub>e summed totals of the estimated emissions of gases with different global warming potentials (see Appendix E of LGOP). The control approach was utilized to define the City's scopes of emissions.

**Reporting year:** 2005

**Protocol Used Local:** Government Operation Protocol, version 1.0

**Control Approach:** Operational Control

#### GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Stationary Combustion	<b>50</b>	<b>49</b>	<b>0.00464</b>	<b>0.00009</b>
Scope 2	Purchased Electricity	<b>83</b>	<b>82</b>	<b>0.00359</b>	<b>0.00136</b>

Streetlights and Traffic Signals					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>72</b>	<b>72</b>	<b>0.00314</b>	<b>0.001193</b>

Water Delivery					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>3</b>	<b>3</b>	<b>0.00014</b>	<b>0.00005</b>

Vehicle Fleet					
Scope 1		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Mobile Combustion	<b>83</b>	<b>80</b>	<b>0.00404</b>	<b>0.00462</b>
Scope 3	<b>Contract Services</b>	CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	CALMet Services	<b>422</b>	<b>421</b>	<b>0.00328</b>	<b>0.00427</b>
	R.F. Dickson Company	<b>0.0004</b>	<b>0.00041</b>	<b>0.0000005</b>	<b>0.0000003</b>

Solid Waste					
Scope 3		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	<b>Contract Services</b>				
	CALMet Services	<b>3</b>	<b>3</b>	<b>0.15941</b>	<b>-</b>

Employee Commute					
Scope 3		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Employee Commute	<b>42</b>	<b>40</b>	<b>0.00257</b>	<b>0.00294</b>

Total Emissions					
		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Scope 1		<b>133</b>	<b>129</b>	<b>0.00868</b>	<b>0.00472</b>
Scope 2		<b>158</b>	<b>158</b>	<b>0.00688</b>	<b>0.00261</b>
Scope 3		<b>467</b>	<b>464</b>	<b>0.16526</b>	<b>0.00721</b>

## 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. 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<sub>2</sub>e summed totals of the estimated emissions of gases with different global warming potentials (see Appendix E of LGOP). The control approach was utilized to define the City's scopes of emissions.

**Reporting year:** 2007

**Protocol Used Local:** Government Operation Protocol, version 1.0

**Control Approach:** Operational Control

## GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Stationary Combustion	<b>47</b>	<b>46</b>	<b>0.00439</b>	<b>0.00008</b>
Scope 2	Purchased Electricity	<b>97</b>	<b>96</b>	<b>0.00437</b>	<b>0.00166</b>

Streetlights and Traffic Signals					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>77</b>	<b>76</b>	<b>0.00347</b>	<b>0.00131</b>

Water Delivery					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>2</b>	<b>2</b>	<b>0.00009</b>	<b>0.00003</b>

Vehicle Fleet					
Scope 1		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Mobile Combustion	<b>88</b>	<b>86</b>	<b>0.00386</b>	<b>0.00448</b>
Scope 3	<b>Contract Services</b>	CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	CALMet Services	<b>422</b>	<b>421</b>	<b>0.00311</b>	<b>0.03923</b>
	R.F. Dickson Company	<b>.0004</b>	<b>0.0004</b>	<b>0.0000005</b>	<b>0.00000003</b>

Solid Waste					
Scope 3		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	<b>Contract Services</b>				
	CALMet Services	<b>3</b>	<b>3</b>	<b>0.15941</b>	<b>-</b>

Employee Commute					
Scope 3		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Employee Commute	<b>49</b>	<b>47</b>	<b>0.00265</b>	<b>0.00312</b>

Total Emissions					
		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Scope 1	<b>135</b>	<b>133</b>	<b>0.00826</b>	<b>0.00457</b>
	Scope 2	<b>176</b>	<b>175</b>	<b>0.00795</b>	<b>0.00301</b>
	Scope 3	<b>474</b>	<b>471</b>	<b>0.165171</b>	<b>0.04235</b>

C. Greenhouse Gas Report 1990—Historical Year

The year 1990 was chosen as the historical year because it is 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. For sources where reliable information was available, GHG emissions have been recorded below. 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<sub>2</sub>e summed totals of the estimated emissions of gases with different global warming potentials (see Appendix E of LGOP). The control approach was utilized to define the City’s scopes of emissions.

**Reporting year:** 1990

**Protocol Used Local:** Government Operation Protocol, version 1.0

**Control Approach:** Operational Control

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Stationary Combustion	<b>0.5</b>	<b>0.4</b>	<b>0.00004</b>	<b>0.0000008</b>
Scope 2	Purchased Electricity	<b>166</b>	<b>164</b>	<b>0.00639</b>	<b>0.00223</b>

Streetlights and Traffic Signals					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>133</b>	<b>132</b>	<b>0.005151</b>	<b>0.00180</b>

Water Delivery					
Scope 2		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Purchased Electricity	<b>10</b>	<b>9</b>	<b>0.00037</b>	<b>0.00013</b>

Total Emissions					
		CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Scope 1	<b>0.5</b>	<b>0.4</b>	<b>0.00004</b>	<b>0.0000008</b>
	Scope 2	<b>309</b>	<b>307</b>	<b>0.01192</b>	<b>0.00417</b>

*Appendix B—Activity Data Disclosure*

Activity data refers to consumption data such as fuel or electricity used 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 specified in the LGOP - relevance, completeness, consistency, transparency, and accuracy – the sources of this data have been recorded. The information is grouped by scope and source of emission and includes descriptions of data sources and the methodology used to obtain information. 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. For sections where an alternative method was used, the City should strive to improve data collection practices to obtain the correct information in order to use the recommended method in future inventories. Scope 3 emissions are considered optional reporting.

A. Buildings & Other Facilities

Scope 1 Stationary Combustion

<p><b>Description:</b> Consumption data was obtained from Southern California Gas Company.</p> <p>For the 1990 inventory, Southern California Gas no longer possesses official customer records going back to 1990 due to document retention policies. SoCalGas located some casual records that go back to 1990 which was the basis for the gas information provided.</p>	<p><b>Recommended Method</b> Known natural gas use</p>
<p><b>Reference:</b> Chauncy Tou, Energy Programs Advisor Customer Programs, Southern California Gas Company, 213-244-2833, ctou@semprautilities.com</p>	

Scope 2 Purchased Electricity

<p><b>Description:</b> Consumption data was obtained from Southern California Edison.</p> <p>2 general service accounts 836613 and 1796691 were excluded from the inventory. Service Account 836613-Cancel Meter Per Edison Service Account 1796691- Dirt Lot Next to Lomita Manor - Cancel Meter Per Edison</p> <p>Note: general service account 1492065- Hathaway Park Restrooms - Meter Removed Per Edison for 2007 and 2005.</p>	<p><b>Recommended Method</b> Known electricity use</p>
<p><b>Reference:</b> 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</p>	

B. Street Lighting and Traffic Signals

Scope 2 Purchased Electricity

<p><b>Description:</b> Consumption data was obtained from Southern California Edison.</p>	<p><b>Recommended Method</b> Known electricity use</p>
<p>2 outdoor lighting accounts 1492051 and 1492064 were excluded from the inventory. Service Account 1492051 Grassy Area - Cancel Meter Per Edison Service Account 1492064 Hathaway Park Field - Cancel Meter Per Edison</p>	
<p><b>Reference:</b> 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</p>	

C. Water Delivery

Scope 2 Purchased Electricity

<p><b>Description:</b> Consumption data was obtained from Southern California Edison.</p>	<p><b>Recommended Method</b> Known electricity use</p>
<p><b>Reference:</b> 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</p>	

D. Vehicle Fleet

Scope 1 Mobile Combustion

<p><b>Description:</b></p> <p>The City provided a description of each fleet vehicle organized by department and cost. Fuel estimates were based on annual dollars spent data collected from city purchasing records (taxes included in cost).</p> <p>The average regional cost per gallon of fuel type was obtained from the Energy Information Administration <a href="http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_cpgal_a.htm">http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_cpgal_a.htm</a>.</p>	<p><b>Alternate Method</b> Fuel estimates based on dollars spent</p>
<p><b>Reference:</b> Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>	



## 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](http://www.surveymonkey.com)

**Reference:** Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, [a.heideman@lomitacity.com](mailto:a.heideman@lomitacity.com)

## E. Solid Waste Facilities

## Scope 3 Waste Related

**Description:**

Tracy Bonano, former Assistant to the City Manager, received data from LA County Sanitation District and CalMet Services.

2007-66 tons, estimated hauling & tipping cost \$ 1716.00 (note: \$26.00 per ton)

2005-66 tons, estimated hauling & tipping cost \$ 1518.00 (note: \$23. per ton)

There was an estimated 95% methane recovery at the Puente Hills 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:** Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, [a.heideman@lomitacity.com](mailto:a.heideman@lomitacity.com)

## F. Other Scope 3 Emissions

## Contracted Services

**Description:** CalMet Services

Tracy Bonano, former Assistant to the City Manager, received data from CalMet Services.

**Reference:** Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, [a.heideman@lomitacity.com](mailto:a.heideman@lomitacity.com)

## Scope 3 Emissions From Contracted Services

**Description:** R.F. Dickson Company, Inc.-Street Sweeping Provider

Tracy Bonano, former Assistant to the City Manager, received data from R.F. Dickson Company.

**Reference:** Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, [a.heideman@lomitacity.com](mailto:a.heideman@lomitacity.com)

*Appendix C—Methodology/Emissions Factors Disclosure*

All methodologies employed to calculate emissions are disclosed below, including 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.<sup>6</sup> In compliance with the LGOP and ICLEI program reporting requirements, this appendix contains descriptions of computational methods and emission factors used to arrive at the equivalent GHG emissions and organized by scope. 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. For sections where an alternative method was used, the City should strive to improve data collection practices to obtain the correct information in order to use the recommended method in future inventories. Scope 3 emissions are considered optional reporting.

A. Scope 1 Stationary Combustion

<p><b>Description of Computational Method:</b>                  Table G.3 of the LGOP, Default CH<sub>4</sub> and N<sub>2</sub>O emissions factors by fuel type and sector, pg. 172 and Table G.1 of the LGOP, Default factors for CO<sub>2</sub> emissions, pg. 170.                  Criteria Air Pollutants, Table 3. NERC Western Systems Coordinating Council/CNV 1990- 2005 2007 inventory-2005 CAP emissions factors                  2005 inventory-2005 CAP emissions factors                  1990 inventory-1990-2003 emissions factors</p>	<p><b>Recommended Method</b>                  Default emission factors, Table G.1 and Table G.3 of the LGOP</p>
<p><b>Reference:</b> Data was provided by Chauncy Tou, Energy Programs Advisor Customer Programs, Southern California Gas Company, 213-244-2833, ctou@semprautilities.com</p>	

B. Scope 1 Mobile Combustion

<p><b>Description of Computational Method:</b>                  Fuel estimates were based on annual dollars spent                  Estimated fuel use (gallons)=(dollars spent-taxes)/                  Fuel cost(\$/gallon). The average regional cost per gallon of fuel type was obtained from the Energy Information Administration  <a href="http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_cpgal_a.htm">http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_cpgal_a.htm</a>.</p> <p>Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.</p>	<p><b>Alternate Method</b>                  Alternate Emissions Factors, Table G.13 of the LGOP</p>
<p><b>Reference:</b> Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>	

<sup>6</sup> 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 2 Purchased Electricity

<p><b>Description of Computational Method:</b>                  Table G.5 Utility-Specific Verified Electricity CO2 Emissions Factors (2000-2006), LGOP pg. 174                  For 2005 inventory Southern California Edison, 2005 emission factors were used</p> <p>For 2007 inventory Southern California Edison, 2006 emissions factors were used</p> <p>TableG.6 California Grid Average Electricity Emissions Factors (1990-2004) emissions factors from the year 2004 was used for both 2005 and 2007.</p> <p>The year 1990 emissions factors from Table G.6 were used for the 1990 inventory.</p>	<p><b>Recommended Method</b>                  Utility-Specific verified emission factors used</p>
<p><b>Reference:</b> Larry Sutton, Account Executive, Southern California Edison, 714-973-5660 PAX 52660 and Maya R. Aubrey, Analyst-Program/Project, Southern California Edison, (909) 357-6536 PAX 16036, Maya.Aubrey@sce.com</p>	

D. Scope 3 Waste Related Emissions

<p><b>Description of Computational Method:</b>                  Tracy Bonano, former Assistant to the City Manager, received data from LA County Sanitation District and CalMet Services.</p> <p>2007-66 tons, estimated hauling &amp; tipping cost \$ 1716.00 (note: \$26.00 per ton)                  2005-66 tons, estimated hauling &amp; tipping cost \$ 1518.00 (note: \$23. per ton)</p> <p>There was an estimated 95% methane recovery at the Puente Hills landfill where the waste was taken.</p> <p>No records could be found for 1990 City operated and owned facilities.</p> <p>Solid Waste Characterization for public administration was obtain from the California Integrated Waste Management Board <a href="http://www.ciwmb.ca.gov/wastechar/BizGrpCp.asp">http://www.ciwmb.ca.gov/wastechar/BizGrpCp.asp</a></p>
<p><b>Reference:</b> Data provided by LA County Sanitation District and CalMet Services. Contact Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>

E. Scope 3 Employee Commute

<p><b>Description of Computational Method:</b></p>	<p><b>Alternative Method</b></p>
<p>The online website Survey Monkey was utilized to conduct an employee commute the survey  <a href="http://www.surveymonkey.com">http://www.surveymonkey.com</a>                  Utilizing employee benefits information, it was estimated that on average employees worked 46.5 weeks, which means 28 days were deducted from the 260 possible working days in a year. It was assumed that these absences were due to vacation, sick, personal, and holiday.                   Respondents who drove city vehicles, or were not employed by the City in the years surveyed, walked, bicycled, or used another form of transportation were excluded from the emissions inventory.                   Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.                   2007--50 employees with 27 responses is a 54% response rate. The remaining 46% of VMT was estimated based on survey responses for a total VMT of 91,436. Assumptions: gasoline, drove alone, passenger vehicle                  (1.8 x 50,799=91,436 Total VMT)                   2005--50 employees with 17 responses is a 34% response rate. The remaining 66% of VMT was estimated based on survey responses for a total VMT of 86,029. Assumptions: gasoline, drove alone, passenger vehicle                  (2.9 x 29,665=86,029 Total VMT)</p>	<p>Alternative emissions factors, Table G.13, LGOP</p>
<p><b>Reference:</b> Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>	

F. Scope 3 Emissions From Contracted Services

<p><b>Description of Computational Method:</b></p>
<p>CalMet provided vehicle fleet data.</p>
<p>Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.</p>
<p><b>Reference:</b> Data provided by LA County Sanitation District and CalMet Services. Contact Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>

<p><b>Description of Computational Method:</b></p>
<p>R.F. Dickson Company, Inc.-Street Sweeping                  R.F. Dickson Company, Inc.-Street Sweeping, provided vehicle fleet data</p>
<p>Alternate Emissions Factors were used based on Table G.13 of the LGOP, Alternate Methodology for Highway Vehicles by Inventory Year, pg. 180.</p>
<p><b>Reference:</b> Data provided by LA County Sanitation District and CalMet Services. Contact Alicia Heideman, Associate City Planner, Community Development Department, 310-325-7110, Ext. 122, a.heideman@lomitacity.com</p>

*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 consumption, and the cost of energy where known.<sup>7</sup>

Sources of Emissions 2005	Source	CO <sub>2</sub> e (MT)	CO <sub>2</sub> e (%)	Energy (MMBtu)	Energy/Fuel Use	Cost (\$)
<b>Buildings and Facilities</b>						
City Hall	Electricity	61	8.3	677	198,342 kWh	\$ 27,390
	Natural Gas	3	0.4	56	561 therms	\$ 811
Lomita Park Building	Electricity	2	0.3	27	7,938 kWh	\$ 1,200
	Natural Gas	46	6.3	861	8,611 therms	\$ 8,923
Lomita Public Works Building	Electricity	13	1.7	140	41,060 kWh	\$ 13,960
Railroad Museum	Electricity	5	0.7	60	17,708 kWh	\$ 2,734
	Natural Gas	1	0.1	11	111 therms	\$ 248
Water Reservoir Building	Electricity	1	0.2	15	4,507 kWh	\$ 797
Hathaway Park (restroom)	Electricity	1	0.2	12	3,641 kWh	\$ 670
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	Electricity	47	6.3	517	151,557 kWh	\$ 12,386
Park Lighting	Electricity	25	3.5	286	83,894 kWh	\$ 5,123
Parking Lot Lighting	Electricity	1	0.2	12	3,649 kWh	\$ 665
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	Electricity	3	0.3	25	7,184 kWh	\$ 983
Water Pump Station/Pump	Electricity	1	0.2	13	3,900 kWh	\$ 3,866
<b>Vehicle Fleet</b>						
City Parks & Recreation Dept.	Gasoline	24	3.3	329	2,649 gallons	\$ 6,595
Community Services (Housing Development)	Gasoline	2	0.2	24	190 gallons	\$ 475
Community Services (Parking enforcement)	Gasoline	7	0.9	90	722 gallons	\$ 1,797
Public Works Dept. (Tree Dept.)	Diesel	6	0.8	84	603 gallons	\$ 1,573
Public Works Dept. (Water Dept.)	Gasoline	25	3.4	345	2,779 gallons	\$ 6,919
Public Works Dept. (Street Dept.)	Gasoline	9	1.2	124	996 gallons	\$ 2,479
	Diesel	10	1.3	132	950 gallons	\$ 2,479
<b>Employee Commute</b>						
Drove Alone	Gasoline	42	5.5	574	86,029 VMT	n/a
<b>Contract Service Providers</b>						

<sup>7</sup> Source of data CACP software output.

CalMet Services	Gasoline	42	5.8	581	4,680 gallons	n/a
	Diesel	380	52.5	5,192	28,080 gallons	n/a
R.F. Dickson Company (Street Sweeping)	CNG	.0004	0	0	58 gal. equiv.	
<b>Waste</b>						
CalMet Services	Carbon Dioxide	3	0.4		66 tons	\$ 1518
	Methane	0.15941				
Sources:	Food Waste	0				
	Paper Products	3				
	Plant Debris	0				
	Wood/Textiles	0				

Sources of Emissions 2007	Source	CO <sub>2</sub> e (MT)	CO <sub>2</sub> e (%)	Energy (MMBtu)	Energy/ Fuel Use	Cost (\$)
<b>Buildings and Facilities</b>						
City Hall	Electricity	71	9.1	834	244,218 kWh	\$ 34,075
	Natural Gas	5	0.6	93	929 therms	\$ 1,136
Lomita Park Building	Electricity	3	0.4	36	10,668 kWh	\$ 1,774
	Natural Gas	41	5.3	774	7,735 therms	\$ 7,448
Lomita Public Works Building	Electricity	18	2.3	207	60,580 kWh	\$ 14,701
Railroad Museum	Electricity	4	0.5	49	14,290 therms	\$ 2,597
	Natural Gas	1	0.1	14	135 therms	\$ 274
Water Reservoir Building	Electricity	0	0.0	4	1,054 kWh	\$ 352
Hathaway Park (restroom)	Electricity	1	0.1	7	1,905 kWh	\$ 484
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	Electricity	52	6.6	604	176,998 kWh	\$ 16,900
Park Lighting	Electricity	24	3.1	285	83,551 kWh	\$ 6,508
Parking Lot Lighting	Electricity	1	0.1	14	4,001 kWh	\$ 809
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	Electricity	1	0.1	12	3,524 kWh	\$ 751
Water Pump Station/Pump	Electricity	1	0.1	13	3,720 kWh	\$ 4,161
<b>Vehicle Fleet</b>						
City Parks & Recreation Dept. Community Services (Parking enforcement)	Gasoline	22	2.8	308	2,478 gallons	\$ 7,557
	Gasoline	6	0.8	87	702 gallons	\$ 2,141
Public Works Dept. (Tree Dept.)	Diesel	5	0.7	70	503 gallons	\$ 1,535
Public Works Dept. (Water Dept.)	Gasoline	30	3.8	408	3,287 gallons	\$ 10,026
Public Works Dept. (Street Dept.)	Gasoline	12	1.6	165	1,325 gallons	\$ 4,040

	Diesel	13	1.7	181	1,307 gallons	\$ 4,040
<b>Employee Commute</b>						
Drove Alone	Gasoline	24	3.1	329	91,180 VMT	n/a
Carpool	Gasoline	0	0.0	2	232.50 VMT	n/a
Public Transit	Diesel	0	0.0	1	23.25 VMT	n/a
<b>Contract Service Providers</b>						
CalMet Services	Gasoline	42	5.4	581	4,680 gallons	n/a
	Diesel	380	48.5	5,192	28,080 gallons	n/a
R.F. Dickson Company (Street Sweeping)	CNG	.0004	0	0	58 gal. equiv.	n/a
<b>Waste</b>						
CalMet Services	Carbon Dioxide	3	0.4		66 tons	\$ 1716
	Methane	0.15941				
Sources:	Food Waste	0				
	Paper Products	3				
	Plant Debris	0				
	Wood/Textiles	0				

Sources of Emissions 1990	Source	CO <sub>2</sub> e (MT)	CO <sub>2</sub> e (%)	Energy (MMBtu)	Energy/ Fuel Use	Cost (\$)
<b>Buildings and Facilities</b>						
City Hall	Electricity	142	45.9	1,032	302,400 kWh	\$ 33,548
	Natural Gas	0	0.1	7	69 therms	n/a
Railroad Museum	Electricity	15	4.8	108	31,516 kWh	\$ 3,735
	Natural Gas	0	0.0	1	5 therms	n/a
Lomita Park Building	Electricity	8	2.6	58	17,123 kWh	\$ 2,057
	Natural Gas	0	0.0	1	14 therms	n/a
Hathaway Park (restroom)	Electricity	1	0.2	5	1,481 kWh	\$ 275
<b>Streetlights &amp; Traffic Signals</b>						
Traffic Signals/Controllers	Electricity	75	24.3	546	159,925 kWh	\$ 14,865
Park Lighting	Electricity	58	18.8	423	124,022 kWh	\$ 12,550
<b>Water Delivery</b>						
Sprinkler/Irrigation Control	Electricity	4	1.3	29	8,590 kWh	\$ 1,287
Water Pump Station/Pump	Electricity	6	1.9	42	12,297 kWh	\$ 931

Criteria Air Pollutants<sup>8</sup>

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.<sup>9</sup> Actions taken to reduce emissions will also reduce criteria air pollutants.

<b>Criteria Air Pollutants 2005</b>	<b>NO<sub>x</sub> (lbs)</b>	<b>SO<sub>x</sub> (lbs)</b>	<b>CO (lbs)</b>	<b>VOC (lbs)</b>	<b>PM<sub>10</sub> (lbs)</b>
Building and Facilities	398	168	194	26	138
Vehicle Fleet	6,104	297	10,423	1,279	292
Employee Commute	280	15	3,000	308	6
Streetlights & Traffic Signals	212	141	134	15	117
Water Delivery	10	7	6	1	5
<b>Total</b>	<b>7,004</b>	<b>627</b>	<b>13,758</b>	<b>1,628</b>	<b>559</b>

<b>Criteria Air Pollutants 2007</b>	<b>NO<sub>x</sub> (lbs)</b>	<b>SO<sub>x</sub> (lbs)</b>	<b>CO (lbs)</b>	<b>VOC (lbs)</b>	<b>PM<sub>10</sub> (lbs)</b>
Building and Facilities	443	203	225	29	167
Vehicle Fleet	5,758	299	10,584	1,281	253
Employee Commute	276	17	3,262	330	6
Streetlights & Traffic Signals	235	156	149	17	129
Water Delivery	6	4	4	0	4
<b>Total</b>	<b>6,718</b>	<b>679</b>	<b>14,224</b>	<b>1,657</b>	<b>559</b>

<b>Criteria Air Pollutants 1990</b>	<b>NO<sub>x</sub> (lbs)</b>	<b>SO<sub>x</sub> (lbs)</b>	<b>CO (lbs)</b>	<b>VOC (lbs)</b>	<b>PM<sub>10</sub> (lbs)</b>
Building and Facilities	304	245	195	22	185
Streetlights & Traffic Signals	244	197	157	18	149
Water Delivery	18	15	12	1	11
<b>Total</b>	<b>565</b>	<b>457</b>	<b>364</b>	<b>41</b>	<b>344</b>

<sup>8</sup> To review definitions and acronyms for criteria air pollutants refer to Appendices G and H.

<sup>9</sup> Source of data CACP software output.



## Indicator Inputs

Indicator inputs describes 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 provide additional information which can be useful for tracking progress over time.<sup>10</sup>

Sources of Emissions 2005		Equiv CO <sub>2</sub> (MT)	Energy (MMBtu)	Cost (\$)
<b>Buildings and Facilities</b>				
City Hall—Electricity				
	Per 1000 sq. ft.	0	0.1	\$1.4
	Per hour of operation	0	0.3	\$10.7
	Per occupant	2.2	25.1	\$1,014.4
City Hall—Natural Gas				
	Per 1000 sq. ft.	0	0.0	0.0
	Per hour of operation	0	0.0	\$0.3
	Per occupant	0.1	2.1	\$30.0
Railroad Museum—Electricity				
	Per 1000 sq. ft.	0	0.0	\$0.2
	Per hour of operation	0	0.0	\$1.9
	Per occupant	1.8	20.1	\$911.3
Railroad Museum—Natural Gas				
	Per 1000 sq. ft.	0	0.0	0.0
	Per hour of operation	0	0.0	\$0.2
	Per occupant	0.2	3.7	\$82.7
Lomita Park Building—Electricity				
	Per 1000 sq. ft.	0	0.0	\$0.3
	Per hour of operation	0	0.0	\$0.3
	Per occupant	0.2	2.5	\$109.1
Lomita Park Building—Natural Gas				
	Per 1000 sq. ft.	0	0.2	\$2.5
	Per hour of operation	0	0.2	\$2.4
	Per occupant	4.2	78.3	\$811.2
Lomita Public Works Building—Electricity				
	Per 1000 sq. ft.	0	0.0	\$2.0
	Per hour of operation	0	0.1	\$5.5
	Per occupant	1.2	14.0	\$1,396.0
Hathaway Park (restroom) —Electricity				
	Per hour of operation	0	0.0	\$0.3
	Per occupant	1.1	12.4	\$670.0
Sector Average				
	Per 1000 sq. ft.	0	0.0	\$0.7
	Per hour of operation	0	0.1	\$2.7
	Per occupant	1.4	19.8	\$601.5
<b>Streetlights &amp; Traffic Signals</b>				
Traffic Signals/Controllers				
	Per streetlight account	3.1	34.5	\$ 825.7
Parking Lot Lighting				

<sup>10</sup> Source of data CACP software output.

	Per streetlight account	1.1	12.5	\$ 665.0
Park Lighting				
	Per streetlight account	12.7	143.2	\$ 2,561.5
Sector Average				
		4.0	45.3	\$ 1,009.7
<b>Vehicle Fleet</b>				
Community Services (Parking enforcement)				
	Per vehicle	6.5	89.7	\$ 1,797.3
City Parks & Recreation Dept.				
	Per vehicle	3.4	47.0	\$ 942.2
Public Works Dept. (Tree Dept.)				
	Per vehicle	6.1	83.6	\$ 1,573.1
Public Works Dept. (Street Dept.)				
	Per vehicle	4.7	63.9	\$ 1,239.5
Public Works Dept. (Water Dept.)				
	Per vehicle	6.3	86.3	\$ 1,729.8
Community Services (Housing Development)				
	Per vehicle	1.7	23.7	\$ 474.6
Sector Average				
	Per vehicle	4.5	62.6	\$ 1,239.9
<b>Employee Commute</b>				
Drove Alone				
	Per vehicle	0.8	10.4	n/a
Sector Average				
	Per vehicle	0.8	10.4	n/a

Sources of Emissions 2007		Equiv CO2 (MT)	Energy (MMBtu)	Cost (\$)
<b>Buildings and Facilities</b>				
City Hall—Electricity				
	Per 1000 sq. ft.	0	0.0	\$1.7
	Per hour of operation	0	0.3	\$13.4
	Per occupant	2.6	30.9	\$1,262.0
City Hall—Natural Gas				
	Per 1000 sq. ft.	0	0.0	\$0.1
	Per hour of operation	0	0.0	\$0.4
	Per occupant	0.2	3.4	\$42.1
Railroad Museum—Electricity				
	Per 1000 sq. ft.	0	0.0	\$0.2
	Per hour of operation	0	0.0	\$1.8
	Per occupant	1.4	16.3	\$865.7
Railroad Museum—Natural Gas				
	Per 1000 sq. ft.	0	0.0	\$0.0
	Per hour of operation	0	0.0	\$0.2
	Per occupant	0.2	4.5	\$91.3
Lomita Park Building—Electricity				
	Per 1000 sq. ft.	0	0.0	\$0.5
	Per hour of operation	0	0.0	\$0.5
	Per occupant	0.3	3.3	\$161.3
Lomita Park Building—Natural Gas				

	Per 1000 sq. ft.	0	0.2	\$2.1
	Per hour of operation	0	0.2	\$2.0
	Per occupant	3.7	70.3	\$677.1
<b>Lomita Public Works Building—Electricity</b>				
	Per 1000 sq. ft.	0	0	2.1
	Per hour of operation	0	0.1	5.8
	Per occupant	1.8	20.7	\$1470.1
<b>Hathaway Park (restroom) —Electricity</b>				
	Per hour of operation	0	0.0	0.2
	Per occupant	0.6	6.5	\$484.0
<b>Sector Average</b>				
	Per 1000 sq. ft.	0	0	0.8
	Per hour of operation	0	0.1	3.0
	Per occupant	1.5	21.6	\$671.9
<b>Streetlights &amp; Traffic Signals</b>				
<b>Traffic Signals/Controllers</b>				
	Per streetlight account	3.2	37.8	\$ 1,056.3
<b>Parking Lot Lighting</b>				
	Per streetlight account	1.2	13.7	\$ 809.0
<b>Park Lighting</b>				
	Per streetlight account	12.2	142.6	\$ 3,254.0
<b>Sector Average</b>				
		4.1	47.5	\$ 1,274.6
<b>Vehicle Fleet</b>				
<b>Community Services (Parking enforcement)</b>				
	Per vehicle	6.3	87.2	\$ 2,140.7
<b>City Parks &amp; Recreation Dept.</b>				
	Per vehicle	5.6	77.0	\$ 1,889.3
<b>Public Works Dept. (Tree Dept.)</b>				
	Per vehicle	5.1	69.8	\$ 1,534.9
<b>Public Works Dept. (Water Dept.)</b>				
	Per vehicle	7.4	102.1	\$ 2,506.5
<b>Sector Average</b>				
	Per vehicle	6.3	87.3	\$ 2,125.9
<b>Employee Commute</b>				
<b>Drove Alone</b>				
	Per vehicle	1.0	13.1	0.0
<b>Carpool</b>				
	Per vehicle	0.1	1.3	0.0
<b>Public Transit</b>				
	Per vehicle	0.0	0.4	0.0
<b>Sector Average</b>				
	Per vehicle	0.9	12.2	0.0

Sources of Emissions 1990		Equip CO2 (MT)	Energy (MMBtu)	Cost (\$)
<b>Buildings and Facilities</b>				
City Hall—Electricity				
	Per 1000 sq. ft.	0.0	0.1	\$ 1.7
	Per hour of operation	0.1	0.4	\$ 13.2
	Per occupant	5.3	38.2	\$1,242.5
City Hall—Natural Gas				
	Per 1000 sq. ft.	0.0	0.0	n/a
	Per hour of operation	0.0	0.0	n/a
	Per occupant	0.0	0.3	n/a
Railroad Museum—Electricity				
	Per 1000 sq. ft.	0.0	0.0	\$ 0.3
	Per hour of operation	0.0	0.1	\$ 2.6
	Per occupant	4.9	35.9	\$ 1,245.0
Railroad Museum—Natural Gas				
	Per 1000 sq. ft.	0.0	0.0	n/a
	Per hour of operation	0.0	0.0	n/a
	Per occupant	0.0	0.2	n/a
Lomita Park Building—Electricity				
	Per 1000 sq. ft.	0.0	0.0	\$ 0.6
	Per hour of operation	0.0	0.0	\$ 0.5
	Per occupant	0.0	0.1	\$ 187.0
Lomita Park Building—Natural Gas				
	Per 1000 sq. ft.	0.0	0.0	n/a
	Per hour of operation	0.0	0.0	n/a
	Per occupant	0.8	5.4	n/a
Hathaway Park (restroom) —Electricity				
	Per hour of operation	0.0	0.0	\$ 0.1
	Per occupant	0.7	5.1	\$ 275.0
Sector Average				
	Per 1000 sq. ft.	0.0	0.0	0.6
	Per hour of operation	0.0	0.1	2.2
	Per occupant	2.0	14.6	\$477.3
<b>Streetlights &amp; Traffic Signals</b>				
Traffic Signals/Controllers				
	Per streetlight account	6.3	45.5	\$ 1,238.8
Park Lighting				
	Per streetlight account	29.1	211.6	\$ 6,275.0
Sector Average				
		9.5	69.2	\$ 1,958.2

*Appendix E—Results from Employee Commute Survey*

An employee commute survey was conducted in 2008 in order to gather scope 3 GHG emissions from vehicle miles traveled by employees for the years 2005 and 2007. In 2007, there were approximately 50 full-time employees; however, only 27 employees took the survey resulting in a 54% response rate. For 2005, it was known that there were 50 full-time employees; however, only 17 employees that took the survey worked for the City in 2005 resulting in a 34% response rate. To capture the remaining VMT for the total number of employees that worked in those years, estimates were derived from the survey responses. Assumptions for the estimated portion include: employees drove alone in gasoline run passenger vehicles.<sup>11</sup>

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 aid in the creation of planning strategies to comply with SB 375.<sup>12</sup> For questions 4 and 13, the miles were grouped to identify individuals that were potential walkers, cyclists, carpools, public transit users, and vanpoolers: 0-1.9 (potential walkers), 2-3.9 miles (potential bicyclists; 4-8.9 miles (potential transit users); 9-19.9 (potential carpools); and 20-40 miles (long distance carpools and vanpools).

Based on information provided by respondents, a total of 50,799 vehicle miles were traveled by employees in 2007. According to the survey, only one employee carpooled to the worksite in a two-person carpool. The largest percentage (38%) of employees lived between 4 and 8.9 miles from the worksite (potential transit users);. Results from question 11 indicate that 25.9% of respondents are interested in participating in a ridesharing program.

In 2005, vehicle miles traveled totaled 29,665 and the largest portion of respondents (35%) lived within 4 to 8.9 miles from the worksite.

A. 2007 Survey Results<sup>13</sup>


1. Employee Information		
	Response Percent	Response Count
Name: <input type="text"/>	100.0%	27
Dept: <input type="text"/>	96.3%	26
	<i>answered question</i>	27
	<i>skipped question</i>	0

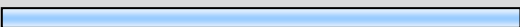

2. What city did you live in?		
	Response Percent	Response Count
Hermosa Beach, Lakewood, Lomita, Long Beach, North Torrance, Rancho Palos Verdes, Redondo Beach, San Pedro, Torrance		
City: <input type="text"/>	100.0%	27
ZIP Code: <input type="text"/>	100.0%	27
	<i>answered question</i>	27
	<i>skipped question</i>	0




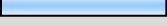
11 See appendix C for a description of the computational method.

12 See appendix F for description of the legislation.


13 Survey Monkey, an online survey website was utilized to conduct the survey and generate graphs [www.surveymonkey.com](http://www.surveymonkey.com)

3. Did you work for the city in 2007?		
	Response Percent	Response Count
Yes 	96.3%	26
No <input type="checkbox"/>	3.7%	1
<i>answered question</i>		27
<i>skipped question</i>		0

4. What was your workweek schedule?		
	Response Percent	Response Count
3/36 work week days off (2 days) <input type="checkbox"/>	0.0%	0
4/40 work week days off (1 day)	3.7%	1
<b>9/80 work week days off (1 day every other week)</b> 	<b>92.6%</b>	<b>25</b>
regular work week 	3.7%	1
Part time work	0.0%	0
Other (such as fire personnel compressed schedules)	0.0%	0
<i>answered question</i>		27
<i>skipped question</i>		0

5. On average, how many miles did you travel to work round trip each day?		
50,799 vehicle miles traveled represents a 54% response rate (91,436 estimated total VMT based on number of full-time employees)		
Commute distance range from worksite (one way)	Response Percent	Response Count
0-1 miles 	20%	5
2-3.9 miles 	27%	7
<b>4-8.9 miles</b> 	<b>38%</b>	<b>10</b>
9-19.9 miles 	15%	4
20-40 miles	0.0%	0
<i>Number of respondents that worked for the city in 2007</i>		26

6. On average, how many days a week did you...								
Day(s) a week								
	1	2	3	4	5	6	7	Response Count
Drive alone to work?	0.0% (0)	3.8% (1)	0.0% (0)	3.8% (1)	<b>80.8% (21)</b>	11.5% (3)	0.0% (0)	26
Carpool/Vanpool to work?	0.0% (0)	<b>100% (1)</b>	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1
Take public transportation to work?	<b>100% (1)</b>	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1
Bicycle to work?	<b>66.7% (2)</b>	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	33.3% (1)	3
Walk to work?	0.0% (0)	0.0% (0)	<b>100% (1)</b>	0.0% (0)	0.0% (0)	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
Noncommuting (such as 24 shift where you sleep at fire station)?	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
<i>answered question</i>								<b>27</b>
<i>skipped question</i>								<b>0</b>

7. If you carpooled/vanpooled, how many other people traveled with you on average?		
	Response Percent	Response Count
2 people 	<b>100%</b>	<b>1</b>
3 people	0%	0
<i>answered question</i>		<b>1</b>
<i>skipped question</i>		<b>26</b>

8. If you used Public Transportation, what is the name of the public transit system?	
	Response Count
Los Angeles MTA	1
<i>answered question</i>	
<b>1</b>	
<i>skipped question</i>	
<b>26</b>	




9. If you drove, what type of vehicle did you drive most often?		
	Response Frequency	Response Count
Auto-full size (e.g., Ford Taurus, Lincoln Town Car)	0.0%	0
Auto-mid size (e.g., Honda Accord, Toyota Camry)	40.7%	11
Auto-compact (e.g., Honda Civic, Toyota Corolla)	7.4%	2
<b>Light truck/SUV (e.g., Chevy Suburban, Ford Expedition)</b>	<b>51.9%</b>	<b>14</b>
Heavy truck (e.g., Tractor-trailer truck)	0.0%	0
Motorcycle	0.0%	0
Van	7.4%	2
City Vehicle	0.0%	0
Did not drive an automobile	0.0%	0
<i>answered question</i>		<b>27</b>
<i>skipped question</i>		<b>0</b>



10. For the vehicle you drove most often, what type of fuel does it use?		
	Response Percent	Response Count
Gasoline	96.3%	26
Diesel	0.0%	0
Ultra-low sulfur diesel	0.0%	0
Bio-diesel	0.0%	0
Hybrid	3.7%	1
ethanol	0.0%	0
electric	0.0%	0
LPG	0.0%	0
CNG	0.0%	0
Did not drive an automobile	0.0%	0
<i>answered question</i>		<b>27</b>
<i>skipped question</i>		<b>0</b>


11. Would you be interested in participating in a ridesharing program i.e., carpooling, vanpooling, walking, bicycling, or using public transit to commute to work?		
	Response Percent	Response Count
Yes	25.9%	7
No	74.1%	20
<i>answered question</i>		<b>27</b>
<i>skipped question</i>		<b>0</b>


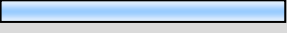




B. 2005 Survey Results

12. If you worked for the city in 2005, would you say your travel to work was about the same as 2007?		
	Response Percent	Response Count
Yes--Skip the 2005 section and go to the end and hit done. 	51.9%	14
No--Click next and complete information for 2005. 	11%	3
Other—Did not work for the city in 2005, skip the 2005 section and go to the end and hit done. 	37.0%	10
<i>answered question</i>		27
<i>skipped question</i>		0

13. What city did you live in?		
	Response Percent	Response Count
Hermosa Beach, Lakewood, Lomita, Long Beach, North Torrance, Rancho Palos Verdes, Redondo Beach, San Pedro, Torrance		
City: 	100.0%	3
ZIP Code: 	100.0%	3
<i>answered question</i>		3
<i>skipped question</i>		24

14. What was your workweek schedule?		
	Response Percent	Response Count
3/12 work week (3-4 days off)	0.0%	0
4/40 work week (1 day off)	0.0%	0
9/80 work week days off (1 day every other week)	0.0%	0
<b>Regular work week (40 hours)</b> 	<b>100.0%</b>	<b>3</b>
Part time work	0.0%	0
Other (such as fire personnel compressed schedules)	0.0%	0
<i>answered question</i>		3
<i>skipped question</i>		24

15. On average, how many miles did you travel to work round trip each day?		
29,665 vehicle miles traveled represents a 34% response rate (86,029 estimated total VMT based on number of full-time employees)		
Commute distance range from worksite (one way)	Response Percent	Response Count
0-1 miles 	29%	5
2-3.9 miles 	24%	4
<b>4-8.9 miles</b> 	<b>35%</b>	<b>6</b>
9-19.9 miles 	12%	2
20-40 miles	0.0%	0
<i>Number of respondents that worked for the city in 2005</i>		17

16. On average, how many days a week did you...								
Day(s) a week								
	1	2	3	4	5	6	7	Response Count
Drive alone to work?	33.3% (1)	0.0% (0)	0.0% (0)	33.3% (1)	33.3% (1)	0.0% (0)	0.0% (0)	3
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?	100% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	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
Noncommuting (such as 24 shift where you sleep at fire station)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0
<i>answered question</i>								3
<i>skipped question</i>								24

17. If you carpooled/vanpooled, how many other people traveled with you on average?		
	Response Percent	Response Count
2 people	0.0%	0
3 people	0.0%	0
<i>answered question</i>		0
<i>skipped question</i>		27

18. If you used Public Transportation, what is the name of the public transit system?	
	Response Count
	0
<i>answered question</i>	
0	
<i>skipped question</i>	
27	

19. 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)	0.0%	0
<b>Auto-mid size (e.g., Honda Accord, Toyota Camry)</b> <input type="text"/>	<b>33.3%</b>	<b>1</b>
<b>Auto-compact (e.g., Honda Civic, Toyota Corolla)</b> <input type="text"/>	<b>33.3%</b>	<b>1</b>
<b>Light truck/SUV (e.g., Chevy Suburban, Ford Expedition)</b> <input type="text"/>	<b>33.3%</b>	<b>1</b>
Heavy truck (e.g., Tractor-trailer truck)	0.0%	0
Motorcycle	0.0%	0
Van	0.0%	0
City Vehicle	0.0%	0
Did not drive an automobile	0.0%	0
<i>answered question</i>		<b>3</b>
<i>skipped question</i>		<b>24</b>

20. For the vehicle you drove most often, what type of fuel does it use?		
	Response Percent	Response Count
<b>Gasoline</b> <input type="text"/>	<b>100%</b>	<b>3</b>
Diesel	0.0%	0
Ultra-low sulfur diesel	0.0%	0
Bio-diesel	0.0%	0
Hybrid	3.7%	1
ethanol	0.0%	0
electric	0.0%	0
LPG	0.0%	0
CNG	0.0%	0
Did not drive an automobile	0.0%	0
<i>answered question</i>		<b>3</b>
<i>skipped question</i>		<b>24</b>

*Appendix F—Climate Change Legislation and Agreements*

For reference, listed below are some of the key climate change policies that have been adopted at the international, national and State levels.<sup>14</sup>

**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 by stimulating 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 environmental effects 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 the Kyoto Protocol target of a seven percent reduction in greenhouse gas emissions below 1990 levels by 2012. The agreement was initiated by Seattle Mayor Greg Nickels.

**AB 1493 Pavley, 2002** – Required the State Air Resources Board to develop and adopt

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<sup>14</sup> 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>.

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 (UNFCCC) 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 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<sup>15</sup>*

Btu	British thermal unit
CH <sub>4</sub>	methane
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide equivalent
FE	Fuel Economy
GHG	greenhouse gas
HFC	hydrofluorocarbon
MMBtu	1 million British thermal unit
NO <sub>x</sub>	oxides of nitrogen
N <sub>2</sub> O	nitrous oxide
PFC	perfluorocarbon
PM <sub>10</sub>	particulate matter smaller than ten microns in diameter
SF <sub>6</sub>	sulfur hexafluoride
SO <sub>x</sub>	sulfur oxides
VOC	volatile organic compounds

*Appendix H—Glossary of Terms<sup>16</sup>*

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	CO <sub>2</sub> 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 (CO <sub>2</sub> )	The most common of the six primary GHGs, consisting of a single carbon atom and two oxygen atoms, and providing the reference point

<sup>15</sup> Abbreviations and acronyms are from the Local Government Operations Protocol, version 1.0

<sup>16</sup> Definition are from the Local Government Operations Protocol, version 1.0 and ICLEI's Cities for Climate Protection Milestone Guide.

for the GWP of other gases. (Thus, the GWP of CO<sub>2</sub> is equal to 1.)

Climate Action Plan (CAP)	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.
CO <sub>2</sub> equivalent (CO <sub>2</sub> e)	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 (NO <sub>x</sub> ), volatile organic compounds (VOCs), carbon monoxide (CO), sulfur oxides (SO <sub>x</sub> ), 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 CO <sub>2</sub> 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 CO <sub>2</sub> emitted per million Btus of coal combusted, or metric tons of CO <sub>2</sub> 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 (CO <sub>2</sub> ) 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 (CO <sub>2</sub> ), nitrous oxide (N <sub>2</sub> O), methane (CH <sub>4</sub> ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF <sub>6</sub> ).
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 (CH <sub>4</sub> )	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 (N <sub>2</sub> O)	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 a very high GWP 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 CO <sub>2</sub> 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 (SF <sub>6</sub> )	One of the six primary GHGs, consisting of a single sulfur atom and 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 <sup>5</sup> ) Btu.