City of Torrance

Municipal Greenhouse Gas Emissions Inventory Report

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City of Torrance GHG Emissions Inventory Report

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How to read this report:

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

I. Executive Summary

A. Project Background

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

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

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

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

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

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

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

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

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

B. Purpose of Conducting a GHG Emissions Inventory

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

C. Scope of the GHG Emissions Inventory

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

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

The City gathered information from a variety of sources, including consumption data from utility companies, fuel data

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

6 See appendix F for descriptions on climate change legislation.

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

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

D. Inventory Methodology

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

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

E. Key Highlights and Findings

- The City of Torrance generated approximately 19,556 metric tons of CO_2e in the baseline year, 2005; this amount is equivalent to the GHG emissions generated by the electricity use of 2,540 homes for one year.[14]
- There was an overall 3.9% decrease in GHG emissions between the baseline year 2005 and the interim year 2007. This was largely due to scope 3 transportation related sources from the employee commute sector.

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

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

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

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

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

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

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

- Emissions resulting from electricity use decreased 1.4%, while emissions resulting from natural gas consumption increased 9.9% between the years 2005 and 2007.
- Emissions resulting from City Fleet vehicles increased 7.5% and emissions related to Transit Fleet vehicles decreased 5% between the years 2005 and 2007.
- Under a business-as-usual scenario, the City can expect emissions to rise to 19,503 metric tons of CO2e by 2012 that is equivalent to the annual GHG emissions from 3,729 passenger vehicles; and 19,985 metric tons of CO2e by 2015, equivalent to the annual GHG emissions from 3,821 passenger vehicles if the City does nothing to reduce its emissions.

E. Future Steps

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

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

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

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

II. Local Government Profile Information

Local Government Description

The City of Torrance is a Charter City operating under the Council/City Manager form of government, with an elected six member Council and Mayor. In addition, Torrance is recognized as a "full service city". Torrance does not contract out for major city services as do many other local cities, but instead has its own Police and Fire Departments as well as a library system, Public Works, Community Services and Community Development Departments. Besides the services normally provided by City government, Torrance operates a number of "businesses", including an airport, refuse system, water company, cable television system and transit system.

The City has several Commissions, composed of interested citizens, who act as advisory bodies to the Council in their areas of expertise. The Environmental Quality and Energy Conservation Commission was established in the early seventies in part to deal with matters such as the oil shortages, oversight of the oil wells in the City and energy conservation. Over the years, the Environmental Quality Commission has expanded its scope to include a number of environmental initiatives, including the Cool cities program, Green Building, Solar Power and environmental outreach, including the City's first Environmental Fair in 2008.

Internally, the City has focused on greening its facilities and operations, including retrofitting light fixtures, moving to energy star energy efficient equipment, making use of hybrid, biodiesel and propane fueled vehicles in the City fleet and incorporating recycling and recycled materials into day to day office practices. The City signed the Mayor's Agreement in April of 2007, beginning our focus on becoming a "Cool City" and reducing our carbon footprint. Since that time, the City renewed its Strategic Plan. In response to citizen input, a new priority entitled "Stewardship of the Environment" was added to the Plan, focusing on green initiatives throughout the City. The General Plan is also undergoing an update, and it reflects an enhanced awareness of the environment and sustainability both in the built environment and in open space, energy and water conservation, air quality and storm water programs.

The City is a member of the Couth Bay Council of Governments Green Task Force and has formed an internal Green Action Team composed of City Employees from all areas of the City who meet together and discuss programs and projects to help the City in its quest to become ever more environmentally friendly. One of the first accomplishments of the Team was an educational PowerPoint presentation discussing Green Building and detailing all of the green initiatives throughout the City, which has been presented to several Commissions and Homeowner groups.

The City of Torrance takes its responsibility to future generations seriously, and is diligently and creatively working to make the City a better and more environmentally friendly place.

Local Government History

Jared Sidney Torrance founded the City of Torrance in 1912 when his land development company purchased 2,791 acres from the Dominguez Estate Company. This land was subdivided to provide housing for an initial population of 500 people with a vision of a model garden-industrial community of both residential and industrial uses. This vision was designed by the Olmsted Brothers, famed for their work in landscape architecture and by the renowned Irving Gill as chief architect. The original Y-shaped City plan was designed to separate the industrial areas from the residential, with the base of the Y, El Prado Avenue, aligned to frame a vista of Mt. Baldy and the San Gabriel Mountains in the distance. Because of the involvement of Irving Gill in the creation of Torrance, there a re several iconic Gill structures that help to link Torrance to its past, including the Gill Bridge over Torrance Boulevard and the Pacific Electric Depot, now home to the popular Depot restaurant.

By 1921 when the City was incorporated it had a population of approximately 1,800 residents. Shortly after incorporation, oil was discovered in Torrance, transforming the City from a small town to a major industrial area. As a major oil-producing region, Torrance was once dotted with thousands of oil wells and derricks and the Mobil refinery, established in the City in 1929, is still responsible for much of Southern California's gasoline supply.

In the early 1900's, the City was already home to an important hub and shop for the Pacific Electric Railway, or Red Car, and the ease of access into the City by the Red Cars provided additional impetus for industrial development along the rail lines. Today, Torrance continues to be a preferred location for transportation, with U.S. headquarters for both Honda and Toyota Motors located in the City.

Torrance is also an important commercial hub for the South Bay as home to the Del Amo Financial Center and the Del Amo Fashion Center, which is one of the largest malls in the United States.

The City has strived to realize Jared S. Torrance's vision of a city with an ideal balance as evidenced in the City slogan: "A balanced City: Industrial, Residential Commercial." Today Torrance is considered to be a highly desirable place to live and work, reflected in its proximity to major employers as well as its coastal location. The City, which covered about 3.8 square when first incorporated in 1921, now encompasses 21 square miles, with a population of close to 149,000 residents.

Primary Services

Department	Primary Services
Administration	General Administration including City Attorney, City Clerk, City Manager, City Council, City Treasurer, Human Resources and Finance.
Community Development Department	Responsible for the management of all City building and planning activities including land use entitlements, building permits, environmental, redevelopment, engineering permits and records, GIS, mapping and survey information, transportation planning, general plan and housing activities.
Community Services Department	Responsible for the management of all City Parks, Cultural, Library, and Recreation Services. The Mission of the department is to enrich the community through the provision of recreational, cultural and education opportunities for persons of all ages.
Department of General Services	Provides support to City departments by providing Airport Administration, Building Maintenance, Central Services, City Yard Management, Cultural Arts Center Administration, Custodial, Fleet Services, Graffiti Abatement Program, HVAC / Electrical, Warehouse.
Fire Department	Dedicated to protecting the community and providing for Life Safety, Environmental Protection, and Property Conservation through Education, Hazard Reduction, and Emergency Response.
Communications and Information Technology	Responsible for phone, radio and computer services and technical support throughout the City Hall complex as well as all outlying City facilities.
Police	The police force understands that keeping a community safe is based on the support and involvement of the community; thus, they constantly strive to enhance relationships with the community and to provide excellence in policing through teamwork.
Public Works	A service department to resident and businesses as well as other City departments, Public Works includes street maintenance, engineering, water, refuse, street sweeping, sewers and streetscape and trees. The Department strives to remain flexible in order to meet the ever changing needs of the

	residents, businesses, and other City departments.
Transit	Torrance Transit has operated weekday service on eight fixed-routes continuously since 1940. Three of the routes provide service within the City of Torrance; five routes provide regional connections to Los Angeles, Long Beach, Metro Blue Line Artesia Station, and Los Angeles International Airport. Service is also provided to numerous other communities within the South Bay region of Los Angeles County.

III. Municipal Emissions Inventory Results

A. Inventory Introduction and Results

Depicted in this section are tables and graphs that represent and illustrate an approximation of the GHG emissions levels for the three years of data collected. As mentioned in the executive summary, the data findings are expressed in CO_2-equivalent, which is an estimated sum or roll-up number for GHGs with different global warming potential,[15] to make it easier to review, plan, and set targets. Appendix A gives a detailed account of individual GHGs separately, by scope, for the purpose of establishing good reporting habits. Based on LGOP reporting standards, GHG emissions are organized according to their scope.[16] Scopes are determined based on what control approach[17] a local government chooses to define its boundaries. The LGOP recommends an operational approach for local governments wherein a city defines its scopes by what they own and operate. In this way, the City can account for direct and indirect emissions separately.

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

Cities also have a level of control over activities that are associated with indirect emissions, known as scope 2. These emissions are associated with the consumption of purchased electricity, steam, heating, or cooling.[18] The difference between the scopes is that these sources are owned or controlled by another entity. Still, a city will want to develop measures to reduce emissions within this scope. Indirect emission are also associated with scope 3, however scope 3 emissions are related to activities that the City does not own or operate, such as emissions from contracted services, employee commuting, or waste disposal. As an ICLEI member, scope 3 reporting is considered optional, but good to include as it may be policy relevant. City staff decided what data to include for contract provides (Scope 3 emissions) based on whether the information was obtainable, reliable, and relevant.

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

2005

Baseline Year

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

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

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

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

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

In 2005, the City of Torrance GHG emissions totaled 19,556 metric tons of CO_2e. This number includes both direct and indirect sources of emissions, as shown in Table 1. This total is equivalent to the GHG emissions emitted from the electricity use of 2,540 homes for one year. Looking at the scopes within the table, the largest portion 54.4% (scope 1 total) were emissions generated from a combination of natural gas use for buildings and facilities, generators, and fuels for the City and Transit vehicles. Emissions emitted from electricity use accounted for 33% (scope 2 total) of the total emissions. The smallest portion 12.6% (scope 3 total) were emissions due to a combination of employee commuting and waste (refuse collected from City bins).

Energy/Fuel use and cost information has been listed for the purpose of planning and tracking energy measures' cost effectiveness. During 2005, the City of Torrance used 21,314,982 kWh of electricity at a cost of $3,087,487.32. In this same year, the City consumed 279,738 therms of natural gas costing $279,543.

Table 1. Municipal Inventory Summary 2005[19]

Torrance Municipal GHG Emissions 2005						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities Total	**1,490**	**7.6%**	**Natural gas**	**279,738 therms**	**$279,543**	**27,972**
Civic Center Facilities	1,265		Natural gas	237,771 therms	$231,771	23,777
Fire Station Facilities	57		Natural gas	10,613 therms	$12,665	1,061
Library Facilities	133		Natural gas	25,006 therms	$26,053	2,500
Parks & Recreations	35		Natural gas	6,348 therms	$9,054	634
Emergency Generators	2	0.0%	Diesel	244 gal	-	50
Airport Facilities						
Airport Facilities	21	0.1%	Natural gas	3,966 therms	$4,284	397
Emergency Generators	1	0.0%	Diesel	73 gal	-	10
City Vehicle Fleet						
City Vehicle Fleet[20]	**3,638**	**18.6%**	-	-	n/a	**50,013**
	2,221		Gasoline	246,835 gal	-	30,664
	1,417		Diesel	139,540 gal	-	19,349
Transit Fleet						
Transit Fleet[21]	5,500	28.1%	Diesel	541,647 gal	n/a	75,113
Total Scope 1 Emissions	**10,652**	**54.4%**	**-**	**-**	**$283,827**	**153,555**
Scope 2 Emissions						
Buildings & Facilities[22]						
Buildings & Facilities Total	**3,316**	**17%**	**Electricity**	**10,977,367 kWh**	**$1,472,689.53**	**36,955**
Civic Center Facilities	2,243		Electricity	7,387,825 kWh	$897,537.13	25,217
Fire Station Facilities	187		Electricity	613,873 kWh	$79,255.59	2,094
Library Facilities	352		Electricity	1,162,316 kWh	$157,198.01	3,667
Parks & Recreations	534		Electricity	1,813,353 kWh	$338,698.80	5,977

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

20 See appendix D, Emissions Data, to review fuel emissions per department.

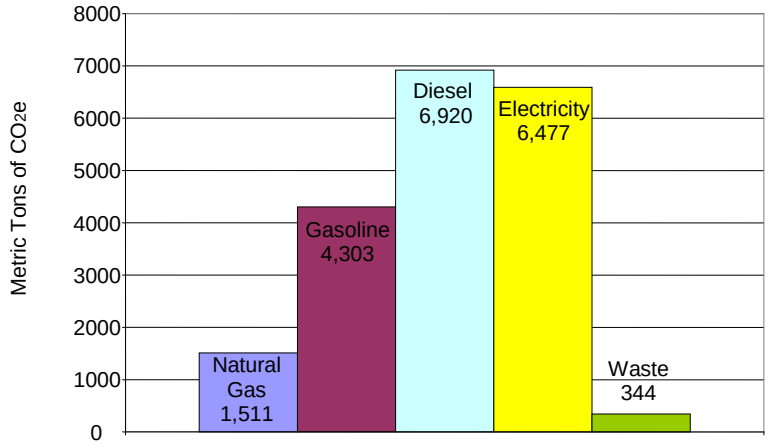
21 Approximately 54 Torrance buses were included in this total.

22 In some cases, building & facility accounts include lights and water delivery devices located on the same metered account.

Sector	MT CO_2e	Percent CO_2e (% CO_2e)	Source	Energy/Fuel Use	Energy/Fuel Use Cost	Energy Equivalent (MMBtu)
Airport Facilities						
Airport Facilities	201	1%	Electricity	597,866 kWh	$81,842.72	2,040
Streetlights & Traffic Signals						
Traffic Signals/Controllers	165	0.8%	Electricity	542,616 kWh	$71,893.95	1,852
Streetlights[23]	2,276	11.6%	Electricity	7,489,521 kWh	$1,231,328.62	25,562
Other Outdoor Lighting	2	0.0%	Electricity	6,710 kWh	$1,149.41	23
Water Delivery						
Sprinkler/Irrigation Control	3	0.0%	Electricity	11,515 kWh	$14,981.91	39
Water Pumps/ Pump Stations	56	0.3%	Electricity	184,378 kWh	$28,282.87	629
Storm Water Pumps	46	0.2%	Electricity	151,744 kWh	$38,514.70	518
Wells/ MWD/ Booster Stations	412	2.1%	Electricity	1,353,265 kWh	$146,803.61	4,619
Total Scope 2 Emissions	**6,477**	**33%**	**-**	**21,314,982 kWh**	**$3,087,487.32**	**72,237**
Scope 3 Emissions						
Employee Commute						
Employee Commute	**2,083**	**10.8%**	**-**	**4,234,596 VMT**	n/a	**28,717**
	2,082		Gasoline	4,234,326 VMT	-	28,711
	1		Diesel	270 VMT	-	6
Solid Waste						
Waste	344	1.8%	-	1,358 tons	n/a	n/a
Total Scope 3 Emissions	**2,427**	**12.6%**	-	-	-	**28,717**
Total Emissions	**19,556**	**100%**	-	**-**	**$3,371,314**	**254,509**

Figure 1 illustrates emissions by source. Diesel was the highest source of emissions followed by electricity and gasoline. Waste resulted in the lowest source of emissions. It was estimated that 1,358 tons of waste generated by city operated and owned facilities was sent to a landfill. A breakdown of the waste composition can be found in appendix D, based on a solid waste characterization study for public administration from the California Integrated Waste Management Board website.

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



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

Figures 2 and 3 illustrate a percentage breakdown of each sector from Table 1. ICLEI asks its members to report on scopes 1 and 2 where scope 3 is optional; therefore, data is organized to reflect this criteria. Figure 2 shows all scopes, where as Figure 3 concentrates only on scopes 1 and 2 – functions that a city has more influence on. Figure 2 indicates 1.8% of emissions are from waste and 10.8% are the result of employee commuting. While a city may not have the same degree of control over these sources, there is still an opportunity to create initiative programs or policies that will engender climate-friendly practices. Figure 3 is comprised of natural gas, fuels, and electricity generated emissions. Electricity in scope 2 accounts for 37.9% of emissions and scope 1 emissions from fuel and natural gas sources accounts for the remaining 62.1% of emissions.

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

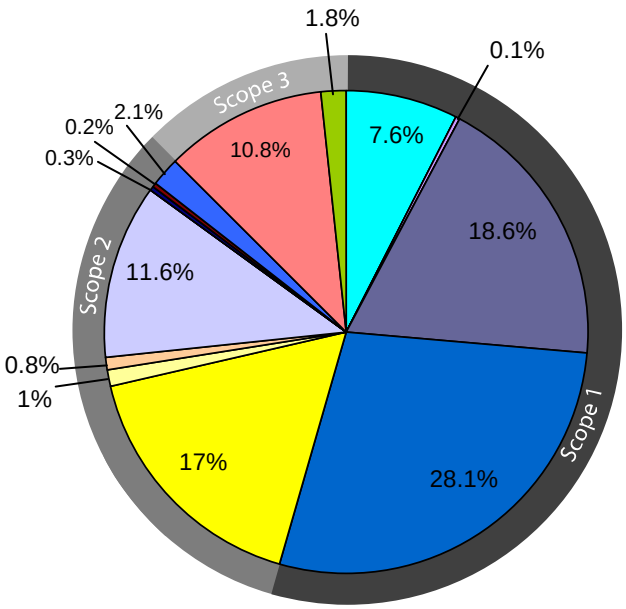
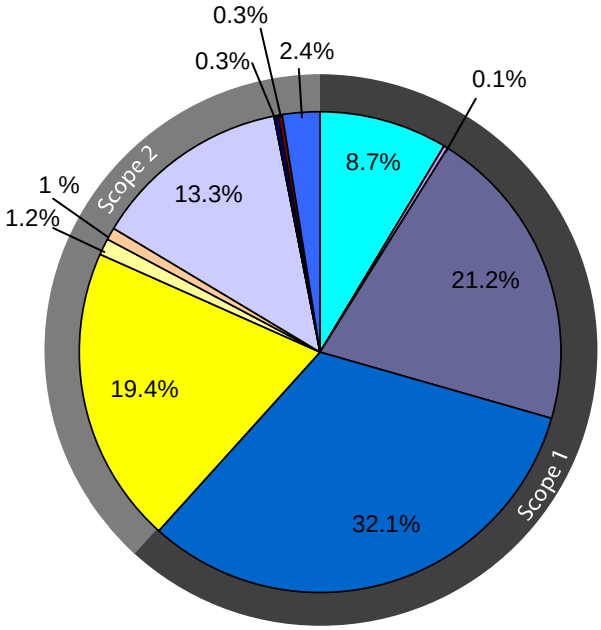
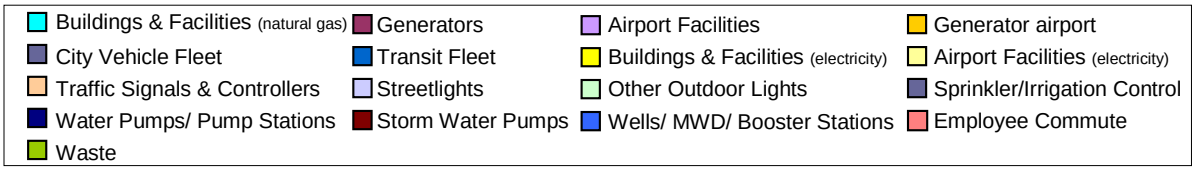


Figure 3. Emissions by Sector 2005
(including only direct and indirect sources from scopes 1 and 2)





2007

Interim Year

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

In 2007, the City of Torrance GHG emissions totaled 18,784 metric tons of CO_2e including both direct and indirect sources of emissions—this number is equivalent to the emissions produced from 2,112,936 gallons of gasoline consumed. The year 2007 represents a 3.9% decrease in emissions from the baseline year. This was largely due to

scope 3 transportation related sources from the employee commute sector. Looking at the scopes within the table, emissions generated from natural gas and fuel sources accounted for 57.5% (scope 1 total) of the emissions inventoried in 2007. Emissions from electricity use decreased from the baseline year contributing 33.9% (scope 2 total) to the total emissions. The smallest portion of emissions came from a combination of employee commuting and waste at 8.6% (scope 3 total).

In 2007, the City of Torrance used 21,723,279 kWh of electricity costing approximately $3,583,411. In this same year, the City used 310,236 therms of natural gas at a cost of $274,141.

Table 2. Municipal Inventory Summary 2007

Torrance Municipal GHG Emissions 2007						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities Total	**1,648**	**8.8%**	**Natural gas**	**310,236 therms**	**$274,141**	**31,019**
Civic Center Facilities	1,388		Natural gas	261,274 therms	$223,195	26,121
Fire Station Facilities	59		Natural gas	11,224 therms	$12,631	1,123
Library Facilities	148		Natural gas	27,998 therms	$26,204	2,800
Parks & Recreations	53		Natural gas	9,740 therms	$12,111	975
Emergency Generators	2	0.0%	Diesel	244 gal	n/a	50
Airport Facilities						
Airport Facilities	14	0.1%	Natural gas	2,628 therms	$2,813	263
Emergency Generators	1	0.0%	Diesel	73 gal	-	10
City Vehicle Fleet						
City Vehicle Fleet[24]	**3,911**	**20.8%**	-	-	n/a	**53,882**
	2,355		Gasoline	262,537 gal	-	32,570
	16		CNG	2,226 gal equiv.	-	277
	1,540		Diesel	151,688 gal	-	21035
Transit Fleet						
Transit Fleet[25]	5,221	27.8%	Diesel	514,207 gal	-	71,308
Total Scope 1 Emissions	**10,797**	**57.5%**	**-**	**-**	**$276,954**	**156,532**
Scope 2 Emissions						
Buildings & Facilities[26]						
Buildings & Facilities Total	**3,225**	**17.2%**	**Electricity**	**10,981,392 kWh**	**$1,639,304**	**37,478**
Civic Center Facilities	2,187		Electricity	7,472,220 kWh	$1,011,453	25,503
Fire Station Facilities	159		Electricity	543,271 kWh	$73,779	1,854
Library Facilities	355		Electricity	1,179,594 kWh	$175,453	4,025
Parks & Recreations	524		Electricity	1,786,307 kWh	$378,619	6,096
Airport Facilities						
Airport Facilities	186	1.0%	Electricity	585,256 kWh	$87,482	2,260

24 See appendix D, Emissions Data, to review fuel emissions per department.

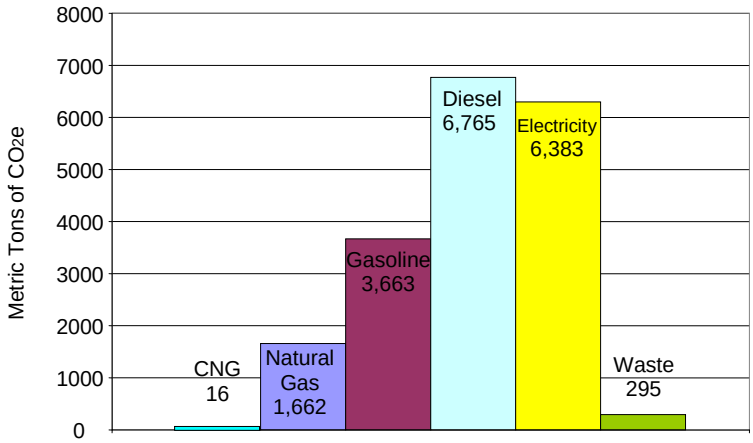
25 Approximately 53 Torrance buses were included in this total.

26 In some cases, building & facility accounts include lights and water delivery devices located on the same metered account.

Sector	MT CO_2e	Percent CO_2e (% CO_2e)	Source	Energy/Fuel Use	Energy/Fuel Use Cost	Energy Equivalent (MMBtu)
Streetlights & Traffic Signals						
Traffic Signals/Controllers	151	0.8%	Electricity	517,244 kWh	$77,382	1,765
Streetlights[27]	2,205	11.7%	Electricity	7,533,579 kWh	$1,530,083	25,712
Other Outdoor Lighting	2	0.0%	Electricity	5,139 kWh	$1,403	18
Water Delivery						
Sprinkler/Irrigation Controls	2	0.0%	Electricity	8,096 kWh	$15,342	28
Water Pumps/ Pump Stations	60	0.3%	Electricity	206,751 kWh	$33,033	706
Storm Water Pumps	24	0.1%	Electricity	82,184 kWh	$32,419	280
Wells/ MWD/ Booster Stations	528	2.8%	Electricity	1,803,638 kWh	$166,963	6,156
Total Scope 2 Emissions	**6,383**	**33.9%**	**-**	**21,723,279 kWh**	**$3,583,411**	**74,403**
Scope 3 Emissions						
Employee Commute						
Employee Commute	**1,309**	**7%**	**-**	**2,737,400 VMT**	n/a	**18,087**
	1,308		Gasoline	2,736,947 VMT	-	18,077
	1		Diesel	453 VMT	-	10
Solid Waste						
Waste	295	1.6%	-	1,164 tons	n/a	n/a
Total Scope 3 Emissions	**1,604**	**8.6%**	-	-	-	**18,087**
Total Emissions	**18,784**	**100%**	-	-	**$3,860,365**	**249,022**

Figure 4 shows an increase in emissions from natural gas sources. Emissions from electricity, fuels, and natural gas decreased. CNG vehicles were added to the fleet in this year and therefore included in the inventory as a source of emissions. It was estimated that 1,164 tons of waste generated by city operated and owned facilities was sent to a landfill.

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



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

Similar to 2005, Figures 5 and 6 illustrate a percentage breakdown of each sector from Table 2. Figure 5 indicates 1.6% of emissions are from waste and 7% of emissions resulted from employee commuting. Figure 6 shows electricity in scope 2 accounts for 37.2% of emissions and fuels and natural gas from scope 1 contributed to the remaining 62.8% of emissions.

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

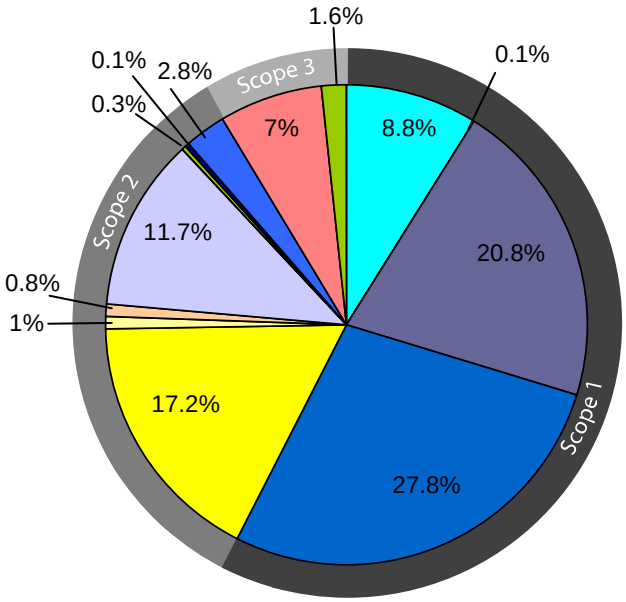
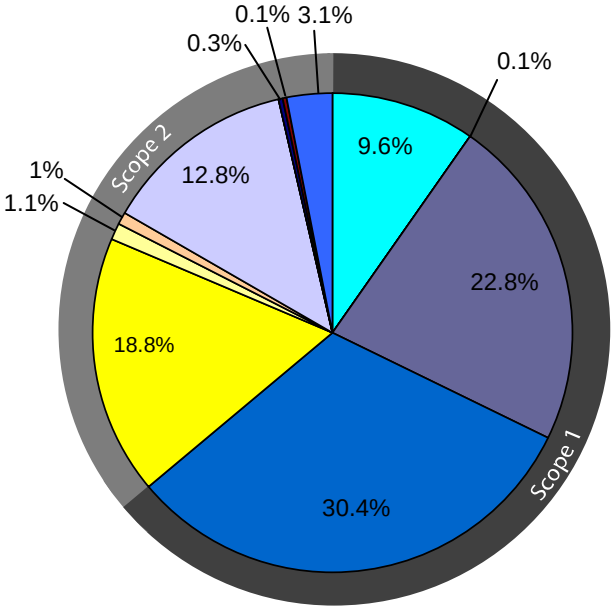
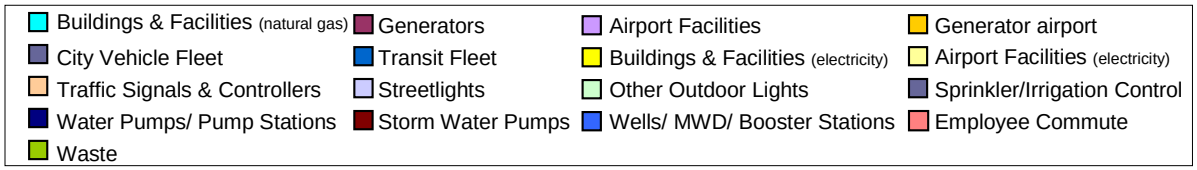


Figure 6. Emissions by Sector 2007
(including only direct and indirect sources from scopes 1 and 2)





1990

Historical Year

Looking back to 1990, this year is a benchmark for several key pieces of climate change legislation, such as the Kyoto Protocol as mentioned in the executive summary. Located in appendix F are brief descriptions pertaining to some of the historical policies that have set 1990 as a benchmark for reducing GHG emissions. Data was collected for this year to review, where possible, the historical GHG levels; however, it was difficult to find accurate data, with the exception of electricity, and "back-casting" or creating a rough estimate of emissions is not recommended in the LGOP.[28] Therefore comparisons have been made in areas where data is reliable. As suggested in the protocol, it is better to concentrate on developing a high-quality, comprehensive inventory with reliable data rather then back-casting to 1990. As previously stated the reduction target should be set from 2005 levels, but the 1990 information has been included to make GHG level comparisons with recent years where possible.

Based on the data that was available for 1990, the GHG emissions identified totaled 9,734 metric tons of CO2e, as

28 See LGOP inventory guidelines, page 12.

shown in Table 3. This number is equivalent to the annual GHG emissions from 1,861 passenger vehicles. Looking at the scopes within the table, emissions generated from natural gas contributed 0.1% (scope 1 total) to the total emissions.[29] Emissions emitted from electricity use accounted for 73.4% (scope 2 total) of the total. Emissions generated by waste and employee commuting contributed 26.5% (scope 3 total) to the remaining total.

Table 3. Municipal Inventory Summary 1990

Torrance Municipal GHG Emissions 1990						
Sector	**MT CO_2e**	**Percent CO_2e (% CO_2e)**	**Source**	**Energy/Fuel Use**	**Energy/Fuel Use Cost**	**Energy Equivalent** (MMBtu)
Scope 1 Emissions						
Buildings & Facilities						
Buildings & Facilities	12	0.1%	Natural gas	2,176 therms	n/a	218
Total Scope 1 Emissions	**12**	**0.1%**	**-**	**-**	**-**	**218**
Scope 2 Emissions						
Buildings & Facilities[30]						
Buildings & Facilities Total	**5,091**	**52.3%**	**Electricity**	**10,829,457 kWh**	**$1,041,012.91**	**36,963**
Civic Center Facilities	3,477		Electricity	7,397,380 kWh	$674,082.81	25,248
Fire Station Facilities	266		Electricity	565,920 kWh	$58,085.91	1,931
Library Facilities	659		Electricity	1,405,562 kWh	$137,765.83	4,797
Parks & Recreations	689		Electricity	1,460,595 kWh	$171,078.36	4,987
Airport Facilities						
Airport Facilities	175	1.8%	Electricity	371,773 kWh	$42,975	1,269
Streetlights & Traffic Signals						
Traffic Signals/Controllers	907	9.3%	Electricity	1,929,799 kWh	$203,445.09	6586
Streetlights	1	0.0%	Electricity	3,067 kWh	$451.36	451
Other Outdoor Lighting	9	0.1%	Electricity	18,528 kWh	$2,285.23	2,285
Water Delivery						
Sprinkler/Irrigation Controllers	4	0.0%	Electricity	9,256 kWh	$7,852.34	32
Water Pumps/ Pump Stations	58	0.6%	Electricity	123,364 kWh	$13,504.95	421
Storm Water Pumps	27	0.3%	Electricity	58,030 kWh	$7,336.56	198
Wells/ MWD/ Booster Stations	878	9.0%	Electricity	1,868,048 kWh	$187,090.66	6,376
Total Scope 2 Emissions	**7,150**	**73.4%**	**-**	**15,211,322 kWh**	**$1,505,954.10**	**54,581**
Scope 3 Emissions						
Employee Commute						
Employee Commute	**2,128**	**21.9%**	**-**	**3,737,913 VMT**	n/a	**29,091**
	2,126		Gasoline	3,736,872 VMT	-	29,066
	2		Diesel	1,041 VMT	-	25
Solid Waste						
Waste	444	4.6%	-	1,568 tons	-	n/a
Total Scope 3 Emissions	**2,572**	**26.5%**	-	-	-	**29,091**
Total Emissions	**9,734**	**100%**	-	**-**	**-**	**83,890**

29 Southern California Gas no longer possesses official customer records going back to 1990 due to document retention policies. SoCalGas located some records that go back to 1990 which was the basis for the gas information provided for 1990.

30 In some cases, building & facility accounts include lights and water delivery devices located on the same metered account.

B. Emissions Trends

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

Between a 15-year span from 1990 to 2005 electricity emissions have decreased 9.4%. The percentage change for natural gas has not been listed since only casual records could be found for 1990 and was therefore difficult to compare with 2005 where complete records existed. Emissions from employee commuting decreased 2% and 50% respectively.[31] Emissions resulting from refuse decreased 22.5%.

From 2005 to 2007 overall emissions from electricity use decreased 1.4%. Emissions from natural gas use increased by 9.9% (refer to appendix D, to review energy use per building). City Fleet sources from gasoline and diesel increased by 6% and 8.6% respectively. Transit Fleet fuel sources decreased 5%. Employee commute emissions from gasoline sources decreased 37.1% and emissions from waste decreased 14.2%.

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

Electricity	**MTCO_2e 1990**	**MT CO_2e 2005**	**Percentage Change**	**MT CO_2e 2005**	**MT CO_2e 2007**	**Percentage Change**
Buildings & Facilities	5091	3316	-34.8%	3316	3225	-2.7%
Airport Facilities	175	201	+14.8%	201	186	-7.4%
Traffic Signals & Controllers	907	165	-81.8%	165	151	-8.4%
Streetlights	1	2276	-	2276	2205	-3.1%
Other Outdoor Lighting	9	2	-77.7%	2	2	-
Sprinkler/Irrigation Controllers	4	3	-25%	3	2	33.3%
Water Pumps/Pump Stations	58	56	-3.4%	56	60	+7.1%
Storm Water Pumps	27	46	+70.3%	46	24	-47.8%
Wells/ MWD/ Booster Stations	878	412	-53%	412	528	+28.1%
Total	**7150**	**6477**	**-9.4%**	**6477**	**6383**	**-1.4%**
Natural Gas						
Buildings & Facilities	12	1490	-	1490	1648	+10.6%
Airport Facilities	-	21	-	21	14	-33.3%
Total	-	**1511**	-	**1511**	**1662**	**+9.9%**
Fuel						
Gasoline, City Vehicle Fleet	-	2221	-	2221	2355	+6.0%
Diesel, City Vehicle Fleet	-	1417	-	1417	1540	+8.6%
CNG, City Vehicle Fleet	-	-	-	-	16	-
Diesel, Transit Fleet	-	5500	-	5500	5221	-5.0%
Diesel, Generators	-	2	-	2	2	-
Diesel, Airport Generators	-	1	-	1	1	-
Gasoline, Employee Commute	2126	2082	-2.0%	2082	1308	-37.1%
Diesel, Employee Commute	2	1	-50%	1	1	-
Waste						
Waste	444	344	-22.5%	344	295	-14.2%

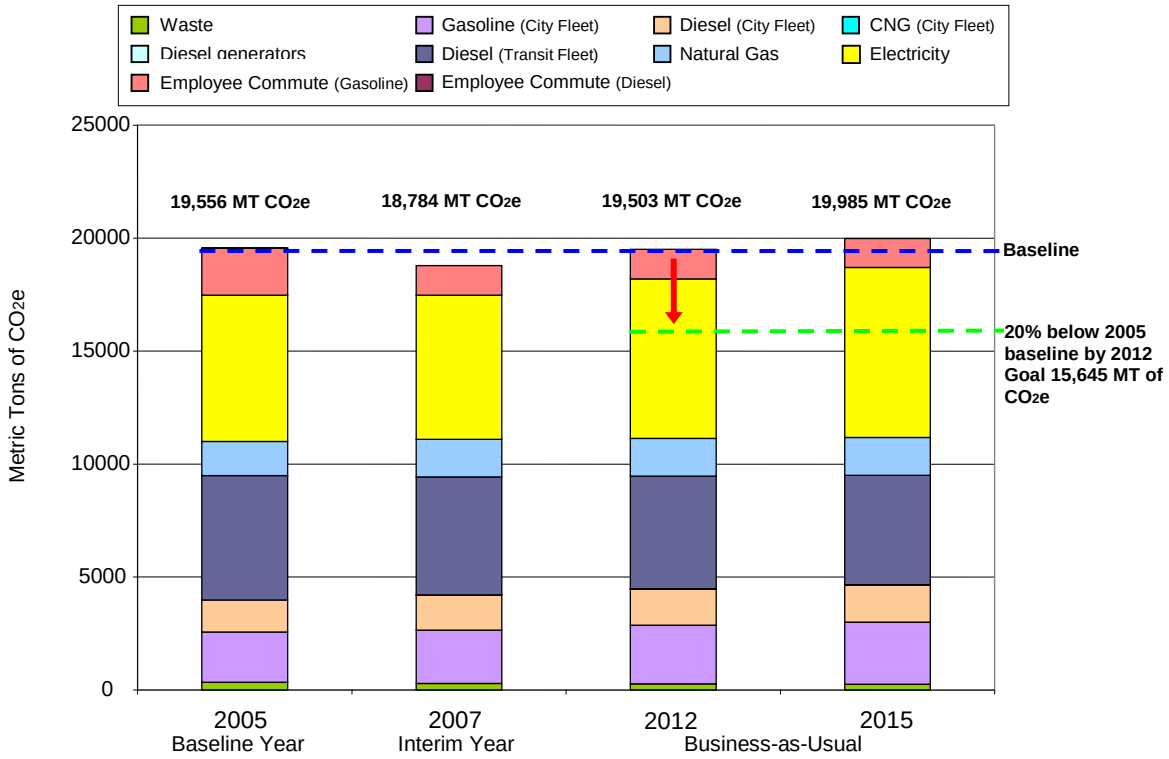
31 Employee commute estimates were based on the AQMD 1990 Trip Reduction Plan AVR surveys required under Rule 308 and the number of full and part staff employed by the City in 1990 (refer to appendix C for additional information).

C. Forecasting and Setting GHG Emissions Reduction Targets

The business-as-usual forecast shown in Figure 7 is a prediction of the likely increase in GHG emissions from municipal operations and services. The emissions shown here represent the business-as-usual forecast for the years 2012 and 2015 if the City does nothing to decrease its GHG emissions. The City can expect GHG emissions levels to increase to 19,503 metric tons of CO_2e by 2012 and 19,985 metric tons of CO_2e by 2015. Several indicators are taken into consideration for predicting anticipated emissions growth, such as, energy usage trends between the baseline year and the interim year (where possible historical year data is taken into account), assumptions about future energy consumption based on the expansion of municipal facilities and operations, new programs that may increase the use of energy, and any anticipated increase in municipal staff. By developing a business-as-usual forecast of emissions, the City can identify a target year to reduce emissions and develop the appropriate measures and policies to target specific areas.

To ensure the City reaches its emission reduction goal it may be helpful to look at individual measures that are planned for implementation and quantify those measures in order to see how much of a reduction can be expected from a given measure. Figure 7 illustrates a possible reduction scenario based on a reduction goal of 20% below the 2005 baseline levels by 2012. ICLEI recommends setting a long-term target (15-20 years) from the baseline year and a short-term or interim target every 2-3 years to make certain the City continues to reduce its emissions. The further away the goal, the larger amount of reductions should be targeted. The blue line represents the baseline year 2005 calculations from which a reduction target can be determined. The green line represents a possible reduction scenario. If the City were to set an emission target 20% below 2005 levels the goal would be to reduce emissions to 15,645 metric tons of CO_2e.

Figure 7. Business-as-Usual Forecast[32]



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

IV. Summary of Measures and Policies

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

A. Energy Efficiency

The City of Torrance is working to be come more energy efficient in a number of ways, including:

Lighting Retrofit and Replacement: The City has retrofit or replaced a number of lighting fixtures throughout City facilities to make use of more energy efficient technologies and continues to do so whenever possible. In addition, many offices make use of small, CFL desk lamps in lieu of the overhead lighting fixtures. In addition, many facilities are being fit with motion sensitive lighting that turns lights on when people are present and turns it off when there is no need for the light.

LED Traffic Signals: Traffic signals throughout the City were retrofit with Light Emitting Diode (LED) lighting, significantly reducing their energy consumption and greatly lengthening their life.

Heating and Air Conditioning System Upgrades: As systems require replacement or repair, care is taken that the most energy efficient technology is put in place, including Energy Star rated equipment; Direct Digital Control systems that remotely monitor and control energy use; and new, high efficiency chillers.

Building upgrades: All building upgrades are now looking at LEED or other Green Building techniques for inclusion as well as specifying low VOC carpet and recycled material content in bids. The City has installed several white or cool roofs and will continue to implement this technology as roofs are repaired or replaced.

Solar Power: The City makes use of solar power in a number of its landscape median irrigation systems, as well as in one of the noise monitors for the Airport Noise Abatement System and for powering portable speed indicators used throughout the City.

Compressed Work Week Schedule: City hall is closed on alternate Fridays to contribute to energy conservation and trip reduction.

B. Solid Waste and Recycling

The City is pro-active in recycling with a wide range of programs, including:

Curbside Recycling: The City has had a very successful residential curbside recycling program for a number of years and has begun expanding the program to include a separate green waste container in certain sectors of the City, with the goal of including the entire City in the green waste program within the next few years. Soon, we will be distributing larger curbside recycling containers and smaller refuse containers, to accommodate the increased levels of recycling in the community and to encourage even more recycling.

Used Oil Drop-off Recycling and Hazardous waste and Electronics Recycling: The City sponsors and publicizes a number of programs allowing residents to recycle such household items as used oil, computer and television components as well as other hazardous materials.

Construction/Demolition Recycling: The City has an ordinance requiring recycling of at least 50% of all construction and demolition waste which has been very successfully implemented, with certain larger projects reporting rates of 90% recycled waste.

Parks and Special Events Recycling: Recycling containers are provided at the local parks and for special events throughout the City, allowing recycling of cans and bottles generated at these facilities and events. In addition, the City provides battery recycling at various City Hall locations and recycling at all City desks and offices. We have also developed food donation routes for businesses and are working on an organics recycling program for restaurants.

City Use of Recycled Products: The City has long used paper and other office products with recycled content, but is now finding more opportunities to use recycled products. Some examples include a recycled tire path in one of our parks and use of asphalt rubber hot mix, which makes use of recycled tires, and cement treated base, reusing existing roadway base material, in roadway rehabilitation projects.

Tree-Cycling: The City makes use of wood chips from tree trimming for mulch, saving landfill space and providing better moisture retention, reduction in soil temperature and reduction in weed growth.

C. Sustainable Development

Green Building: The City adopted the "Build it Green" standards as voluntary guidelines for residential remodeling. We currently are home to one "Build it Green" rated residential condominium project as well as a number of commercial and industrial buildings that are complying with the LEED rating system, including two LEED gold buildings; the Toyota building and the Acura Design Center. In addition there are several projects either under construction or recently entitled that are designed to LEED Silver standards, including the Miyako Hotel, the Shell Hydrogen fueling station and a small commercial center. Green building techniques are encouraged in all development reviewed by the Planning Division.

Permitting Center: The new permitting center for Torrance has been designed incorporating green principals and materials, and there are plans to include a demonstration garden showing native and drought tolerant plants, smart irrigation systems and permeable hardscape as part of the entry to the new center.

General Plan and Strategic Plan: The City recently renewed its Strategic Plan, including a new priority focusing on "Stewardship of the Environment", and the General Plan is currently being revised, with emphasis on sustainable practices and livable communities.

D. Urban Forests

Madrona Marsh: Torrance is home to the Madrona Marsh and Wildlife preserve, a natural wetland area replete with wildlife and native vegetation. The Marsh also contains a nature center and a host of educational programs focusing on drought tolerant and native plants, water conservation and wildlife. In addition, there are other areas of native, drought tolerant vegetation such as the Begonia Trail.

Community Gardens: Community gardens allow members of the community to grow their own organic vegetables and herbs.

Tree Planting Programs: Besides an aggressive program for street trees and landscaping in new developments, Torrance has tree dedication programs that allow members of the community plant new trees in parks throughout the City and dedicate them to family members or friends. The City also helps Community groups who wish to hold tree plantings, such as one recently held in North Torrance that resulted in a number of new trees planted in parkways.

E. Water Usage and Conservation

Water conservation is important to the City both because we need to carefully manage our water resources and because the more efficiently we use our water the more energy we save in transporting the water and the more pollution we eliminate through energy conservation.

New Water Conservation Ordinance: Although the City already had water conservation regulations, in 2009 a new and wider-reaching ordinance was passed to help the City and its residents conserve even more water and deal with the issue of water shortage.

Recycled Water: The City has a number of recycled water lines supplying parks and landscape medians, as well as the Mobil refinery, thus conserving potable water supplies, reducing dependence on imported water and providing a dependable, drought-proof locally-controlled water supply for irrigation and industrial uses.

Residential Conservation Programs: The City has its own Water Department serving the bulk of Torrance residents, and provides access to rebate programs for high efficiency toilets, high efficiency washing machines, low flow sprinklers, smart landscape controllers and synthetic turf. In addition the City provides free low flow shower heads, faucet aerators and conservation kits.

Commercial and Institutional Conservation Programs: The City provides access to "Save a BUCK Rebate Programs" for commercial and institutional facilities, providing rebates on high efficiency toilets and washing machines and low flow urinals. Industrial water and large landscape water efficiency audits and process improvement incentives are also available.

Public Sector Program: This program focuses on retrofitting City restrooms and School district and City irrigation systems to use less water.

Desalinization Plant: The City is home to a desalinization plant located at the City yard providing an additional source of clean water for the City.

F. Storm Water Management

Torrance has an aggressive and effective storm water management program that includes education and enforcement. In addition to the regular commercial and industrial inspections, enforcement, education and training required by the NPDES permit, the following are some of the programs dealing with storm water:

Clean Bay Restaurant Certification: The City participates in this program sponsored by the Santa Monica Bay Restoration commission in recognizing those restaurants that have taken the extra effort to be environmentally friendly and safe. There are currently 52 certified restaurants in Torrance who have 100% compliance with all requirements.

Basin Enhancement Program: Basins are undergoing habitat restoration and are used for storm water retention, infiltration and treatment. Fitted with trash screens where necessary, these basins protect the ocean and beaches from bacteria, trash, oils and a host of other pollutants.

Full Capture Trash BMP's: Full capture screens are being installed in catch basins, CDS units installed at Torrance Beach and street sweeping is performed throughout the City on a weekly basis.

City Yard Water Quality Improvement Plan: The City yard is undergoing improvements including catch basin fossil filters, vegetated swales and biofiltration, new clarifiers for street sweeper waste water in order to maximize storm water cleanliness coming from the yard.

G. Vehicle Fleet and City-Contracted Service

The City fleet is making great strides in becoming greener, both in terms of emissions and energy and fuel consumption. Some of the notable fleet achievements include:

Alternate fuel vehicles: The fleet includes 2 propane street sweepers with 9 additional heavy duty propane vehicles on order; 130 diesel vehicles and heavy equipment fueling with biodiesel; 2 compressed natural gas refuse trucks; 27 hybrid sedans and SUVs with more to come. Transit buses are converting to alternate fuel hybrid buses beginning in 2010 with the delivery of 12 buses and culminating in 2012 when the entire fleet will be hybrid. In addition, the City has both a propane and a biodiesel fueling station.

Rideshare and Van Pools: To help reduce vehicle miles by employees coming in to work, the City sponsors a very popular rideshare program as well as hosting several van pools for employees.

H. Community Involvement

Green Torrance: The City is partnering with the Chamber of Commerce on the Green Torrance Web site, featuring green businesses throughout the City and ideas for businesses to help them become more environmentally friendly.

Homeowner Groups: Homeowner groups are taking an active part in the City's environmental efforts, with the Old Torrance Neighborhood Association sponsoring quarterly clean-up days in their neighborhood and the North Torrance HOA sponsoring a tree planting project in their neighborhood.

Madrona Marsh: The Madrona Marsh is host to a number of opportunities for involvement in environmental issues and boasts a large contingent of regular volunteers as well as providing volunteer projects for school, scout and other youth groups to work on restoring native habitat within the marsh.

I. Education and Outreach

School outreach programs: the City's recycling Coordinator visits Torrance classrooms on a regular basis presenting information about recycling and other environmental issues.

Environmental Fair: Torrance hosted its first Environmental Fair at the Madrona Marsh in 2009 and plans to make this an annual event, with exhibits ranging from solar panels to electric and hydrogen vehicles, educational groups, school groups and many other green/environmentally themed exhibitors as well as a series of talks throughout the day regarding various environmental topics.

Green Pride in Torrance Award: Environmental Quality Commission annually recognizes several groups and individuals for their work in helping to make Torrance a better and greener City.

South Bay Environmental Services Center: The City is pleased to be able to refer residents to the SBESC for a range of resources and classes regarding environmental practices.

Appendix A—Greenhouse Gas Municipal Inventory Details

A. Greenhouse Gas Report 2005—Baseline Year

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

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

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**1492**	**1487**	**0.14040**	**0.00283**
Scope 2	Purchased Electricity	**3316**	**3314**	**0.14440**	**0.05477**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**2443**	**2427**	**0.10574**	**0.04011**

Water Delivery Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**517**	**513**	**0.02237**	**0.00849**

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**3638**	**3588**	**0.14761**	**0.15213**

Airport Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**22**	21	0.00209	0.00005
Scope 2	Purchased Electricity	**201**	180	0.00786	0.00298

Transit Fleet					
Scope1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**5500**	**5494**	**0.01737**	**0.01635**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**344**	**344**	**16.40014**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**2083**	**2035**	**0.12649**	**0.14439**

Total Emissions	CO_2e	CO_2	CH_4	N_2O
Scope 1	**10,652**	**10590**	**0.30747**	**0.17136**
Scope 2	**6,477**	**6434**	**0.28037**	**0.10635**
Scope 3	**2,427**	**2379**	**16.52663**	**0.14439**

B. Greenhouse Gas Report 2007— Interim Year

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

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

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**1648**	**1647**	**0.15564**	**0.00313**
Scope 2	Purchased Electricity	**3225**	**3194**	**0.14445**	**0.05479**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**2358**	**2343**	**0.10597**	**0.04020**

Water Delivery Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**0.13**	**0.12**	**0.00001**	**0.00000**
Scope 2					
	Purchased Electricity	**614**	**611**	**0.02763**	**0.01048**

Airport Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**15**	14	0.00143	0.00003
Scope 2	Purchased Electricity	**186**	170	0.00770	0.00292

Vehicle Fleet					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**3911**	**3862**	**0.17502**	**0.15063**

Transit Fleet					
Scope1		CO_2e	CO_2	CH_4	N_2O
	Mobile Combustion	**5221**	**5216**	**0.01652**	**0.01555**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**295**	**295**	**14.05727**	**-**

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**1309**	**1282**	**0.07605**	**0.08043**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**10,797**	**10739**	**0.34862**	**0.16934**
	Scope 2	**6,383**	**6318**	**0.28575**	**0.10839**
	Scope 3	**1,604**	**1577**	**14.13332**	**0.08043**

C. Greenhouse Gas Report 1990—Historical Year

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

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

GHG Emissions Summary (All Units in Metric Tons)

Buildings & Other Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**12**	**11**	**0.00109**	**0.00002**
Scope 2	Purchased Electricity	**5091**	**5065**	**0.19649**	**0.06877**

Streetlights and Traffic Signals					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**917**	**912**	**0.03541**	**0.01239**

Water Delivery Facilities					
Scope 1		CO_2e	CO_2	CH_4	N_2O
	Stationary Combustion	**0.00531**	**0.00531**	**0.00000**	**0.00000**
Scope 2					
	Purchased Electricity	**917**	**962**	**0.03735**	**0.01307**

Airport Facilities					
Scope 2		CO_2e	CO_2	CH_4	N_2O
	Purchased Electricity	**175**	173	0.00675	0.00236

Employee Commute					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Employee Commute	**2128**	**2062**	**0.18704**	**0.19956**

Solid Waste					
Scope 3		CO_2e	CO_2	CH_4	N_2O
	Contract Services				
	Waste Resources	**444**	**444**	**21.13752**	**-**

Total Emissions					
		CO_2e	CO_2	CH_4	N_2O
	Scope 1	**12**	**11**	**0.00109**	**0.00002**
	Scope 2	**7,150**	**7112**	**0.27600**	**0.09659**
	Scope 3	**2,526**	**2506**	**21.32456**	**0.19956**

Appendix B—Activity Data Disclosure

Listed below are the data sources. 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 mentioned in the LGOP - relevance, completeness, consistency, transparency, and accuracy - this information has been recorded. This information is grouped by scope and source of emission. Descriptions of data sources and the methodology used to obtain information are listed here. Indicated in the upper right-hand corner is the methodology used and whether or not it is a recommended or alternative method as prescribed by the LGOP. In this way, the City will be able to improve its data collection process if an alternative method is listed. It is important to note that scope 3 emissions are considered optional reporting.

A. Buildings & Other Facilities

Scope 1 Stationary Combustion

Description:	**Recommended Method**
Consumption data was obtained from Southern California Gas Company. Southern California Gas no longer possesses official customer records going back to 1990 due to document retention policies. SoCalGas located some casual records that go back to 1990 which was the basis for the gas information provided for 1990. Fuel data from other stationary combustion sources was provided by city staff.	Known Natural Gas use
Reference: Chauncy Tou, Energy Programs Advisor Customer Programs, Southern California Gas Company, 213-244-2833, ctou@semprautilities.com. Linda Cessna, Deputy Community Development Director, Community Development Dept., 310-618-5930, LCESSNA@TorranceCA.gov	

Scope 2 Purchased Electricity

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

B. Street Lighting and Traffic Signals

Scope 2 Purchased Electricity

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

C. Water Delivery and Wastewater

Scope 2 Purchased Electricity

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

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

D. Vehicle Fleet and Transit Fleet

Scope 1 Mobile Combustion

Description:	**Recommend Method**
City staff provided fuel data based on known fuel use from the fuel tracking system.	Known fuel use from fuel tracking system

Reference: City of Torrance Fleet Services Division and Transit Department, Beverly Gray, 310-781-6984, bgray@ TorranceCA.gov; James Lee, 310-781-6924, jlee@ TorranceCA.gov

E. Solid Waste Facilities

Scope 3 Waste Related

Description:
City staff from the Public Works department provided refuse data on waste generated from City operated and owned facilities.
2007—1164 tons
2005—1358 tons
1990—1568 tons

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

Reference: Alison Sherman, Waste Management Coordinator, Public Works Dept, ASherman@TorranceCA.gov

Scope 3 Employee Commute

Description:
Vehicle miles traveled were determined based on the South Coast Air Quality Management District's 2202 and 1990 Trip Plan Reduction, Average Vehicle Ridership (AVR) surveys.

Reference: Kim Fuentes, 626-357-4445 kim@southbaycities.org

Appendix C—Methodology/Emissions Factors Disclosure

It is considered good practice to disclose all methodologies employed to calculate emissions. Listed below are the formulas used to determine the equivalent emissions. Emissions factors refer to a unique value used to determine the amount of a GHG emitted on a per unit activity basis. They are used to convert activity data, like energy usage, into the associated GHG emissions.[33] In compliance with the LGOP and ICLEI program reporting requirements listed below and organized by scope are descriptions of computational methods and emission factors used to arrive at the equivalent GHG emissions. Indicated in the top right corner is the method used and whether it is considered to be a recommended or alternate method based on the LGOP standards. In this way, the City will be able to improve its data collection where an alternative method is listed. It is important to note that scope 3 emissions are considered optional reporting.

A. Scope 1 Stationary Combustion

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

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

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

B. Scope 1 Mobile Combustion

Description of Computational Method:	**Alternative Method**
City staff provided fuel data based on known f fuel use from fuel tracking system.	Alternative emissions factors, Table G.13 of the LGOP

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

Reference: City of Torrance Fleet Services Division and Transit Department, Beverly Gray, 310-781-6984, bgray@ TorranceCA.gov; James Lee, 310-781-6924, jlee@ TorranceCA.gov

C. Scope 2 Purchased Electricity

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

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

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

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

33 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.

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

D. Scope 3 Waste Related Emissions

Description of Computational Method:
There was an estimated 75% methane recovery at the landfill where the waste was taken, LGOP page 93.

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

Reference: Data was provided by Alison Sherman, Waste Management Coordinator, Public Works Dept, ASherman@TorranceCA.gov

E. Scope 3 Employee Commute

Description of Computational Method:

Vehicle miles traveled were determined based on the South Coast Air Quality Management District's 2202 and 1990 Trip Plan Reduction, Average Vehicle Ridership (AVR) surveys.

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

Utilizing AVR survey results it was estimated that on average employees worked 49 weeks, meaning 15 days were deducted from the possible number of working days in a year. It was assumed that these absences were due to vacation, sick, personal, and holiday.

2007—Vehicle miles traveled (VMT) was based on the 812 surveys from employees reporting to the worksite(s) within the designated peak travel window. However, the actual number of employees reporting to the worksite(s) was 1013 (including full and part-time employees). The remaining 19.8% of VMT was estimated based on AVR survey responses for a total VMT of 2,737,400. Assumptions: gasoline, drove alone, passenger vehicle (1.24 x 2,207,581=2,737,400 Total VMT).

2005—VMT was based on the 681 surveys from employees reporting to the worksite(s) within the designated peak travel window. However, the actual number of employees reporting to the worksite(s) was 1767 (including full and part-time employees). The remaining 61% of VMT was estimated based on AVR survey responses for a total VMT of 4,234,596. Assumptions: gasoline, drove alone, passenger vehicle (2.56 x 1,654,139 =4,234,596 Total VMT).

1990—VMT was estimated based on the zip codes (or commute distances) of the 1146 employees reporting to the worksite(s) (including full and part-time employees) for a total VMT of 3,737,913. Mode and frequency variables were based on percentages from AVR results and randomly assigned to zip codes. Assumptions: gasoline, passenger vehicle.

Reference: Kim Fuentes, 626-357-4445 kim@southbaycities.org

Appendix D—Emissions Data

The municipal inventory report was based on data collected from electricity, natural gas consumption, fuels, and other sources listed in the tables below as reference. Information is organized to be consistent with the order of the report, e.g., baseline year, interim year, and historical year. Emissions sources are organized according to source, equivalent metric tons of carbon dioxide emissions, energy equivalent in MMBtu, energy/ fuel use, and cost where known.[34]

Sources of Emissions 2005	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost
Buildings and Facilities						
Civic Center Facilities:						
Administration Panel A	Electricity	32	0.2	358	104,760 kWh	$15,949
Administration Panel B	Electricity	58	0.3	651	190,620 kWh	$25,631
Benstead Plunge	Electricity	83	0.5	938	274,720kWh	$32,187
	Natural Gas	560	3.2	10533	105,334 therms	$98,661
Cable TV Administration	Natural Gas	7	0	125	1,249 therms	$1,624
City Hall	Electricity	888	4.5	9974	2,922,279 kWh	$372,963
	Natural Gas	183	1	3437	34,366 therms	$34,550
City Yard Services Building	Electricity	399	2.3	4487	1,314,685 kWh	$149,974
	Natural Gas	133	0.8	2509	25,090 therms	$23,690
City Yard Transit Building	Electricity	169	1	1899	556,320 kWh	$70,536
	Natural Gas	70	0.4	1316	13,161 therms	$13,142
Cultural Art Center	Natural Gas	92	0.5	1722	17,220 therms	$16,987
Human Resources Building	Electricity	54	0.3	610	178,800 kWh	$25,736
	Natural Gas	30	0.2	560	5,601 therms	$6,085
Ken Miller Rec Center	Electricity	19	0.1	218	63,820 kWh	$11,091
	Natural Gas	7	0	136	1,356 therms	$1,735
Police Department	Electricity	518	2.9	5817	1,704,303 kWh	$178,746
	Natural Gas	170	1	3194	31,940 therms	$31,901
Police Department Substation	Electricity	6	0	67	19,566 kWh	$2,827
Teen Center	Electricity	10	0.1	117	34,232 kWh	$4,938
	Natural Gas	2	0	44	443 therms	$625
Torrance Art Museum	Electricity	7	0	81	23,720 kWh	$6,958
Torrance Historical Museum	Natural Gas	11	0.1	201	2,011 therms	$2,351
Generators:						
City Hall	Diesel	0	0	3	20 gal	
City Yard	Diesel	0	0	3	20 gal	

34 Source of data CACP software output.

Cultural Arts	Diesel	0	0	2	16 gal	
Fire Station #1	Diesel	0	0	5	33 gal	
Fire Station #3	Diesel	0	0	3	20 gal	
Fire Station #4	Diesel	0	0	5	39 gal	
Fire Station #5	Diesel	0	0	4	26 gal	
Fire Station #6	Diesel	0	0	3	20 gal	
Police Building A	Diesel	0	0	3	20 gal	
Police Building B	Diesel	0	0	3	20 gal	
Walteria Pumping Facility	Diesel	1	0	7	50 gal	
Well 7 Pumping Facility	Diesel	1	0	7	50 gal	
West Annex	Diesel	0	0	2	13 gal	
Libraries Facilities:						
Civic Center Library	Electricity	82	1.6	3172	929,502 kWh	$118,075
	Natural Gas	125	0.7	2358	23584 therms	$23,854
El Retiro Library	Electricity	18	0.1	205	60120 kWh	$9,574
	Natural Gas	1	0	27	273 therms	$433
Henderson Library	Electricity	11	0.1	125	36,576 kWh	$6,731
	Natural Gas	2	0	42	422 therms	$609
North Torrance Library	Natural Gas	1	0	16	159 therms	$296
South East Library	Electricity	30	0.2	337	98,720 kWh	$16,204
	Natural Gas	2	0	32	322 therms	$473
Walteria Library	Electricity	114	0.6	1276	37,398 kWh	$6,613
	Natural Gas	1	0	25	246 therms	$387
Fire Stations Facilities:						
Fire Station #1	Electricity	88	0.5	992	290,726 kWh	$35,146
	Natural Gas	19	0.1	358	3,577 therms	$3,978
Fire Station #2	Electricity	17	0.1	191	56,085kWh	$8,068
	Natural Gas	5	0	97	974 therms	$1,243
Fire Station #3	Electricity	23	0.1	257	75,400 kWh	$10,046
	Natural Gas	9	0	164	1,636kWh	$2,050
Fire Station #4	Electricity	28	0.2	309	90,660 kWh	$11,867
	Natural Gas	7	0	123	1,233 therms	$1,435
Fire Station #5	Electricity	15	0.1	165	48,402 kWh	$6,730
	Natural Gas	6	0	107	1,071 therms	$1,401
Fire Station #6	Electricity	16	0.1	180	52,600 kWh	$7,398
	Natural Gas	11	0.1	212	2,122 therms	$2,558

Parks & Recreations:						
Alta Loma Park	Electricity	6	0	68	20,004kWh	$3,017
	Natural Gas	0	0	5	47 therms	$173
Bartlett Senior Center	Electricity	39	0.2	435	127,491 kWh	$21,450
	Natural Gas	11	0.1	205	2,052 therms	$2,466
Columbia Park	Electricity	52	0.3	588	172,300 kWh	$41,403
De Portla Park	Electricity	6	0	72	20,987 kWh	$2,986
Del Thorne Park	Electricity	15	0.1	167	48,965 kWh	$6,762
Descanso Park	Electricity	0	0	0	0	$176
Discovery Park	Electricity	1	0	12	3,538 kWh	$667
El Nido Park	Electricity	10	0.1	116	34,017 kWh	$9,466
	Electricity	8	0	88	25,760 kWh	$3,575
El Retiro Park	Natural Gas	1	0	26	264 therms	$431
Entradero Park	Electricity	7	0	76	22,394 kWh	$3,134
Greenwood Park	Electricity	17	0.1	188	55,120 kWh	$9,791
	Natural Gas	6	0	115	1,152 therms	$1,476
Guenser Park	Electricity	4	0	47	13,628 kWh	$2,067
Hickory Park	Electricity	7	0	74	21,814kWh	$3,080
La Carretera Park	Electricity	5	0	53	15,517 kWh	$2,208
La Paloma Park	Electricity	0	0	0	0	$177
La Romeria Park	Electricity	10	0.1	112	32,808 kWh	$5,579
	Natural Gas	0	0	5	53 therms	$180
Lago Seco Park	Electricity	10	0.1	110	32,300 kWh	$9,840
Las Cancmas	Natural Gas	0	0	8	75 therms	$206
Los Arboles Park	Electricity	2	0	19	5,494 kWh	$916
Madrona Marsh	Electricity	15	0.1	174	51,013 kWh	$10,231
McMaster Park	Electricity	38	0.2	424	124,191 kWh	$22,250
	Natural Gas	6	0	117	1,168 therms	$1,631
Miramar Park	Electricity	1	0	8	2,335 kWh	$481
Osage Park	Electricity	0	0	0	88 kWh	$177
Paradise Park	Electricity	11	0.1	122	35,748 kWh	$4,558
Pequeno Park	Electricity	0	0	5	1,324 kWh	$328
Pueblo Park	Electricity	1	0	10	2,842 kWh	$578
	Natural Gas	0	0	3	33 therms	$160
RSVP Building	Natural Gas	1	0	17	172 therms	$323
Sea Aire Golf Club House	Electricity	6	0	72	21,021 kWh	$3,233

	Natural Gas	1	0	11	114 therms	$248
Sunny Glen Park	Electricity	5	0	56	16,313 kWh	$2,508
Sur La Brea Park	Electricity	11	0.1	121	35,448 kWh	$7,056
	Natural Gas	0	0	7	72 therms	$194
Torrance Park	Electricity	19	0.1	214	62,614 kWh	$22,541
Victor Park	Electricity	9	0.1	101	29,582 kWh	$4,146
Walteria Park	Electricity	3	0	39	11,322 kWh	$1,681
	Natural Gas	1	0	10	96 therms	$226
Wilson Park	Electricity	233	1.2	2620	767,552 kWh	$132,828
	Natural Gas	6	0	105	1,050 therms	$1,340
Streetlights & Traffic Signals						
Traffic Signals/Controllers	Electricity	165	0.8	1852	542,616 kWh	$71,894
Streetlights:						
City Owned Streetlights	Electricity	186	0.9	2085	610,770 kWh	$53,665
Streetlight SCE Owned	Electricity	2090	11.9	23477	6,878751kWh	$1,177,664
Other Outdoor Lighting:						
Other Outdoor Lighting	Electricity	2	0	23	6,710 kWh	$1,149
Water Delivery Facilities						
Sprinkler/Irrigation Control	Electricity	3	0	39	11,383kWh	$14,438
Water Pump	Electricity	24	0.1	272	79,662 kWh	$9,912
Water Pump Stations	Electricity	32	0.2	357	107,716 kWh	$18,370
Wells	Electricity	173	1	1941	568,858 kWh	$44,350
Municipal Water District Connections	Electricity	1	0	9	2,493 kWh	$1,147
Storm Water Pumping	Electricity	46	0.3	518	151,744 kWh	$38,515
	Natural Gas	0	0	0	0	$121
Booster Stations	Electricity	238	1.3	2669	781,914 kWh	$101,307
Vehicle Fleet						
Community Service/Public Works	Gasoline	888	5	12270	98,771 gal	n/a
	Diesel	1309	7.4	17875	128,896 gal	n/a
General City Fleet	Gasoline	195	1.1	2699	21,724 gal	n/a
Leased Vehicles	Gasoline	164	0.9	2262	18,205 gal	n/a
Police/Fire Vehicle	Gasoline	890	5.1	12269	98,763 gal	n/a
	Diesel	91	0.5	1239	8,933 gal	n/a

Transit Service Vehicles	Gasoline	84	0.4	1164	9,372 gal	n/a
	Diesel	17	0.1	237	1,171 gal	n/a
Transit Fleet						
Transit Fleet	Diesel	5500	28.1	75113	541,647 gal	n/a
Employee Commute						
Drove Alone	Gasoline	1903	9.7	26,227	3,928,990 VMT	n/a
	Gasoline (off road)	34	0.2	471	3,790.80 VMT	
Carpool	Gasoline	146	0.7	2013	301,545.33 VMT	n/a
Public Transportation	Diesel	1	0	10	453 VMT	n/a
Airport Facilities						
Airport Operations	Electricity	106	0.6	1194	1,544 kWh	$51,848
General Aviation Center	Electricity	75	0.4	841	246,330 kWh	$29578
	Natural Gas	21	0.1	397	3,966 therms	$4,284
Airport Facilities	Electricity	106	0.6	1194	349,982 kWh	$51,848
Airport Generator:						
Airport Generator	Diesel	1	0	10	73	n/a
Solid Waste						
Refuse	Carbon Dioxide	344	1.8		1,358 tons	n/a
Sources:	Food Waste	27				
	Paper Products	194				
	Plant Debris	27				
	Wood/Textiles	9				

Sources of Emissions 2007	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost
Buildings and Facilities						
Civic Center Facilities:						
Administration Panel A	Electricity	29	0.2	337	98,760 kWh	$15,913
Administration Panel B	Electricity	59	0.3	685	200,610 kWh	$27,177
Benstead Plunge	Electricity	86	0.5	1008	295,360 kWh	$324,059
	Natural Gas	680	3.9	12792	127,915 therms	$100,374
Cable TV Administration	Natural Gas	9	0.1	175	1,751 therms	$2,043
City Hall	Electricity	852	4.5	9934	2,910,597 kWh	$423,311
	Natural Gas	196	1.1	3687	36,865 therms	$32,963

City Yard Services Building	Electricity	383	2.2	4465	1,308,145kWh	$167,924
	Natural Gas	78	0.4	1473	14,727 therms	$13,510
City Yard Transit Building	Electricity	166	0.9	1931	565,760 kWh	$72,452
	Natural Gas	55	0.3	1037	10,365 therms	$9,690
Cultural Art Center	Natural Gas	132	0.7	2477	24,773 therms	$22,464
Human Resources Building	Electricity	50	0.3	583	170,880 kWh	$25,748
	Natural Gas	42	0.2	795	7,948 therms	$7,620
Ken Miller Rec Center	Electricity	31	0.2	364	106,680 kWh	$19,350
	Natural Gas	28	0.2	528	5,281 therms	$5,229
Police Department	Electricity	493	2.8	5746	1,683,588kWh	$202,953
	Natural Gas	153	0.9	2868	28,684 therms	$25,781
Police Department Substation	Electricity	3	0	40	11,700kWh	$2,057
Teen Center	Electricity	10	0.1	117	33,420 kWh	$5,565
	Natural Gas	3	0	64	641 therms	$824
Torrance Art Museum	Electricity	25	0.1	296	86,720 kWh	$14,944
Torrance Historical Museum	Natural Gas	12	0.1	230	2,300 therms	$2,542
Libraries Facilities:						
Civic Center Library	Electricity	40	0.2	464	135,969 kWh	$947,414
	Natural Gas	139	0.8	2622	26,219 therms	$23,655
El Retiro Library	Electricity	19	0.1	216	63,240 kWh	$10,065
	Natural Gas	2	0	37	365therms	$519
Henderson Library	Electricity	11	0.1	127	37,350 kWh	$6,985
	Natural Gas	2	0	37	373 therms	$524
North Torrance Library	Electricity	0	0	1	354 kWh	$212
	Natural Gas	2	0	36	362 therms	$519
South East Library	Electricity	28	0.2	328	96,160 kWh	$16,571
	Natural Gas	2	0	42	422 therms	$587
Walteria Library	Electricity	10	0.1	120	35,076 kWh	$5,651
	Natural Gas	1	0	26	257therms	$400
Fire Stations Facilities:						
Fire Station #1	Electricity	68	0.4	794	3,577 kWh	$30,829
	Natural Gas	20	0.1	379	3,791 therms	$3,909
Fire Station #2	Electricity	18	0.1	204	59,858kWh	$9,689
	Natural Gas	5	0	102	1,023 therms	$1,244
Fire Station #3	Electricity	26	0.1	307	89,940 kWh	$11,310
	Natural Gas	9	0.1	167	1,667kWh	$2,004

Fire Station #4	Electricity	33	0.2	380	111,390 kWh	$14,073
	Natural Gas	7	0	137	1,367 therms	$1,494
Fire Station #5	Natural Gas	7	0	135	1,50 therms	$1,659
Fire Station #6	Electricity	14	0.1	169	49,440 kWh	$7,877
	Natural Gas	11	0.1	203	2,026 therms	$2,321
Generators:						
City Hall	Diesel	0	0	3	20 gal	
City Yard	Diesel	0	0	3	20 gal	
Cultural Arts	Diesel	0	0	2	16 gal	
Fire Station #1	Diesel	0	0	5	33 gal	
Fire Station #3	Diesel	0	0	3	20 gal	
Fire Station #4	Diesel	0	0	5	39 gal	
Fire Station #5	Diesel	0	0	4	26 gal	
Fire Station #6	Diesel	0	0	3	20 gal	
Police Building A	Diesel	0	0	3	20 gal	
Police Building B	Diesel	0	0	3	20 gal	
Walteria Pumping Facility	Diesel	1	0	7	50 gal	
Well 7 Pumping Facility	Diesel	1	0	7	50 gal	
West Annex	Diesel	0	0	2	13 gal	
Parks & Recreations:						
Alta Loma Park	Electricity	7	0	76	22,297kWh	$3,837
	Natural Gas	0	0	8	81 therms	$209
Bartlett Senior Center	Electricity	38	0.2	447	130,962 kWh	$23,425
	Natural Gas	15	0.1	275	2,750 therms	$3,013
Columbia Park	Electricity	50	0.3	583	170,840 kWh	$54,128
De Portola Park	Electricity	4	0	51	15,073 kWh	$2,532
	Electricity	12	0.1	140	41,092 kWh	$6,579
Descanso Park	Electricity	0	0	0	0	$188
Discovery Park	Electricity	1	0	17	4,899 kWh	$949
El Nido Park	Electricity	13	0.1	147	42,947 kWh	$11,537
	Natural Gas	0	0	4	39 therms	$77
El Retiro Park	Electricity	7	0	83	24,320 kWh	$3,951
	Natural Gas	2	0	34	338 therms	$486
Entradero Park	Electricity	6	0	69	20,338 kWh	$3,343
Greenwood Park	Electricity	15	0.1	174	51,120 kWh	$9,107
	Natural Gas	14	0.1	256	2,558 therms	$2,738

Guenser Park	Electricity	1	0	9	2,656 kWh	$2,173
Hickory Park	Electricity	6	0	75	22,004kWh	$3,597
La Carretera Park	Electricity	4	0	44	12,971 kWh	$2,509
La Paloma Park	Electricity	0	0	0	0	$189
La Romeria Park	Electricity	6	0	72	21,200 kWh	$5,717
	Natural Gas	0	0	6	55 therms	$181
Lago Seco Park	Electricity	24	0.1	280	81,917 kWh	$19,239
Las Cancmas	Natural Gas	0	0	7	72 therms	$199
Los Arboles Park	Electricity	1	0	11	3,212 kWh	$685
Madrona Marsh	Electricity	16	0.1	190	55,744 kWh	$11,912
McMaster Park	Electricity	36	0.2	417	122,245 kWh	$28,850
	Natural Gas	10	0.1	191	1,907 therms	$2,320
Miramar Park	Electricity	1	0	11	3,079 kWh	$651
Osage Park	Electricity	1	0	8	2,273 kWh	$540
Paradise Park	Electricity	10	0.1	114	33,300 kWh	$5,340
Pequeno Park	Electricity	0	0	3	1,10 kWh	$344
Pueblo Park	Electricity	1	0	8	2,353 kWh	$658
	Natural Gas	1	0	10	103 therms	$235
RSVP Building	Natural Gas	2	0	35	346 therms	$509
Sea Aire Golf Club House	Electricity	5	0	54	15,690 kWh	$2,861
	Natural Gas	1	0	10	104 therms	$230
Storage Facility	Electricity	0	0	3	801 kWh	$233
Sunny Glen Park	Electricity	5	0	56	16,547 kWh	$2,943
Sur La Brea Park	Electricity	11	0.1	129	37,842 kWh	$8,272
	Natural Gas	1	0	19	194 therms	$353
Torrance Park	Electricity	17	0.1	195	57,106 kWh	$24,293
Victor Park	Electricity	8	0	93	27,193 kWh	$4,585
Walteria Park	Electricity	4	0	46	13,361 kWh	$2,263
	Natural Gas	1	0	16	155 therms	$293
Wilson Park	Electricity	214	1.1	2491	729,915 kWh	$105,480
	Natural Gas	6	0	104	1,038 therms	$1,268
Streetlights & Traffic Signals						
Traffic Signals/Controllers	Electricity	151	0.8	1765	517,244 kWh	$77,382
Streetlights:						
City Owned Streetlights	Electricity	183	1.0	2133	624,971 kWh	$66,552

Streetlight SCE Owned	Electricity	2022	11.5	23579	6,908,608 kWh	$1,463,531
Other Outdoor Lighting:						
Other Outdoor Lighting	Electricity	2	0	18	5,139 kWh	$1,403
Water Delivery Facilities						
Sprinkler/Irrigation Control	Electricity	2	0	25	7,324 kWh	$14,656
Water Pump	Electricity	24	0.1	282	82,603 kWh	$12,258
Water Pump Stations	Electricity	36	0.2	424	124,148 kWh	$20,775
Wells	Electricity	301	1.7	3512	1,028,941 kWh	$89,571
Municipal Water District Connections	Electricity	1	0	14	4,010 kWh	$1,556
Storm Water Pumping	Electricity	24	0.1	280	82,184 kWh	$32,419
	Natural Gas	0	0	2	24 therms	$155
Booster Stations	Electricity	226	1.3	2630	770,687 kWh	$75,836
Vehicle Fleet						
Community Service/Public Works	Gasoline	796	4.5	11021	88,719 gal	n/a
	Diesel	1421	8.1	19,409	139,962 gal	n/a
	Electricity	0	0	0	135 gal	
	CNG	16	0.1	277	2,262 gal	
General City Fleet	Gasoline	208	1.2	2879	23,175 gal	n/a
	Diesel	2	0.0	29	207 gal	
Leased Vehicles	Gasoline	164	0.9	2262	18,205 gal	n/a
Police/Fire Vehicle	Gasoline	1,096	6.2	15149	121,951gal	n/a
	Diesel	99	0.6	1346	0 gal	n/a
	Electricity	0	0	1	215 gal	n/a
Transit Service Vehicles	Gasoline	91	0.5	1259	10,137 gal	n/a
	Diesel	18	0.1	251	1,813 gal	
Transit Fleet						
Transit Fleet	Diesel	5221	27.8	71308	514,207 gal	n/a
Employee Commute						
Drove Alone	Gasoline	1171	6.2	16189	2,471,621 VMT	n/a
	Gasoline (off road)	11	0.1	158	1,274.00 VMT	
Carpool	Gasoline	125	0.7	1730	264,051.86 VMT	n/a
Public Transportation	Diesel	0	0	10	453 VMT	n/a

Airport Facilities						
Airport Operations	Electricity	1	0.0	6	1,818 kWh	$471
General Aviation Center	Electricity	71	0.4	834	244,230 kWh	$29,549
	Natural Gas	14	0.1	263	2,628therms	$2,813
Airport Facilities	Electricity	99	0.6	1158	339,208 kWh	$57,462
Airport Generator:						
Airport Generator	Diesel	1	0	10	73	n/a
Solid Waste						
Refuse	Carbon Dioxide	295	1.6		1,164 tons	n/a
Sources:	Food Waste	31				
	Paper Products	222				
	Plant Debris	31				
	Wood/Textiles	11				

Sources of Emissions 1990	Source	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Energy/ Fuel Use	Energy/ Fuel Use Cost
Buildings and Facilities						
Civic Center Facilities:						
Administration Panel A	Electricity	34	0.5	246	71,940 kWh	$9,189
Administration Panel B	Electricity	67	1	489	143,220 kWh	$16,531
Benstead Plunge	Electricity	65	0.9	474	138,800 kWh	$13,682
	Natural Gas	1	0	22	223 therms	n/a
Cable TV Administration	Natural Gas	0	0	2	17 therms	n/a
City Hall	Electricity	1276	16.9	9266	2,714,940 kWh	$247,169
	Natural Gas	4	0.1	75	749 therms	n/a
City Yard Services Building	Electricity	685	8.7	4465	1,457,760 kWh	$131,032
	Natural Gas	2	0	33	332 therms	n/a
City Yard Transit Building	Electricity	239	3.4	1733	507,720 kWh	$48,491
	Natural Gas	1	0	15	145 therms	n/a
Human Resources Building	Electricity	91	1.2	657	192,560 kWh	$19,884
	Natural Gas	1	0	11	112 therms	n/a
Ken Miller Rec Center	Electricity	45	0.6	328	96,120 kWh	$10,714
	Natural Gas	0	0	5	54 therms	n/a
Police Department	Electricity	975	11.8	7080	2,074,320 kWh	$177,390
	Natural Gas	2	0	31	305 therms	n/a

Teen Center	Natural Gas	0	0	1	11 therms	n/a
Torrance Historical Museum	Natural Gas	0	0	2	15 therms	n/a
Libraries Facilities:						
Civic Center Library	Electricity	517	7.3	3,757	1,100,800 kWh	$102,571
El Retiro Library	Electricity	28	0.4	204	59,660 kWh	$7,059
	Natural Gas	0	0	0	2 therms	n/a
Henderson Library	Electricity	20	0.3	149	46,542 kWh	$5,342
	Natural Gas	0	0	1	6 therms	n/a
North Torrance Library	Natural Gas	0	0	1	8 therms	n/a
South East Library	Electricity	76	1.1	554	162,420 kWh	$17,833
	Natural Gas	0	0	3	32therms	n/a
Walteria Library	Electricity	6	0.1	46	39,060 kWh	$4,960
	Natural Gas	0	0	1	5 therms	n/a
Fire Stations Facilities:						
Fire Station #1	Electricity	123	1.7	895	262,360 kWh	$24,963
	Natural Gas	0	0	5	47therms	n/a
Fire Station #2	Electricity	18	0.3	134	39,126 kWh	$4,545
	Natural Gas	0	0	1	10 therms	n/a
Fire Station #3	Electricity	40	0.6	288	84,480kWh	$8,680
	Natural Gas	0	0	2	20 kWh	n/a
Fire Station #4	Electricity	36	0.5	258	75,570 kWh	$8,377
Fire Station #5	Electricity	26	0.4	187	54,744 kWh	$6,007
	Natural Gas	0	0	1	10 therms	n/a
Fire Station #6	Electricity	23	0.3	169	49,640 kWh	$5,515
	Natural Gas	0	0	2	24 therms	n/a
Parks & Recreations:						
Alta Loma Park	Electricity	7	0.1	47	13,865kWh	$1,757.86
	Natural Gas	0	0	0	n/a	n/a
Bartlett Senior Center	Electricity	70	1	509	149,016 kWh	$18,097
	Natural Gas	0	0	1	13 therms	n/a
Columbia Park	Electricity	90	1	651	190,700 kWh	$21,708.83
De Portola Park	Electricity	7	0.1	52	15,243 kWh	$1,808.95
Del Thorne Park	Electricity	12	0.2	84	24,744 kWh	$2,869.17
Descanso Park	Electricity	0	0	0	0	$119.70
Discovery Park	Electricity	0	0	0	0	$0
El Nido Park	Electricity	22	0.3	159	46,704 kWh	$5,653.64

El Retiro Park	Electricity	15	0.2	107	31,320 kWh	$3,603.59
	Natural Gas	0	0	0	4 therms	n/a
Entradero Park	Electricity	1	0	4	1,068 kWh	$229.26
Greenwood Park	Electricity	16	0.2	117	34,160 kWh	$3,920
	Natural Gas	0	0	1	14 therms	n/a
Guenser Park	Electricity	0	0	1	346 kWh	$257.65
Hickory Park	Electricity	10	0.1	73	21,376kWh	$2,492.73
La Carretera Park	Electricity	4	0	27	7,802 kWh	$989
La Paloma Park	Electricity	0	0	0	0	$109.50
La Romeria Park	Electricity	14	0.2	102	29,800 kWh	$3,434.56
	Natural Gas	0	0	0	1 therm	n/a
Lago Seco Park	Electricity	27	0.4	196	57,323 kWh	$6,597.12
Las Cancmas	Electricity	53	0.7	384	112,560	$12,659
	Natural Gas	0	0	0	3 therms	n/a
Los Arboles Park	Electricity	2	0	17	5,029 kWh	$670.57
Madrona Marsh	Electricity	0	0	0	n/a	$50
McMaster Park	Electricity	46	0.6	332	97,185 kWh	$11,751
	Natural Gas	0	0	1	7 therms	n/a
Miramar Park	Electricity	1	0	7	1,991 kWh	$331.90
Osage Park	Electricity	0	0	0	0	$110.10
Paradise Park	Electricity	15	0.2	109	31,920 kWh	$3,668.06
Pequeno Park	Electricity	1	0	5	1,484 kWh	$275.53
Pueblo Park	Electricity	1	0	8	2,445 kWh	$381.96
	Natural Gas	0	0	0	3 therms	n/a
Sea Aire Golf Club House	Electricity	13	0.2	96	28,087 kWh	$3,865
	Natural Gas	0	0	0	2 therms	n/a
Sunny Glen Park	Electricity	6	0.1	46	13,388 kWh	$1,713.87
Sur La Brea Park	Electricity	17	0.2	122	35,862 kWh	$4,082.83
	Natural Gas	0	0	0	2 therms	n/a
Torrance Park	Electricity	30	0.4	217	63,535 kWh	$7,498
Victor Park	Electricity	11	0.1	77	22,553 kWh	$2,736.44
Walteria Park	Electricity	18	0.3	133	13,373 kWh	$1,610.29
	Natural Gas	0	0	0	1 therms	n/a
Wilson Park	Electricity	192	2.5	1392	407,716 kWh	$46,026
Streetlights & Traffic Signals						

Traffic Signals/Controllers	Electricity	907	12	6586	1,929,799 kWh	$203,445
Streetlights:						
City Owned Streetlights	Electricity	1	0.0	10	3,067 kWh	$451
Other Outdoor Lighting:						
Other Outdoor Lighting	Electricity	9	0.1	63	18,528kWh	$2,285
Water Delivery Facilities						
Sprinkler/Irrigation Control	Electricity	3	0	23	6,604 kWh	$7,295
Water Pump	Electricity	35	0.5	254	74,560 kWh	$7,332
Water Pump Stations	Electricity	23	0.3	167	48,804 kWh	$6,173
Wells	Electricity	589	8.3	4,274	1,252,160 kWh	$135,345
Municipal Water District Connections	Electricity	0	0	1	168 kWh	$129
Storm Water Pumping	Electricity	27	0.4	198	58,030 kWh	$7,337
	Natural Gas	0	0	0	1 therms	n/a
Booster Stations	Electricity	289	4.1	2101	615,720 kWh	$51,617
Employee Commute						
Drove Alone	Gasoline	1961	7.2	26806	3,440,630.30 VMT	n/a
	Gasoline (off road)	9	0.4	125	22,240.40 VMT	n/a
Carpool	Gasoline	156	5.6	2135	274,001.38 VMT	n/a
Public Transportation	Diesel	2	0.1	25	1,041 VMT	n/a
Airport Facilities						
Airport Operations/ Center	Electricity	35	0.5	6	253 kWh	$7,690
Airport Facilities	Electricity	140	2.0	1016	297,567 kWh	$35,285
Solid Waste						
Refuse	Carbon Dioxide	444	5.3		1,568 tons	n/a
Sources:	Food Waste	29				
	Paper Products	383				
	Plant Debris	24				
	Wood/Textiles	8				

Criteria Air Pollutants[35]

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.[36] Actions taken to reduce emissions will also reduce criteria air pollutants as well.

Criteria Air Pollutants 2005	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	14,644	6,693	7,422	968	5,517
Streetlights & Traffic Signals	7,126	4,754	4,513	507	3,924
Airport Facilities	641	359	362	45	297
Water Delivery	1,508	1,006	955	107	830
Vehicle Fleet	20,226	1,585	139,400	15,614	1,407
Employee Commute	13,765	736	147,557	15,132	318
Transit Fleet	93,726	3,660	71,828	9,216	3,713
Total	151,635	18,794	372,037	41,591	16,005

Criteria Air Pollutants 2007	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	15,159	6,716	7,556	997	5,534
Streetlights & Traffic Signals	7,142	4,764	4,523	508	3,932
Airport Facilities	608	351	350	43	290
Water Delivery	1,863	1,242	1,179	133	1,025
Vehicle Fleet	37,658	1,734	163,479	17,026	1,176
Employee Commute	8,452	460	95,424	9,602	206
Transit Fleet	83,613	3,462	68,305	8,764	2,970
Total	154,494	18,730	340,816	37,073	15,134

Criteria Air Pollutants 1990	NOx (lbs)	SOx (lbs)	CO (lbs)	VOC (lbs)	PM10 (lbs)
Building and Facilities	9,325	7,532	5,994	683	5,675
Streetlights & Traffic Signals	1,674	1,357	1,078	123	1,022
Airport Facilities	319	259	205	23	195
Water Delivery	1,766	1,432	1,138	129	1,079
Total	13,083	10,579	8,415	959	7,970

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

36 Source of data CACP software output.

Appendix F—Climate Change Action

For reference, listed below are some of the key climate change policies that have been adopted at an international level as well as at State and Regional levels. [37]

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

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

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

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

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

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

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

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

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

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

Appendix G—Abbreviations and Acronyms[38]

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

Appendix H—Glossary of Terms[39]

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

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

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

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

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

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