CITY OF RIVERSIDE

Baseline Greenhouse Gas Emissions Inventory and Emission Reduction Strategies

December 2008

EXECUTIVE SUMMARY

Overview

The objective of this study for the City of Riverside (City) is to establish the current greenhouse gas (GHG) emissions inventory, identify actions that the City can take to minimize its carbon footprint, and develop an approach for tracking and reporting future GHG emissions.

The City of Riverside is a signatory of the U.S. Mayors Climate Protection Agreement, which contains pledges to take action to reduce GHG emissions by at least 7% from 1990 levels by the year 2012, in line with the Kyoto Protocol. Participation in the Mayor's Agreement includes membership into ICLEI – Local Governments for Sustainability. Therefore, ICLEI's resources and methods of GHG reporting have been utilized in this inventory.

Current Inventory

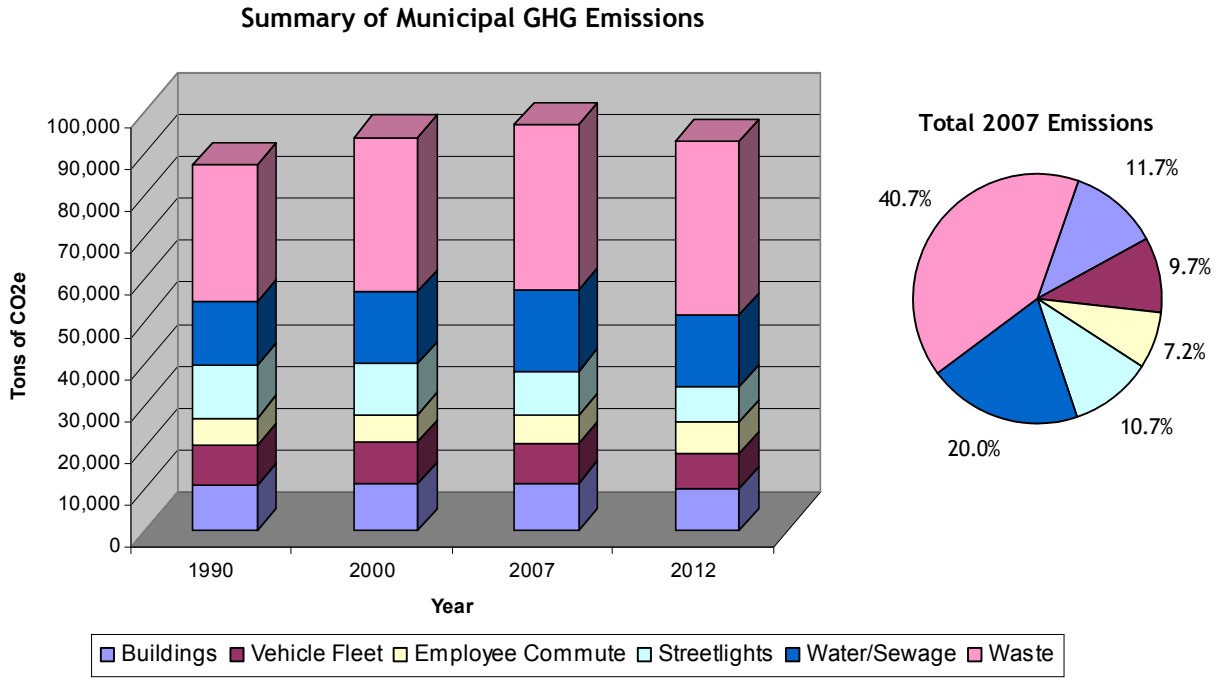
This preliminary study evaluates the current level of GHG emissions from City operations utilizing ICLEI's Clean Air and Climate Protection (CACP) Software and emission accounting protocols by assessing emissions from the following sectors:

- Buildings and Other Facilities
- Vehicle Fleet
- Employee Commute
- Streetlights/Traffic Signals
- Water/Sewage Facilities
- Solid Waste Facilities

The City's estimated GHG emissions for the years 1990, 2000, 2007 and projected GHG emissions for 2012 (as represented by carbon dioxide equivalents, CO_2e) are as follows:

Summary of Municipal GHG Emissions

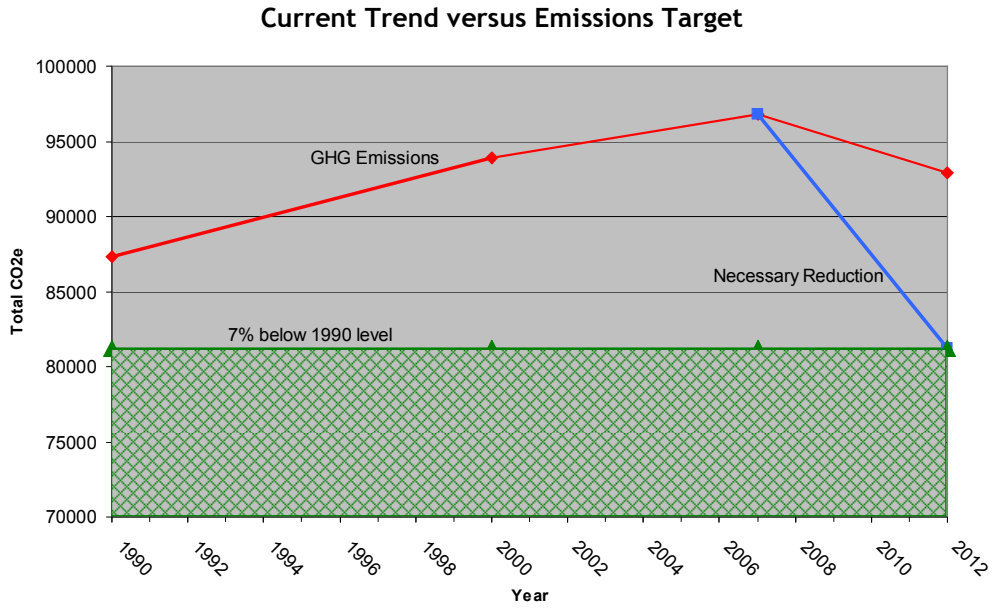
	1990		2000		2007		Projected 2012	
Sector	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total
Buildings	10,660	12.2%	11,124	11.8%	11,354	11.7%	9,902	10.7%
Vehicle Fleet	9,790.1	11.2%	9,835	10.5%	9,345	9.7%	8,529	9.2%
Employee Commute	6,455	7.4%	6,764	7.2%	6,939	7.2%	7,310	7.9%
Streetlights	12,551	14.4%	12,109	12.9%	10,392	10.7%	8,661	9.3%
Water/Sewage	15,231	17.4%	17,050	18.2%	19,382	20.0%	16,919	18.2%
Waste	32,610	37.4%	37,015	39.4%	39,401.7	40.7%	41,566	44.7%
Total	**87,298**	**100%**	**93,898**	**100%**	**96,815**	**100%**	**92,886**	**100%**



Percentage Change

Sector	1990 to 2000	2000 to 2007	Projected 2007 to 2012
Buildings	4.4%	2.1%	-12.8%
Vehicle Fleet	0.5%	-5.0%	-8.7%
Employee Commute	4.8%	2.6%	5.3%
Streetlights	-3.5%	-14.2%	-16.7%
Water/Sewage	11.9%	13.7%	-12.7%
Waste	13.5%	6.4%	5.5%
Weighted Total	**7.6%**	**3.1%**	**-4.1%**

Municipal operations within the City of Riverside produced a calculated 87,298 tons of CO_2e in the year 1990, 93,898 tons in 2000, 96,815 tons in 2007 and are projected to produce 92,886 tons of CO_2e in the year 2012. This is a 7.6% increase in the years between 1990 and 2000. Because of the City's proactive measures to reduce their GHG emissions, the City's percentage of increase is much lower than the national average of 14.2%. This trend can be continued in the future years, and even improved upon to reduce emissions by 7% below 1990 levels by the year 2012 -- the goal set forth in the U.S. Mayor's Climate Protection Agreement. In order to achieve this goal, the City's current output of 96,815 metric tons of CO2e would have to be reduced by at least 11,699 metric tons by 2012.



GHG Emission Reduction Actions

The City of Riverside is committed to becoming a clean, green and sustainable community; this has been demonstrated by their proactive GHG reduction actions as laid out in the Clean and Green Sustainable Riverside Action Plan (Green Action Plan). Measures within this plan that will have direct impacts on municipal operations include:

- Implementation of green building rating systems for all new municipal buildings over 5,000 square feet;
- Implementation of green operations and maintenance for municipal operations and buildings;
- Reduction of per capita portable water usage by 15%;
- Increased numbers of clean vehicles in non-emergency City fleet by at least 60%;
- Implementation of alternative transportation programs for City employees;
- Increased diversion of waste from landfills by 2%;
- Promotion of green purchasing and reduction of upstream waste generation by 10%;
- Increased usage of renewable energy in order to meet 33% of the City's electric load by 2020.

Implementation of the above items in the Green Action Plan will move the City's municipal operations towards reaching at least the 7% reduction in CO_2e as laid out in AB32.

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List of Acronyms

AB32	California Global Warming Solutions Act of 2006
CACP	Clean Air Climate Protection
CARB	California Air Resources Board
CCAR	California Climate Action Registry
CO_2	carbon dioxide
CH_4	methane
CNG	compressed natural gas
E85	ethanol – 85%
GHG	greenhouse gas
HFC	hydrofluorocarbon
ICLEI	Local Governments for Sustainability
kWh	kilowatt hour
LED	light emitting diode
LGO	Local Government Operations
LPG	liquefied petroleum gas
MWh	megawatt hour
N_2O	nitrous oxide
NO_X	oxides of nitrogen
PFC	perflourocarbon
PUP	Power Utility Protocol
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SO_X	oxides of sulfur
SUV	sport utility vehicle
ULSD	ultra low sulfur diesel
VMT	vehicle miles traveled
W	watts

1.0 INTRODUCTION

1.1 OBJECTIVE

The City of Riverside is committed to becoming a clean, green and sustainable community. The City has commissioned this Greenhouse Gas Emissions Inventory Report as part of their ongoing effort to diminish the impact that their community has on the environment, beginning with their municipal operations. This inventory is intended to take account of the emissions generated by current municipal operations, develop an approach for tracking and reporting future emissions, and to recommend best practices for reducing greenhouse gas (GHG) emissions. These green goals are accomplished, in addition to addressing and ultimately complying with GHG reduction goals outlined in the U.S. Mayors Climate Protection Agreement (Mayor's Agreement) and Assembly Bill (AB) 32.

1.2 OVERVIEW OF CLIMATE CHANGE

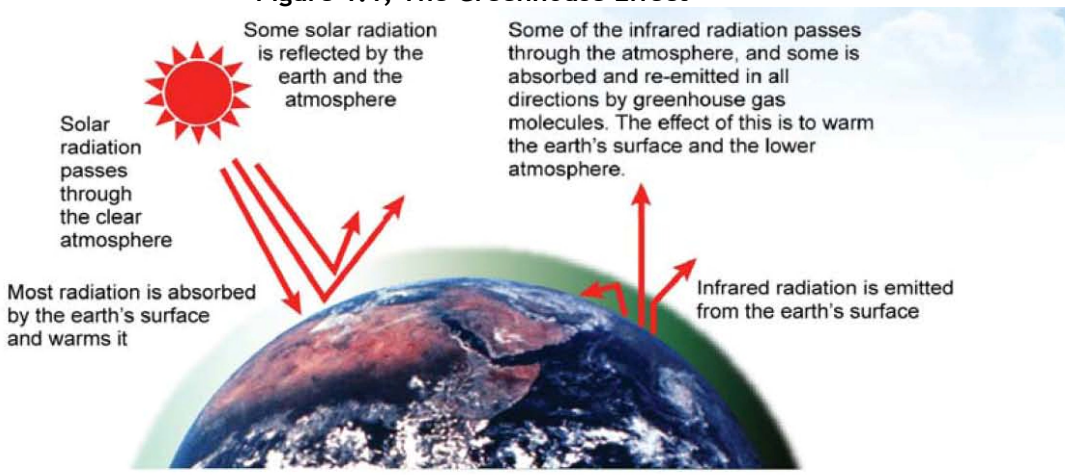
Gases in the earth's atmosphere insulate the planet from radiation originating beyond our atmosphere. The gases in the atmosphere that trap heat inside it are termed greenhouse gases because they cause a natural "greenhouse effect" (Figure 1.1). The sun radiates heat to the earth's surface, where some is absorbed by the earth, and some is reflected out to space. The GHGs in the earth's atmosphere both absorb some of this heat and reflect some of it back to the earth, causing a warming effect.

Some GHGs, such as carbon dioxide (CO_2) and methane (CH_4), occur naturally through processes such as transpiration from plants and vegetation decomposition. CO_2 can also form from anthropogenic or man-made sources such as the combustion of fossil fuels. Other GHGs, such as fluorinated gases are emitted solely from human activities. The significant GHGs emitted due to human activity and the specific focus of international attention via the Kyoto Protocol are CO_2, CH_4, nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perflourocarbons (PFCs), and sulfur hexafluoride (SF_6).

While a natural balance of GHGs contributes to the maintenance of our atmosphere and climate, an excess of anthropogenic GHGs is considered likely to be one of the main factors contributing to the enhanced greenhouse effect known as global climate change.

There are a variety of scenarios for potential impacts from climate change. Potential impacts could include more extreme temperatures, drought, sea level rise, and habitat disturbance.

Figure 1.1, The Greenhouse Effect



Source: U.S. Environmental Protection Agency Climate Change website

1.3 Key Climate Change Legislation And Initiatives

1.3.1 Mayor's Agreement

On February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, became law for the 141 countries that have ratified it to date. On that day, Seattle Mayor Greg Nickels launched the U.S. Mayors Climate Protection Agreement to advance the goals of the Kyoto Protocol through leadership and action. Two years later, the U.S. Conference of Mayors launched the Mayors Climate Protection Center to administer and track the agreement, among its other activities. By November 1, 2007, there were more than 710 signatories to the Agreement. Among these signatories was the City of Riverside's Mayor Ronald Loveridge.

Under the Agreement, participating cities commit to take the following three actions:

- Strive to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns;
- Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas emission reduction target suggested for the United States in the Kyoto Protocol - 7% reduction from 1990 levels by 2012; and
- Urge the U.S. Congress to pass the bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system.

This GHG emissions baseline inventory marks one of the first steps towards the goal of reaching at least a 7% reduction of emissions from 1990 levels by 2012.

1.3.2 AB32

The California Global Warming Solutions Act of 2006 (AB32) adopts a statewide goal to reduce GHG emissions to 1990 levels by 2020. Under this Act, the California Air Resources Board (CARB) is given the authority and a timeline to undertake a number of steps in order to meet this goal.

Key programs to be developed by CARB in order to meet the state's GHG emissions reduction goal under AB32 include:

- The creation of market mechanisms including an enforceable statewide cap on GHG emissions that will be phased in starting in 2012;
- Regulations for the mandatory reporting of GHG emissions by elected emission sources and source categories have already been developed by CARB; and
- Regulations to achieve emission reductions for selected emission sources and source categories in the subsequent years.

Table 1.1, AB32 CARB Action Timeline

By July 1, 2007	CARB forms Environmental Justice and Economic & Technology Advancement advisory committees.
By July 1, 2007	CARB adopts list of discrete early action measures that can be adopted and implemented before January 1, 2010.
By July 1, 2008	CARB adopts regulations for mandatory GHG emissions reporting. CARB defines 1990 emissions baseline for California (including emissions from imported power) and adopts that as the 2020 statewide cap.
Today → By July 1, 2009	CARB adopts plan indicating how emission reductions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions.
By July 1, 2009	CARB staff drafts rule language to implement its plan and holds a series of public workshops on each measure (including market mechanisms).
By July 1, 2010	Early Action Measures take effect.
By July 1, 2010	CARB conducts a series of rulemakings, after workshops and public hearings, to adopt GHG regulations, including rules governing market mechanisms.
By July 1, 2011	CARB completes major rulemakings for reducing GHGs, including market mechanisms. CARB may revise the rules and adopt new ones after January 1, 2011 in furtherance of the 2020 cap.
By July 1, 2012	GHG rules and market mechanisms adopted by CARB take effect and are legally enforceable.
By July 1, 2020	Deadline for achieving 2020 GHG emissions cap.

1.4 APPROACH

Accounting for GHG emissions is a relatively new field, yet is has been developing rapidly in conjunction with growing with public awareness and concern relating to global climate change.

The City of Riverside became an ICLEI – Local Governments for Sustainability member when it became a signatory to the U.S. Mayor's Agreement, as ICLEI was the current leader in the development of accounting methodology. ICLEI's protocol was utilized to develop this inventory. The "Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions", was not yet finalized when this inventory started to be developed. As such, further work may be required in the future to update this inventory to meet protocol requirements.

ICLEI and CACP

ICLEI was founded in 1990 as 'The International Council for Local Environmental Initiatives', and is a membership association of local governments that have made a commitment to sustainable development. The organization is now officially known as ICLEI - Local Governments for Sustainability. Through its Cities for Climate Protection campaign, ICLEI is a leader in the development of accounting methodology for local communities' GHG emission inventories. ICLEI coordinates its work with the California Climate Action Registry (CCAR), the U.S. Department of Energy, the U.S. Environmental Protection Agency, and State and Territorial Air Pollution Program Administrators - Association of Local Air Pollution Control Officials (STAPPA/ALAPCO). ICLEI, in collaboration with STAPPA/ALAPCO has

developed and released the CACP Software. CACP is a valuable tool that has enabled various local governments to inventory their GHG emissions, quantify the benefits of reduction measures, and formulate local climate action plans. The CACP software has been used precisely for these purposes within this inventory.

It is anticipated that this software tool will be revised by ICLEI in 2009 with the release of the Next Generation Emissions Analysis Tool, which will be consistent with the Local Government Operations Protocol.

Data Collection
This inventory encompasses all aspects of the City's municipal operations, and is separated into the following sectors:

- Buildings and Other Facilities
- Vehicle Fleet
- Employee Commute
- Streetlights/Traffic Signals
- Water/Sewage Facilities
- Solid Waste Facilities

Data from 2007 is the most recent full calendar year with the most complete data available from the aforementioned City sectors. Therefore, 2007 was utilized as the initial reporting (baseline) year for this inventory as it was based on the most reliable data. While 1990 as a base year is stipulated by the Kyoto Protocol, data records from this year were, for the most part, unavailable. As such, estimates for 1990 and 2000 were based on actual data or backcasted data which was correlated to changes in employee, city population or other data which was considered appropriate to generate the most accurate results. Forecasted 2012 emissions, as presented throughout the report, take into account growth within the City, as well as reduction measures already in place. Any assumptions, as well as data sources, are presented in Section 4, Activity Data Details.

2.0 Local Government Profile Information

The City of Riverside was founded in 1870, and the first orange trees were planted in 1871. The following years led to the establishment and success of the citrus industry and the blooming of the City of Riverside. Even today, the Inland Empire is still experiencing rapid growth, now with increases in the residential and business sectors.

Being in one the fastest growing areas in the state and with the City Council's dedication to creating a clean and sustainable future, the City has taken key steps toward ensuring sustainable growth to preserving the health of the local environment. The Green Action Plan addresses seven broad categories encompassing all aspects of living in Riverside including: energy, greenhouse gas emissions, waste reduction, urban design, urban nature, transportation, and water.

Location and Size

The City of Riverside is located in the northwest portion of Riverside County. Riverside is situated just southwest of the 91 and 60 Freeways at the juncture of Interstate 215 with established transportation corridors accessible by freeway, air, train or bus.

According to the United States Census Bureau, the city has a total area of 78.4 square miles (203.0 km^2), of which, 78.1 square miles (202.3 km^2) of it is land and 0.3 square miles (0.7 km^2) of it is water. The total area is 0.36% water. Riverside is the 61st-largest city in the United States, and the largest city in California's Inland Empire region, the 14th-largest metropolitan area in the nation.

Population

In 2007, growth in the Riverside metropolitan area was the 5th largest in the nation. According to the United States Census Bureau, in 1990, the City had a population of 226,546 residents and in 2000, the City had a population of 255,166 residents. According to California Department of Finance estimates, in 2007 the City's population consisted of 296,842 people. Population in the 17 years from 1990 to 2007 has experienced a 31% growth. According to the City of Riverside General Plan and Supporting Documents Environmental Impact Report, the projected population in 2025 will be 346,867. Assuming a linear growth rate, a population estimate of 310,738 in 2012 was derived. Much of this projected growth will result from infill and redevelopment within the City. The growth of the City's resident population is shown in Figure 2.1, City Population.

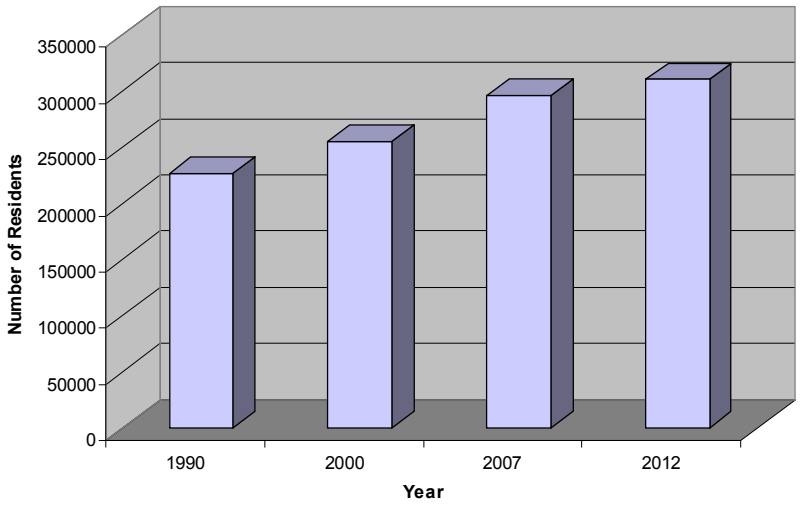
As with any city, an increase in population correlates with the need to expand city services. With increased growth and expansion comes the potential for an increase in greenhouse gas emissions unless significant steps are taken to reduce emissions within both municipal and community operations.

Top ten metropolitan population increases

	Metropolitan statistical area	Number increase 2000-'06
1.	Atlanta	890,211
2.	Dallas-Fort Worth	842,449
3.	Houston	824,547
4.	Phoenix	787,306
5.	**Riverside**	**771,314**
6.	Los Angeles	584,510
7.	New York	495,154
8.	Washington	494,220
9.	Miami	455,869
10.	Chicago	407,133

Source: U.S. Census Bureau

Figure 2.1, City Population

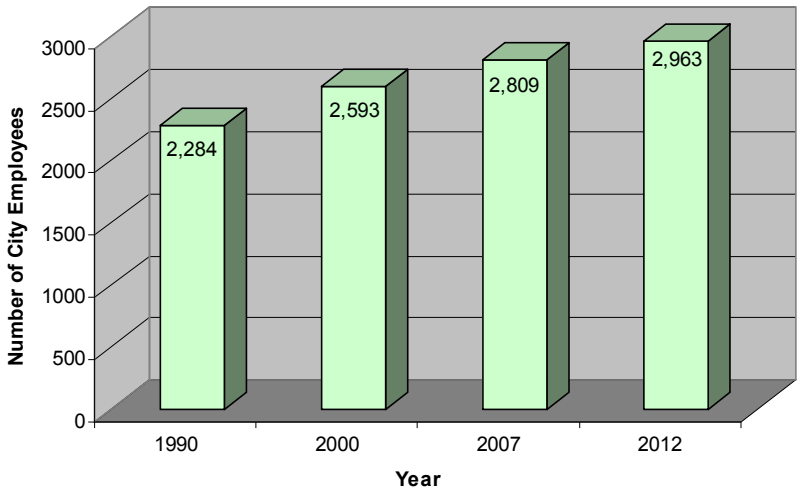


Employees

The City has a multifaceted workforce that encompasses a wide range of essential services and managerial offices. City employees facilitate much of the necessary daily operations and support the departments that provide basic City services.

According to information provided by the City of Riverside Human Resources Department, the City employed 2,809 staff members at the start of 2008 (this number was assumed to represent 2007 employee numbers) and 2,593 staff members in the year 2000. Based on these numbers, it was estimated that 2,284 staff members were employed in 1990 and 2,963 staff members are projected to be employed in 2012. The growth of the City's work force is shown in Figure 2.2.

Figure 2.2, City Employees



Services

The City provides a wide range of services including administrative services, community planning/development, emergency services, parks, libraries, utilities and museums.

The City is organized into sixteen departments which include:

1. Airport
2. City Clerk
3. City Manager – Administration
4. City Manager – Finance
5. Community Development
6. Development
7. General Services
8. Fire
9. Human Resources
10. Library
11. Mayor's Office
12. Museum
13. Park, Recreation, and Community Service
14. Police
15. Public Works
16. Public Utilities

3.0 GREENHOUSE GAS INVENTORY DETAILS

3.1 RIVERSIDE'S SOURCES OF GHGS

From 1990 to 2000, overall GHG emissions produced by municipal activities within the City of Riverside increased by 7.5%. A critical factor in this rise is the continued growth and development within the City. For comparison, GHG emissions nationwide increased by 14.2% between 1990 and 2000, according to the U.S. Environmental Protection Agency. The following table and chart summarize the GHG emissions from City operations in 1990, 2000, 2007, and projected emissions in 2012.

Table 3.1, Summary of Municipal GHG Emissions

	1990		2000		2007		Projected 2012	
Sector	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total	CO_2e (tons)	% of Total
Buildings	10,660	12.2%	11,124	11.8%	11,354	11.7%	9,902	10.7%
Vehicle Fleet	9,790.1	11.2%	9,835	10.5%	9,345	9.7%	8,529	9.2%
Employee Commute	6,455	7.4%	6,764	7.2%	6,939	7.2%	7,310	7.9%
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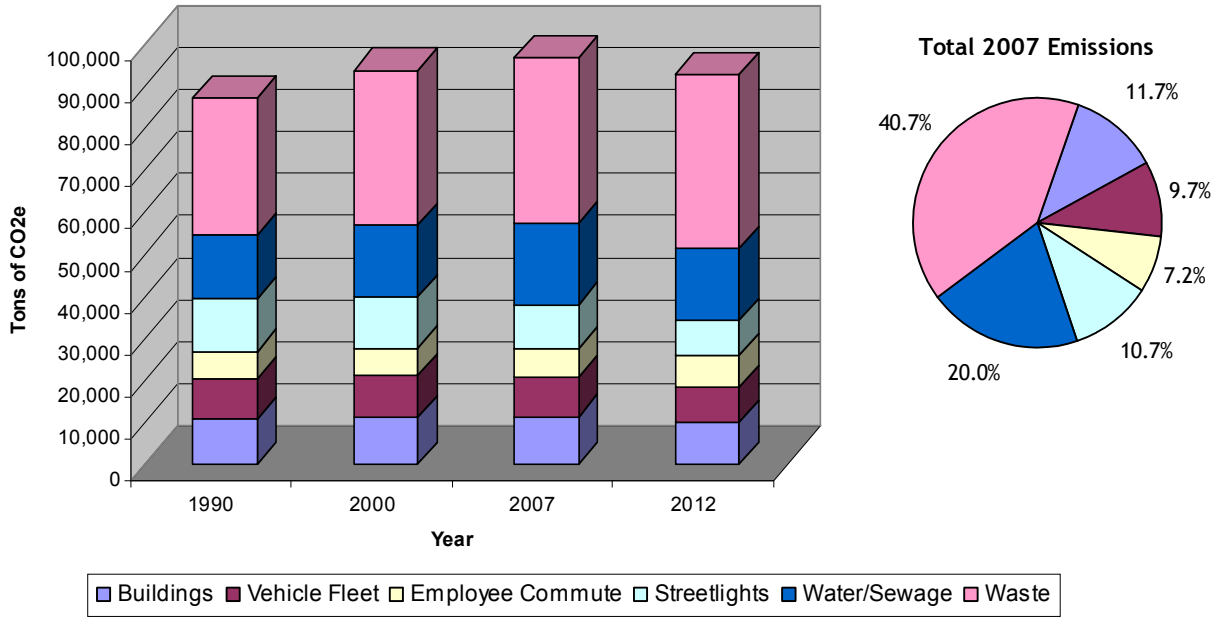
Figure 3.1, Summary of Municipal GHG Emissions



3.1.1 Buildings and Other Facilities

Description

The City currently owns and operates over 200 buildings. Included among these buildings are administrative uses, libraries (including a cybrary), museums, fire stations, police stations, Riverside Airport and Aerial Labs, and approximately 52 parks and recreation areas (including community centers). For calculation purposes, also included within the "building" category are buildings that are temporarily owned by the City's Redevelopment Agency, and power meters/poles.

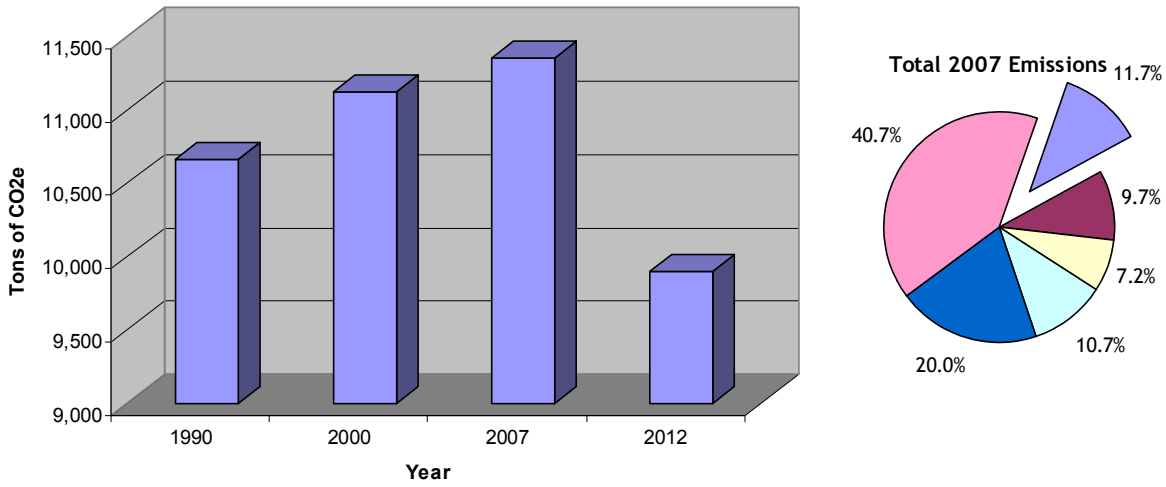
Results

The primary GHG emissions from building use are associated with the electricity and natural gas usage. In 2007, the City's buildings utilized an estimated 14,532,963 kilowatt hours (kWh) of electricity, 191,577 therms of natural gas and 28,518 gallons of diesel fuel. This energy usage resulted in a total of 11,354 tons of CO_2e emissions in 2007. The CO_2e attributed to the City's buildings and other facilities are as follows:

Table 3.2, GHG Emissions from City Buildings

	1990	2000	2007	2012
Metric Tons CO_2e	10,660	11,124	11,354	9,902

Figure 3.2, GHG Emissions from City Buildings



Energy usage from City buildings is expected to increase annually; however, overall emissions will decrease by 2012 with the City's program to increase its usage of renewable energy by 20% by 2010.

3.1.2 Vehicle Fleet

Description

The City maintains a fleet of approximately 1,400 vehicles. These vehicles vary greatly in their uses, but include sedans, pickup trucks, sport utility vehicles (SUVs), vans, street sweepers, refuse packers, fire trucks, and a variety of other heavy duty trucks and equipment. In addition to the City fleet, the Riverside Police Department utilizes approximately 400 vehicles comprised mainly of sedans and motorcycles, but also including pickup trucks, vans, and SUVs.

Currently, over 400 of the City's fleet utilize various forms of alternative fuels. An impressive 98% of all sedans have been converted to more eco-friendly compressed natural gas (CNG), hybrid or hydrogen vehicles. Other advanced forms of alternatively fueled vehicles include liquefied petroleum gas (LPG), ethanol, full electric and hybrid electric.

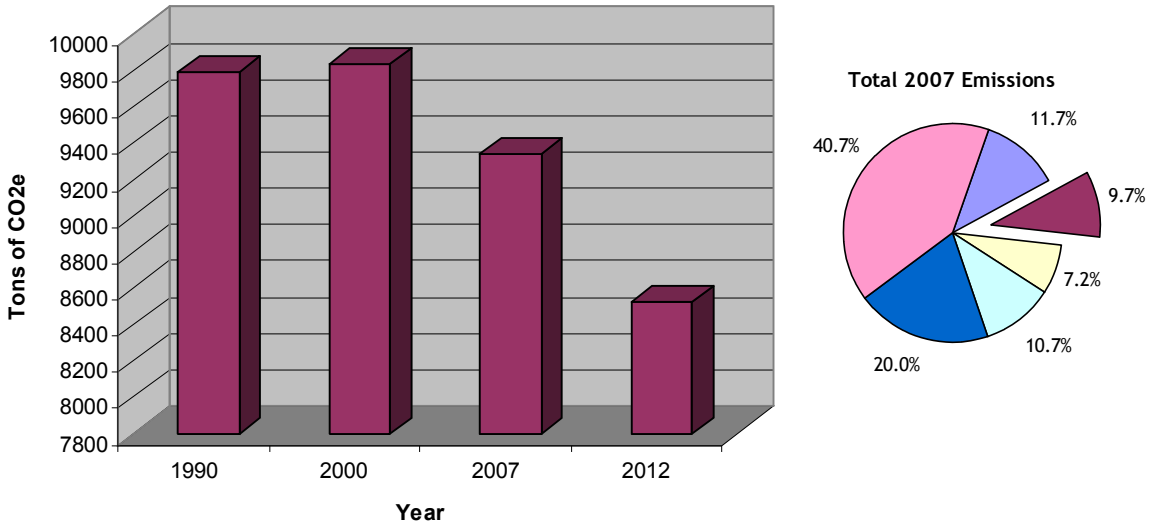
Results

In the year 2007, over 10 million miles were traveled by City vehicles and City police vehicles. Vehicle types and their respective miles driven were used to translate these miles into 9,345 tons of CO_2e in 2007. This is a decrease in emissions from previous years, as shown below:

Table 3.3, GHG Emissions from City Fleet Vehicles

	1990	2000	2007	2012
Metric Tons CO_2e	9,790	9,835	9,345	8,529

Figure 3.3, GHG Emissions from City Fleet Vehicles



Even though the number of miles driven has increased since 1990, greenhouse gas emissions have experienced a significant decrease due to technological advancements and air quality regulations leading to cleaner burning vehicles. The City has been proactive in making a great effort to reduce their emissions by their more recent utilization of alternative fuels. This is reflected in the decrease in emissions between 2000 and 2007 as shown above. Additionally, emissions are anticipated to continue to decrease to 2012, as the City increases their alternative fuel usage.

3.1.3 Employee Commute

Description
In 2007, 2,809 employees were employed by the City of Riverside. A breakdown of employee's County of residence and distance from the City of Riverside is presented below:

County	Average Distance (miles)	Number of Employees
Kern	170.7	1
Los Angeles	40.2	46
Maricopa	343.6	1
Orange	35.5	61
Riverside	***8.6***	***2206***
Sacramento	430.9	1
San Bernardino	21.4	467
San Diego	74.7	24
Ventura	115.6	2

An estimated 2,593 employees were employed in 2000.

Employee commute patterns were not known; however, it was assumed that this matched U.S. Census Year 2000 mode share percentages for various counties as listed in the U.S. Census Bureau's 2000 *Census Transportation Planning Package* (2004):

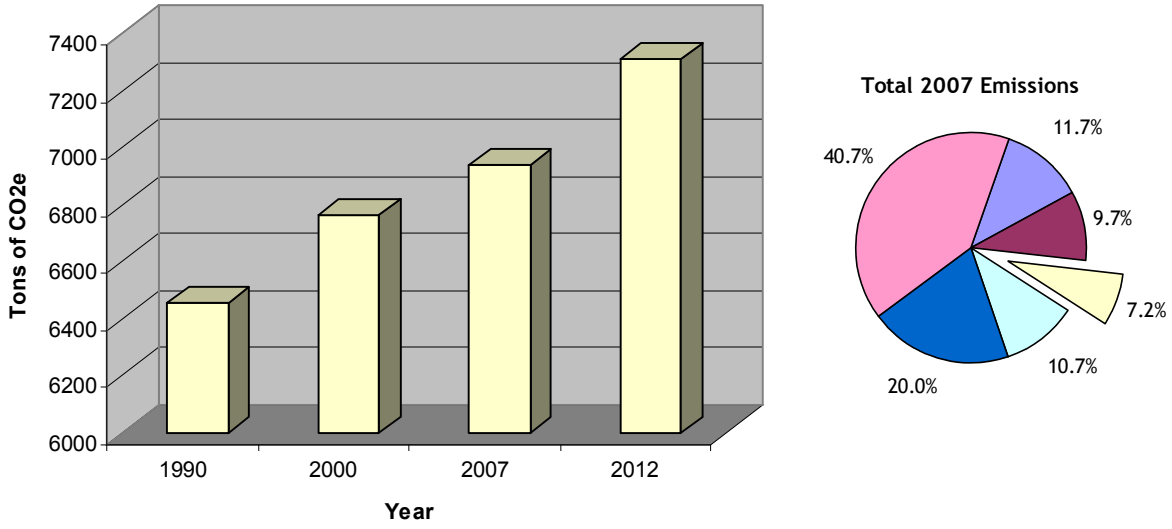
County	Drive Alone	Carpool	Bus/ Trolley/ Streetcar	Subway/ Rail	Bicycle	Walk	Taxi	Motorcycle	Work from home	Other
Kern	72.73%	27.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Los Angeles	73.55%	23.82%	0.97%	0.11%	0.27%	0.27%	0.00%	0.22%	0.00%	0.81%
Orange	79.76%	19.22%	0.26%	0.03%	0.03%	0.03%	0.00%	0.00%	0.00%	0.66%
Riverside	***72.06%***	***16.68%***	***1.24%***	***0.04%***	***0.70%***	***2.57%***	***0.02%***	***0.23%***	***5.46%***	***1.00%***
Sacramento	74.32%	5.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.27%
San Bernadino	79.55%	18.73%	0.43%	0.05%	0.03%	0.37%	0.00%	0.27%	0.00%	0.58%
San Diego	80.19%	17.69%	0.60%	0.00%	0.26%	0.51%	0.00%	0.34%	0.00%	0.43%
Ventura	83.33%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Results
The primary GHG emissions from employee commuting are associated with gasoline and diesel combustion. In 2007, City employees that travel to and from work put an estimated 13,891,507 passenger miles on their cars, of which 11,380,801 miles were by drive-alone commuters, generating 6,939 metric tons of CO_2e from all transport modes. The CO_2e attributed to employee commuting is shown below:

Table 3.4, GHG Emissions from Employee Commuting

	1990	2000	2007	2012
Metric Tons CO_2e	6,455	6,764	6,939	7,310

Figure 3.4, GHG Emissions from Employee Commuting



3.1.4 Streetlights and Traffic Signals

Description

Between 1990 and 2007, the City owned and operated the following streetlights:

Lamp Type	Wattage	Number of Lamps in 1990	Number of Lamps in 2000	Number of Lamps in 2007
Incandescent	100	88	88	88
	200	135	135	135
	400	44	44	44
Mercury Vapor	100	445	445	445
	175	11,302	9,302	1,702
	400	12	12	12
High Pressure Sodium	70	2,443	2,443	2443
	100	8,487	10,487	18,087
	150	824	824	824
	200	4,361	4,361	4,361
	250	741	741	741
	400	290	290	290

The above streetlights are each operated for approximately 4,148 hours per year.

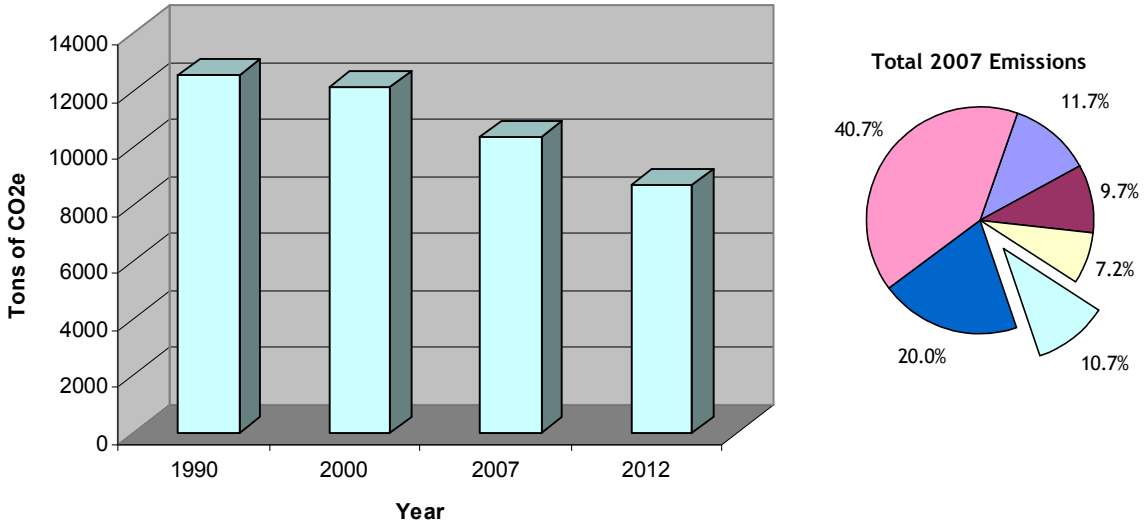
In a change-out program that occurred between 1996 and 2007, 9,600 175 watt (W) mercury vapor lights were converted to 100W high pressure sodium lamps.
The City also owns and operates approximately 9,873 traffic signals. These were previously all incandescent lamps; however, all lamps were changed to lower wattage light emitting diode (LED) lamps in 2000.

Results
The primary GHG emissions from streetlights and traffic signals are from purchased electricity. In 2007, streetlights and traffic signals consumed over 15,253,000 kWh and 50,368 kWh of electricity respectively, generating a total of 10,392 metric tons of CO_2e. The CO_2e attributed to streetlights and traffic signals in each year is shown below:

Table 3.5, GHG Emissions from Streetlights/Traffic Signals

	1990	2000	2007	2012
Metric Tons CO_2e	12,551	12,109	10,392	8,661

Figure 3.5, GHG Emissions from Streetlights/Traffic Signals



The emissions from streetlights/traffic signals are projected to decrease as the City continues to replace its lights with more energy-efficient models.

3.1.5 Water/Sewage Facilities

Description

The City owns and operates a number of water/wastewater related facilities including:

- The Riverside Regional Water Quality Control Plant
- Sewage Disposal Plant
- Pump Stations
- Booster Stations
- Water Meters
- Wells
- Reservoirs

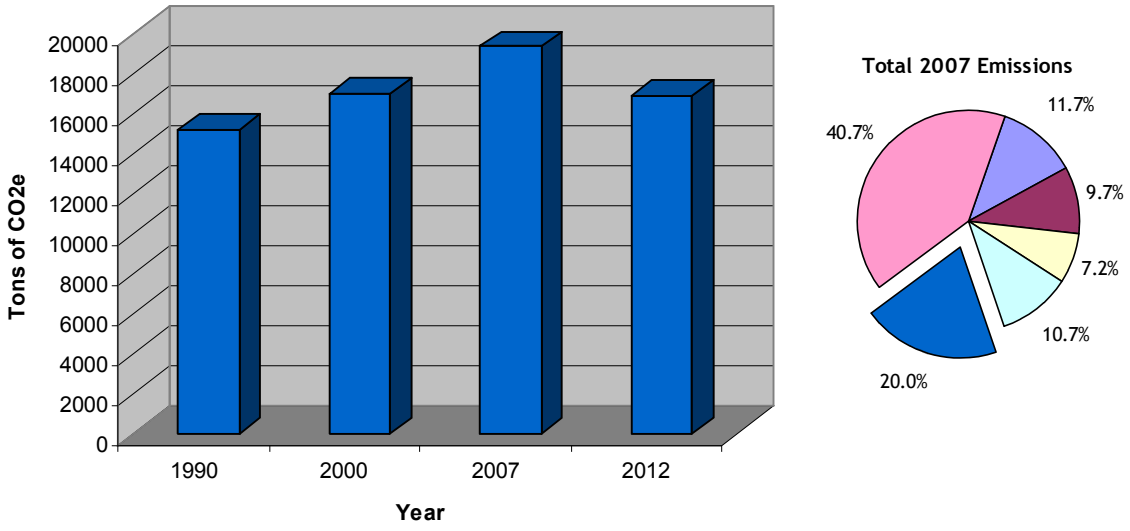
Results

The primary GHG emissions from water and sewage facilities are from natural gas combustion and purchased electricity. In 2007, GHG emissions totaled 19,018 metric tons of CO_2e. The CO_2e attributed to water and wastewater in each year is shown below:

Table 3.6, GHG Emissions from Water and Wastewater

	1990	2000	2007	2012
Metric Tons CO_2e	15,231	17,050	19,382	16,919

Figure 3.6, GHG Emissions from Water/Wastewater



The City of Riverside's Water Quality Control Plant Cogeneration facility and boilers using digester gas would save over 3,762 and 1,346 metric tons of CO_2e respectively in 2012 compared to hypothetically using an equivalent amount of natural gas.

Combined, this reduction is equivalent to the amount of carbon sequestered by 133,282 tree seedlings grown for 10 years.

3.1.6 Waste

Description

Office waste, green waste and construction waste is generated by the City at various buildings and operations.

This waste is collected by three commercial waste contractors and transferred to various managed landfills. Landfill waste is sent to either Badlands landfill with a methane gas to energy plant, El Sobrante landfill with a not fully functional gas to energy plant and flare, or Lamb Canyon landfill with a methane flare. In 2007, 133,765 metric tons of waste was estimated to be disposed of to landfills.

Waste from City Hall and two other buildings have been collected for recycling since 2006. In 2007, 1,183 metric tons of waste was recycled from City Hall and other City buildings.

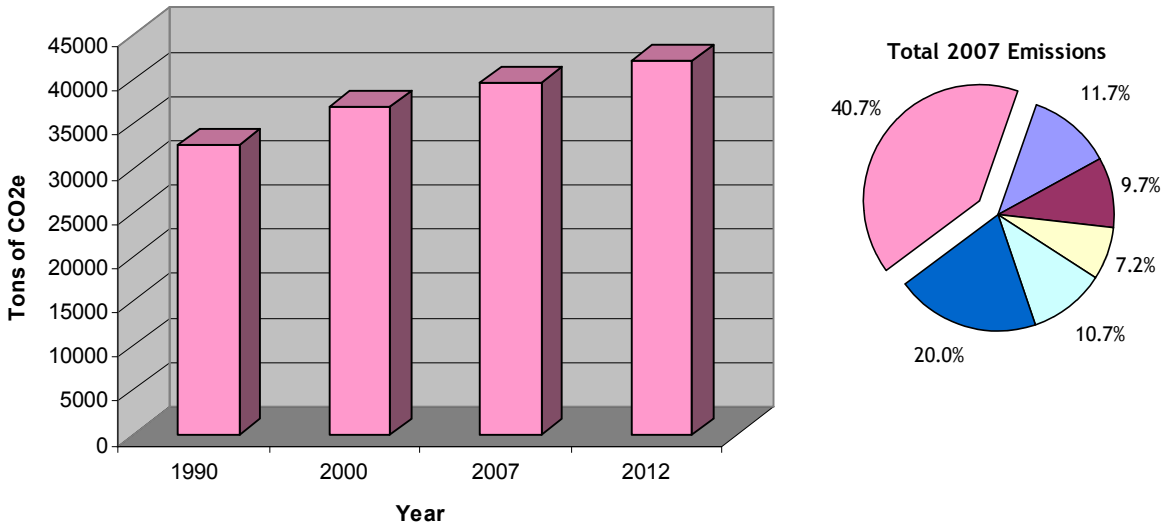
Results

The primary GHG emissions are from decomposition of organic waste. In 2007, total GHG emissions were 39,625 metric tons of CO_2e. The CO_2e attributed to waste in each year is as follows:

Table 3.7, GHG Emissions from Waste

	1990	2000	2007	2012
Metric Tons CO_2e	32,610	37,015	39,625	42,171

Figure 3.7, GHG Emissions from Waste



The City's Office Waste recycling program has prevented approximately 1,183 metric tons of waste from filling landfills in 2007. This is equal to over 260,800,000 sheets of office paper, or the weight of 311 elephants.

The CO_2e savings are equivalent to an estimated 632 metric tons of CO_2e emissions. Additionally, the program will continue to save emissions annually, and is anticipated to save 666 metric tons of CO_2e emissions in the year 2012.

3.1.7 Other (Riverside Public Utilities)

Description

The City generates power for sale to the public and for its own operations through Riverside Public Utilities. As some of this electricity is used in City operated buildings, water/wastewater facilities and streetlighting, it is already counted in separate sections in the City Operations inventory, and would be considered double counting to separately total the actual GHG emissions from power generation facilities operated by Riverside Public Utilities.

When a community level greenhouse gas inventory is prepared by the City of Riverside, this will account for emissions which are the result of residential/commercial and industrial consumption of purchased electricity generated by Riverside Public Utilities. As such, these emissions are not included in the City's GHG Inventory as summarized in this report.

Some of the emissions from the operation of Riverside Public Utilities cannot be attributed to either City operations or the community inventory. For example, retail and wholesale sales outside of the City's boundaries are not included in either of these inventories.

Riverside Public Utilities has developed a separate GHG inventory for its operations according to CCAR's Electricity Utilities protocol. The 2006 inventory has been verified, while the 2007 inventory is awaiting verification.

For City departments apart from Riverside Public Utilities, a small proportion of on-site power generation which occurs through cogeneration, generators and solar power at various City operated facilities is included where applicable in the buildings or water/wastewater section of the City GHG inventory.

Note: The unverified GHG emissions for Riverside Public Utilities in 2007 were 1,001,373 metric tons of CO_2e for direct emissions and 52,564 metric tons of CO_2e for indirect emissions.

Additionally, the emissions resulting from the sale of electricity outside the City's boundaries will not be reported within the City Operations or Community inventories. The emissions resulting from the sale of 297,842 MWh would equate to 180,532 metric tons of CO_2e in 2007.

4.0 Activity Data Details

4.1 Sources of all activity data reported

4.1.1 Employees and Resident Population

The number of employees at the start of 2008 and 2000 was supplied by the City of Riverside Human Resources Department. This data was backcast to 1990 and forecast to 2012 using the rate of change in employee numbers over this period. The proportion of employees in each employment category was supplied by the City of Riverside Human Resources Department. The proportion of employees in each employment category was assumed to remain the same over time.

1990 and 2000 City population data was obtained from the U.S. Census Bureau, and population data for 2007 was obtained from California Department of Finance estimates. 2025 City population data was obtained from the City of Riverside General Plan and Supporting Documents Environmental Impact Report.

4.1.2 Buildings and Other Facilities

Electricity usage from City owned buildings and other facilities for the years 2000 and 2007 was obtained from the electricity bills from the Riverside Public Utilities. Data within account numbers 167075 and 260296 were utilized, as they are City-owned accounts. Since 1990 data was unavailable, the rate of change between usage in 2000 and 2007 was used to backcast 1990 data. The rate of change, as well as the City's program to increase its usage of renewable energy by 20% by 2010 was used to forecast 2012 data.

Since the electricity bills included various sectors of municipal operations, the electricity usage was allocated to either the Buildings or Water/Wastewater section of the City's GHG Inventory depending on the individual facility usage. Any unidentified facilities were grouped together and assumed to fall under the Building category. Included in the Building category were parks, libraries, museums, administrative buildings, fire and police departments, Riverside Airport and Aerial Labs, buildings associated with public utilities and fleet management, temporary City-owned buildings with the Redevelopment Agency, City parking structures, and power meters and poles.

Natural Gas Stationary Combustion

Natural gas usage for the City's accounts was supplied by the City's representative for Southern California Gas Company. This usage was allocated to either the Buildings or Water/Wastewater section of the City's GHG Inventory depending on the facility usage.

Stationary Diesel Fuel Usage

Stationary diesel fuel usage in other emergency generators was supplied by the Fleet Director for the City's General Services Department. This information was included in the Buildings and Other Facilities sector.

4.1.3 Vehicle Fleet

An inventory of vehicles owned by the City, including alternative fuel vehicles and each of the vehicle's respective miles traveled in 2007, was provided by the Fleet Director for the General Services Department.

An inventory of vehicles owned by the Police Department and each of the vehicle's respective miles traveled for 2007 was provided by the Senior Office Specialist with the Riverside Police Department.

Vehicle CNG usage for 2003 to 2008 was provided by the Fleet Director and the Operations Manager for the General Services Department.

No 2000 or 1990 vehicle data was available, so the mileage data was backcasted using the rate of change within the employee population for various vehicles classes. Data for 2012 was forecasted based on miles traveled trends and the City's targeted amounts of alternative fuel usage.

In 1990 and 2000, no alternative fuels (i.e. CNG, LPG, hybrids, hydrogen, or E85) were being utilized. Therefore, backcast alternative fuel usage from 2007 was assumed to have been diesel or gasoline usage in 1990 and 2000, depending on the vehicle class.

As of September 2006, California law required all diesel fuel to be ultra low sulfur diesel (ULSD). Therefore, it was assumed that any diesel usage prior to 2006 was regular diesel (not ULSD).

"Scooters" within vehicle fleet were placed into the motorcycle category.

4.1.4 Employee Commute

Employee commute mode was assumed to match U.S. Census Year 2000 mode share percentages for various counties as listed in the U.S. Census Bureau's 2000 *Census Transportation Planning Package* (2004).

The number of employees from various postcodes was obtained from the Human Resources Department. Trip distances from each zip code to the City of Riverside were then calculated using zip code databases and Google map trip distance calculators. The average trip distance from each County to the City was then calculated.

The estimated number of trips per year per employee type is shown in the following table:

Employee Type	Days of Work per Year	Trips per Year
Fulltime Benefited	250	500
½ Time Benefited	150	300
¾ Time Benefited	200	400
Temp/Part Time	50	100

The total trip distance for each mode type was then calculated by multiplying the number of employees in each County by the average mode share by the average trip distance by the proportion of employees in each category and number of trips per year.

4.1.5 Streetlights and Traffic Signals

Streetlighting lamp data and hours of operation were supplied by the Public Works Department for 2007 along with a description of the mercury vapor change-out program in previous years.

Traffic light electricity usage and other data for the years 1988 and 2000 were supplied by the Public Works Department. Data from 1990 was assumed to be the same as 1988 data, and 2007 data was assumed to match 2000 data when all incandescent lamps were changed to LEDs.

4.1.6 Water and Sewage Facilities

At the City's water and sewage facilities, the following emission sources were included in the emission inventory:

- Natural Gas Combustion in various small boilers/hot water systems etc. This was represented by various Southern California Gas account numbers including 1225240200, 1896235000, 848229700, 1295833155, and 1421253900.
- Natural Gas Combustion in cogeneration engines from January 2001 onwards.
- Natural gas and digester gas consumed in the fuel cell which began operation in June 2008. This fuel cell converts digester gas to hydrogen gas via a non-combustive process. This hydrogen gas is then used to generate electricity.
- Natural gas usage in the cogeneration engines and fuel cell is represented by Southern California Gas account number 1295833155.
- Landfill gas combustion in cogeneration engines from January 2001 to early 2005. This landfill gas was sent from the Tequesquite Landfill but is now flared on-site at the Landfill.
- Digester gas combustion in boilers, flares and cogeneration engines.
- Electricity purchased from Riverside Public Utilities for use at facilities such as pump stations/pump meters/booster stations/water meters/reservoirs/sewage disposal plant and the Riverside Regional Water Quality Control Plant.

Digester Gas Stationary Combustion

Digester gas production from the Regional Water Quality Control Plant (Plant) cogeneration engines from 1992 to 2008 was supplied by the Wastewater Resources Analyst from the Plant. For 1990, the rate was assumed to equal 1991 rates discussed in the *Wastewater Collection and Treatment Facilities Masterplan* (2008).

Digester gas combustion in flares, cogeneration engines and boilers for 1992 to 2008 was supplied by the Wastewater Resources Analyst from the Plant. For 1990 and 2000, the combustion in each of the flares and boilers was assumed to match the same proportion as 2001 biogas production and combustion in each of these sources. For 1990 and 2000, combustion of digester gas in cogeneration engines was assumed to be zero, as these engines were not yet operational.

Any excess digester gas not consumed in combustion was assumed to be absorbed by passive carbon absorbers and not released directly to the atmosphere.

Landfill Gas Stationary Combustion

The amount of landfill gas used in the Plant cogeneration engines was supplied by the Wastewater Resources Department. Landfill gas was only utilized by the Plant for this purpose between 2001 and 2005. No landfill gas was used for cogeneration during the inventory years 1990, 2000, and 2007 or projected for 2012.

Diesel Fuel Stationary Combustion

Stationary diesel fuel usage in diesel engines was supplied by the Wastewater Resources Analyst from the Plant. This was allocated to the Water/Wastewater section of the City's GHG Inventory.

4.1.7 Waste

Waste data was supplied by the City of Riverside's Public Works Department.

A typical waste composition for public administration organizations was obtained from the California Integrated Waste Management Board's *Business Waste Composition Study* (1999) as shown below:

Code	Waste Type	% Composition
1	Paper	39.40%
2	Glass	2.80%
3	Metal	4.80%
4	Plastic	10.90%
5	Other Organic	27.70%
6	Construction and Demolition	12.90%
7	Household Hazardous Waste	0.20%
8	Special Waste	1.20%
9	Mixed Residue	0.20%

In 2007, 133,765 metric tons of waste was sent to landfills from various City buildings.

In 2007, 1,183 metric tons of waste was recycled from City Hall and other City buildings. It was assumed that only paper, plastics and metals were recycled by the City. The typical composition of the landfill and recycling waste streams was then updated to reflect the diversion of these waste types to recycling. No recycling was undertaken in 2000 or 1990.

According to information provided by the Human Resources Department, the City employed 2,809 staff members at the start of 2008 (this number was assumed to represent 2007 employee numbers), 2,593 staff members in the year 2000. These numbers were extrapolated to estimate 2,284 staff members in 1990 and 2,963 staff members in 2012.

Per employee waste disposal and recycling rates for 2007 were used to derive estimates for other years. This resulted in the following calculations for waste tonnages to landfill and recycling from City operations.

Table 4.2, GHG Emissions from Waste

	1990	2000	2007	2012
Landfilled Waste Tons	109,747	124,571	133,765	141,113
Recycled Waste Tons	0	0	1,183	1,247

The landfills to which waste is sent either use landfill gas flares to control emissions or are waste-to-energy facilities.

4.2 METHODOLOGY/EMISSION FACTOR DETAILS

4.2.1 Fuel Emission Factors

Default fuel combustion emission factors were based on ICLEI's CACP software default emission factors.

4.2.2 Purchased Electricity Emission Factors

Electricity CO_2 emission factors from 1990 and 2000 were based on Riverside Public Utilities' verified 2006 Power Utility Protocol (PUP) report electricity deliveries emission factor as included in CCAR public reporting. Because the actual resource mix was not able to be obtained for 1990 and 2000, Riverside Public Utilities' PUP report CO_2 emission factor was taken to be the most accurate emission factor available. The default emission factor included in the CACP software was not considered to be representative, as the typical state power mix has a higher proportion of renewable energy than Riverside Public Utilities, for which coal fired power stations form a large proportion of the power mix. The actual power mix for 1990 and 2000 was not known; however, so it was not possible to develop an accurate emission factor for these years and instead the verified 2006 emission factor was used based on the assumption that the power resource mix has not changed significantly since this time.

Electricity CO_2 emission factors for 2007 were based on Riverside Public Utilities' not yet verified 2007 PUP report electricity deliveries emission factor as supplied by City staff. When this electricity emission factor is verified by CCAR, this can be updated in the CCAR software if any changes are required.

The 2007 PUP report data was used to derive an estimated 2012 electricity CO_2 emission factor, based on Riverside Public Utilities stated RPS goals of 20% eligible renewables by 2010 and 25% by 2015.

Electricity CH_4 and N_2O electricity emission factors for all years were based on default ICLEI CACP software emission factors for Region 13. ICLEI default emission factors were used for these gases are more accurate figures are not included in CCAR public reporting for Riverside Public Utilities.

5.0 Conclusions and Recommendations

5.1 Riverside's Current GHG Emission Reduction Actions

The City of Riverside is currently taking various proactive measures in order to reduce GHG emissions. The City's approach consists of multiple renewable fuel power generation projects, public incentive programs, and a communications and marketing campaign. Additionally, the Clean and Green Sustainable Riverside Action Plan outlines many current and proposed methods of reducing emissions.

City actions that relate specifically to municipal operations include the following:

- Cogeneration with methane (grease wastewater) is a program which is converting grease wastewater from restaurants into clean, cost-effective energy. (http://www.switchonenergy.com/greasetogas.html)
- Methane with sewage to power 1 megawatt (MW) fuel cell power plant is a program brought on line June 9, 2008. The program is intended to replace one third of the power needed to run the sewage treatment facility. (http://www.pe.com/localnews/environment/stories/PE_News_Local_S_fuelcell04.35d916c.html)
- There are currently nine utility funded Photovoltaic Solar installations around the City that are producing 529.4 kW.
- In the year 2000, the City's fleet was 0% alternatively fueled. Today, 40% of the City's fleet consists of either alternatively fueled vehicles or low emission gas hybrids.

5.2 Recommended GHG Emission Reduction Actions

The reduction actions below pertain to municipal operations and have been taken from the City's Green Action Plan in order to quantify the associated emissions reductions.

5.2.1 Buildings

Proposed Measure 1: As per Item 16 of the Clean and Green Sustainable Riverside Action Plan, if the City mandates a green building rating system standard that applies to all new municipal buildings over 5,000 square feet, the City will have an estimated 36% reduction in future energy consumption compared to typical buildings. This would reduce 69 metric tons of CO_2e, which could account for 0.6% of the 11,699 metric ton reduction target required by 2012.

Proposed Measure 2: As per Item 18 of the Clean and Green Sustainable Riverside Action Plan, if the City encourages green operations and maintenance for municipal operations and buildings (by 2009), this is estimated to have a 20% reduction in energy consumption. This would reduce 1,942 metric tons of CO_2e, which could account for 16.6% of the 11,699 metric ton reduction target required by 2012.

Existing Measure 1: The City has already installed solar panels at a number of City properties. This is estimated to generate 156,651 kWh of green electricity each year. This would reduce 89 metric tons of CO_2e. This measure is already included in the 2012 emissions inventory projection.

If the City were to double their solar power usage, this would reduce emissions by an additional 89 metric tons of CO_2e, which could account for 0.8% of the 11,699 metric ton reduction target required by 2012.

5.2.2 Streetlights/Traffic Signals

Recommended Measure 1: Converting 741 High Pressure Sodium 250W lamps to 140W LED lamps is estimated to save over 1,356,707 kWh of electricity usage. Converting 4,361 High Pressure Sodium 200W lamps to 125W LED lamps will save over 338,103 kWh of electricity usage (IQLED, 2008). This would reduce 959 metric tons of CO_2e, which could account for 8.2% of the 11,699 metric ton reduction target required by 2012.

As bulbs require replacement, it is recommended that the City also consider replacing other high pressure sodium streetlights lamps with suitable LEDs.

Existing Measure 2: The City's Streetlighting Mercury Vapor replacement program and Traffic Signal LED replacement program has saved 3,016,439 kWh or 1,707 metric tons of CO_2e in 2012. This measure is already included in the 2012 emissions inventory projection.

5.2.3 Water/Wastewater

Proposed Measure 3: As per Item 38 of the Clean and Green Sustainable Riverside Action Plan, if the City implements a program to reduce the City's per capita potable water usage by 15% by 2025, this is estimated to have a 2,538 metric tons CO_2e reduction in 2012. This estimate is based on the assumption that the greenhouse gas emissions for the water sector are directly proportional to water usage. This reduction could account for 21.7% of the 11,699 metric ton reduction target required by 2012.

5.2.4 Vehicle Fleet

Existing Measure 3: As per Item 29 of the Clean and Green Sustainable Riverside Action Plan, if the City implements a program to increase the number of clean vehicles in the non-emergency city fleet to at least 60% by 2010, this is estimated to result in a reduction of 873 metric tons of CO_2e emissions in 2012. This measure is already included in the 2012 emissions inventory projection.

Existing Measure 4: The City has already introduced a number of clean vehicles. Vehicles already introduced by the City are estimated to result in a reduction of 620 metric tons of CO_2e emissions in 2012. This measure is already included in the 2012 emissions inventory projection.

5.2.5 Employee Commute

Proposed Measure 4: As per Item 32 of the Clean and Green Sustainable Riverside Action Plan, if the City develops and promotes alternative transportation programs to City employees this will reduce GHG emissions.

- Assuming that these alternative transportation programs result in a 15% increase in carpooling and reduction in drive alone commute trips, or 900,355 vehicle miles traveled, this would reduce 542 metric tons of CO_2e, which could account for 4.6% of the 11,699 metric ton reduction target required by 2012.

- Assuming that these alternative transportation programs increase walking and cycling by City employees living within the County of Riverside by 3%, this would potentially reduce vehicle miles traveled by 181,435 and is anticipated to result in a reduction of 111 metric tons of CO_2e emissions in 2012. This could account for 0.9% of the 11,699 metric ton reduction target required by 2012.

- If the City can increase the proportion of employees living within the County of Riverside to utilize public transportation to access work by 5%, this would reduce vehicle miles traveled by

273,864 and will result in a reduction of 62 metric tons of CO_2e emissions in 2012. This which could account for 0.5% of the 11,699 metric ton reduction target required by 2012.

- If the City can increase the proportion of City employees who work from home by 5% this would reduce vehicle mileage by 600,237 miles and will result in a reduction of 366 metric tons of CO_2e emissions in 2012. This could account for 3.1% of the 11,699 metric ton reduction target required by 2012.

5.2.6 Waste

Existing Measure 5: The City has already introduced office waste recycling at City Hall and a number of other locations. The office waste recycling program already in place is estimated to result in a reduction of 666 metric tons of CO_2e emissions in 2012. This measure is already included in the 2012 emissions inventory projection.

Proposed Measure 5: As per Item 12 of the Clean and Green Sustainable Riverside Action Plan, if the City implements a program to increase diversion of waste from landfills by 2% by 2008, this will have a reduction of 3,111 tons of waste and will result in a reduction of 757 metric tons of CO_2e emissions in 2012. This could account for 6.4% of the 11,699 metric ton reduction target required by 2012.

Proposed Measure 6: As per Item 15 of the Clean and Green Sustainable Riverside Action Plan, if the City implements a program to promote green purchasing before 2009, this will reduce upstream waste generation and GHG emissions. However, due to the method used to develop the GHG inventory, these emission reductions will not be counted towards the City of Riverside's emission reduction target, and should be further analyzed in the City's Community Inventory.

Recommended Measure 2: If the City undertakes a Green Waste program which captures 75% of the green waste generated by the City from its properties, this is assumed to represent 19,066 tons of green waste or 3,269 metric tons of CO_2e emission reductions in 2012. This could account for 27.9% of the 11,699 metric ton reduction target required by 2012.

Recommended Measure 3: If the City expands its office waste recycling program to include office paper recycling from at least 15% of all properties, this is assumed to include 8,862 tons of additional office paper recycling. This would reduce 4,298 metric tons of CO_2e, which could account for 36.7% of the 11,699 metric ton reduction target required by 2012.

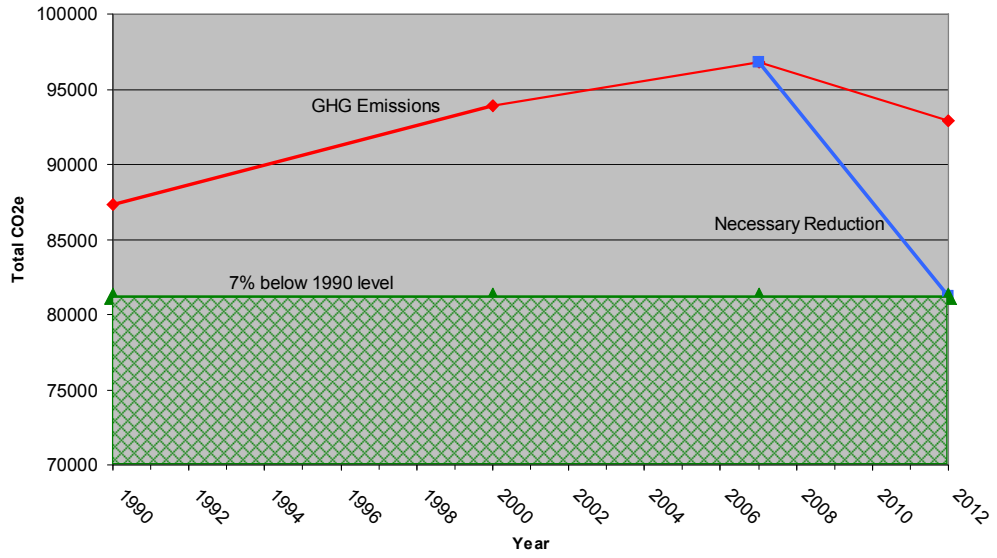
5.2.7 Electricity Generation

Existing Measure 6: Item 1 of the Clean and Green Sustainable Riverside Action Plan states that the City is to adopt and implement a policy to increase the use of renewable energy to meet 33% of the City's electric load by 2020. This item has already been adopted by the Public Utilities Board, (with interim targets of 20% by 2010 and 25% by 2015). This measure is estimated to reduce the electricity deliveries emission factor to 1111 lbs CO_2/MWh by 2012 and 881 lbs CO_2/MWh by 2020 compared to the 1,336 lbs CO_2/MWh in 2007. This would result in a reduction of 5,687 metric tons of CO_2e emissions from City operated buildings, streetlights and water sectors in 2012 (compared to what would have resulted from the renewable power content which existed in 2007). This measure is already included in the 2012 emissions inventory projection.

5.3 CONCLUSION

Municipal operations within the City of Riverside produced a calculated 87,298 tons of CO_2e in the year 1990, 93,898 tons in 2000, 96,815 tons in 2007 and are projected to produce 92,886 tons of CO_2e in the year 2012. This is a 7.6% increase in the years between 1990 and 2000. Because of the City's proactive measures to reduce their GHG emissions, the City's percentage of increase is much lower than the national average of 14.2%. This trend can be continued in the future years, and even improved upon to reduce emissions by 7% below 1990 levels by the year 2012 -- the goal set forth in the Mayor's Agreement. In order to meet this goal, the City's current output of 96,815 metric tons of CO_2e would have to be reduced by at least 11,699 metric tons by 2012. This goal can be accomplished with the furthered commitment to the reduction strategies set forth in the Green Action Plan.

Current Trend versus Emissions Target



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Appendix A
City Provided Data and Key Points of Contact

Appendix A
City-Provided Data and Key Points of Contact

Sector	City-Provided Data	Contact	Department
Buildings	Electricity Usage, 2000 and 2007	Rebeccah Goldware, Senior Account Manager	Riverside Public Utilities
	Solar Generation, 2007		
	Risk Management Asset Inventory, 2007		
	Building Identification List, 2007	Fred Stoiber, Field Services Supervisor	Riverside Public Utilities
	Redevelopment Agency Owned Property List, Current	John Curts	Redevelopment Agency
	Natural Gas Bills, 2007	Staci Sullivan, Senior Management Analyst	
	Natural Gas Usage, 2000 and 2007	David Kristedja, Account Executive	Southern California Gas Company
Vehicle Fleet	Vehicle Fleet List, 2008	Susan Cox, Fleet Director	General Services
	Unit Use Cost Report – All vehicles, 2007		
	Unit Use Cost Report – CNG vehicles only, 2007		
	Fuel Usage at Alternative Fueling Stations, 2007		
	Police Department Vehicle Fleet List, 2007	Kathy Hinojosa, Senior Office Specialist	Police
	Police Department Vehicle Mileage List, 2007		
Employee Commute	Employee Zip Codes	Lori Meyers, Human Resources Analyst	Human Resources
	Numbers of full-time, shift and hourly employees, 2007		
	Number of employees, 2000		
Streetlights/ Traffic Lights	Number, type and wattage of streetlights, 2007	Vanessa Scott	Pubic Works
	Estimated annual hours of operation		
	Energy usage from traffic lights, 1988 and 2000	David Bride, Utilities Supervising Electrical Engineering Tech	Riverside Public Utilities
Water/Sewage	Landfill Gas, 2001-2005	Kevin Street, Wastewater Resources Analyst	Riverside Water Quality Control Plant
	Biogas Production and BTU Content, 2000-2008		
	Stationary Combustion, 2001-2008		
Waste	Waste Collected from Municipal Buildings, 2007	Diann Paul, Senior Management Analyst	Public Works
	Recycled Waste from Municipal Buildings, 2007		
Other	Power Utility Protocol Report, 2007	Atoya Mendez	Riverside Public Utilities

Appendix B
Clean Air and Climate Protection Software Outputs

Riverside

Government Greenhouse Gas Emissions
Time Series Report

Year	1990	2000	2007	2012	
Buildings					
eCO2 (tons)	10,660.2	11,124.0	11,354.3	9,901.6	0.0
Energy (MMBtu)	65,500.9	69,463.7	72,772.5	74,570.3	0.0
Cost ($)	0.0	1,228,961.6	1,064,421.2	0.0	0.0
Vehicle Fleet					
eCO2 (tons)	9,790.1	9,835.1	9,345.0	8,528.9	0.0
Energy (MMBtu)	114,008.8	114,506.9	114,022.4	109,167.5	0.0
Cost ($)	0.0	0.0	0.0	0.0	0.0
Employee Commute					
eCO2 (tons)	6,455.4	6,764.4	6,939.1	7,309.8	0.0
Energy (MMBtu)	74,788.0	78,529.7	81,203.5	85,653.0	0.0
Cost ($)	0.0	0.0	0.0	0.0	0.0
Streetlights					
eCO2 (tons)	12,550.5	12,109.2	10,392.4	8,660.5	0.0
Energy (MMBtu)	62,526.4	60,301.6	52,231.6	52,231.6	0.0
Cost ($)	0.0	0.0	0.0	0.0	0.0
Water/Sewage					
eCO2 (tons)	15,231.2	17,050.2	19,382.3	16,919.4	0.0
Energy (MMBtu)	182,019.9	198,261.1	335,057.2	361,404.3	0.0
Cost ($)	0.0	1,945,448.0	1,868,511.0	2,086,504.0	0.0
Waste					
eCO2 (tons)	32,610.3	37,015.2	39,401.7	41,565.7	0.0
Energy (MMBtu)	0.0	0.0	0.0	0.0	0.0
Cost ($)	0.0	0.0	0.0	0.0	0.0
Total					
eCO2 (tons)	87,297.8	93,898.1	96,814.9	92,885.9	0.0
Energy (MMBtu)	498,844.0	521,063.0	655,287.2	683,026.7	0.0
Cost ($)	0.0	3,174,409.6	2,932,932.2	2,086,504.0	0.0

This report has been generated for Riverside, California using STAPPA/ALAPCO and ICLEI's Clean Air and Climate Protection Software developed by Torrie Smith Associates Inc.

Government Greenhouse Gas Emissions in 1990

- **Report by Source**
- **Detailed Report**

Riverside

Government Greenhouse Gas Emissions in 1990
Report by Source

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Diesel	3,108	3.6	35,842	0
Electricity Riverside-1990	36,140	41.4	180,048	0
Food Waste	3,587	4.1		0
Gasoline	13,138	15.0	152,955	0
Natural Gas	2,054	2.4	33,238	0
Paper Products	25,480	29.2		0
Plant Debris	3,360	3.8		0
Sewage Gas	0	0.0	93,894	0
Stationary Diesel	249	0.3	2,867	0
Wood/Textiles	183	0.2		0
Total	87,298	100.0	498,844	0

Fuel costs include Buildings, Vehicle Fleet, Streetlights and Water/Sewage sectors only.
This report has been generated for Riverside, California using STAPPA/ALAPCO and ICLEI's Clean Air and Climate Protection Software developed by Torrie Smith Associates Inc.

Government Greenhouse Gas Emissions in 1990
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings				
Riverside, California				
Aggregate Estimated Building Data				
Stationary Diesel	245	0.3	2,830	0
Natural Gas	963	1.1	15,580	0
Electricity Riverside-1990	9,452	10.8	47,091	0
Subtotal Aggregate Estimated Building Data	10,660	12.2	65,501	0
Subtotal Buildings	10,660	12.2	65,501	0
Vehicle Fleet				
Riverside, California				
Main Vehicle Fleet Aggregated Estimated Data				
Gasoline	3,890	4.5	45,527	0
Diesel	2,864	3.3	33,027	0
Subtotal Main Vehicle Agg Estimated Data	6,754	7.7	78,554	0
Police Department Estimated Data				
Gasoline	3,036	3.5	35,455	0
Subtotal Police Department Estimated Data	3,036	3.5	35,455	0
Subtotal Vehicle Fleet	9,790	11.2	114,009	0
Employee Commute				
Riverside, California				
Aggregated Employee Commute				
Gasoline	6,211	7.1	71,974	
Diesel	244	0.3	2,814	
Subtotal Aggregated Employee Commute	6,455	7.4	74,788	
Subtotal Employee Commute	6,455	7.4	74,788	

Government Greenhouse Gas Emissions in 1990
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Streetlights				
Riverside, California				
Streetlights				
Electricity Riverside-1990	12,496	14.3	62,253	0
Subtotal Streetlights	12,496	14.3	62,253	0
Traffic Lights				
Electricity Riverside-1990	55	0.1	274	0
Subtotal Traffic Lights	55	0.1	274	0
Subtotal Streetlights	12,550	14.4	62,526	0
Water/Sewage				
Riverside, California				
Aggregated Water/Sewage				
Stationary Diesel	3	0.0	37	0
Natural Gas	1,091	1.2	17,658	0
Sewage Gas	0	0.0	93,894	0
Electricity Riverside-1990	14,137	16.2	70,431	0
Subtotal Aggregated Water/Sewage	15,231	17.4	182,020	0
Subtotal Water/Sewage	15,231	17.4	182,020	0
Waste				
Riverside, California				
Landfill Waste Disposal			*Disposal Method - Managed Landfill*	
Paper Products	25,480	29.2		0
Food Waste	3,587	4.1		0
Plant Debris	3,360	3.8		0
Wood/Textiles	183	0.2		0
Subtotal Landfill Waste Disposal	32,610	37.4		0
Subtotal Waste	32,610	37.4		0
Total	87,298	100.0	498,844	0

Government Greenhouse Gas Emissions in 2000

- **Report by Source**
- **Detailed Report**

Riverside

Government Greenhouse Gas Emissions in 2000
Report by Source

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Diesel	3,194	3.4	36,819	0
Electricity Riverside-2000	37,589	40.0	187,185	3,174,410
Food Waste	4,072	4.3		0
Gasoline	13,406	14.3	156,217	0
Natural Gas	2,413	2.6	39,053	0
Paper Products	28,921	30.8		0
Plant Debris	3,814	4.1		0
Sewage Gas	0	0.0	98,539	0
Stationary Diesel	282	0.3	3,249	0
Wood/Textiles	208	0.2		0
Total	93,898	100.0	521,063	3,174,410

Fuel costs include Buildings, Vehicle Fleet, Streetlights and Water/Sewage sectors only.
This report has been generated for Riverside, California using STAPPA/ALAPCO and ICLEI's Clean Air and Climate Protection Software developed by Torrie Smith Associates Inc.

Government Greenhouse Gas Emissions in 2000
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings				
Riverside, California				
Administration				
Electricity Riverside-2000	546	0.6	2,720	4,943
Subtotal Administration	546	0.6	2,720	4,943
Aggregate Natural Gas Estimated Data				
Natural Gas	1,093	1.2	17,685	0
Subtotal Aggregate Natural Gas Estimated Data	1,093	1.2	17,685	0
Airport				
Electricity Riverside-2000	362	0.4	1,802	52,025
Subtotal Airport	362	0.4	1,802	52,025
Fire Department				
Electricity Riverside-2000	542	0.6	2,700	79,597
Subtotal Fire Department	542	0.6	2,700	79,597
Fleet Management				
Electricity Riverside-2000	870	0.9	4,334	109,767
Subtotal Fleet Management	870	0.9	4,334	109,767
Generators				
Stationary Diesel	279	0.3	3,212	0
Subtotal Generators	279	0.3	3,212	0
Libraries				
Electricity Riverside-2000	165	0.2	819	22,166
Subtotal Libraries	165	0.2	819	22,166
Meters				
Electricity Riverside-2000	684	0.7	3,405	86,033
Subtotal Meters	684	0.7	3,405	86,033

Government Greenhouse Gas Emissions in 2000
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Museums				
Electricity Riverside-2000	129	0.1	643	16,188
Subtotal Museums	129	0.1	643	16,188
Parking Facilities				
Electricity Riverside-2000	55	0.1	276	2,240
Subtotal Parking Facilities	55	0.1	276	2,240
Parks/Community Centers				
Electricity Riverside-2000	5,269	5.6	26,238	694,422
Subtotal Parks/Community Centers	5,269	5.6	26,238	694,422
Poles				
Electricity Riverside-2000	12	0.0	62	2,035
Subtotal Poles	12	0.0	62	2,035
Police Department				
Electricity Riverside-2000	417	0.4	2,078	50,741
Subtotal Police Department	417	0.4	2,078	50,741
Public Utilities				
Electricity Riverside-2000	180	0.2	898	27,158
Subtotal Public Utilities	180	0.2	898	27,158
Redevelopment Agency				
Electricity Riverside-2000	57	0.1	284	7,506
Subtotal Redevelopment Agency	57	0.1	284	7,506
Unidentified Buildings				
Electricity Riverside-2000	464	0.5	2,308	74,139
Subtotal Unidentified Buildings	464	0.5	2,308	74,139
Subtotal Buildings	11,124	11.8	69,464	1,228,962

Government Greenhouse Gas Emissions in 2000
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Vehicle Fleet				
Riverside, California				
Aggregate Estimated Data				
Gasoline	3,847	4.1	44,974	0
Diesel	2,937	3.1	33,866	0
Subtotal Aggregate Estimated Data	6,784	7.2	78,840	0
Police Department Estimated Data				
Gasoline	3,051	3.2	35,666	0
Subtotal Police Department Estimated Data	3,051	3.2	35,666	0
Subtotal Vehicle Fleet	9,835	10.5	114,507	0
Employee Commute				
Riverside, California				
Untitled				
Gasoline	6,508	6.9	75,577	
Diesel	256	0.3	2,953	
Subtotal Untitled	6,764	7.2	78,530	
Subtotal Employee Commute	6,764	7.2	78,530	
Streetlights				
Riverside, California				
Streetlights				
Electricity Riverside-2000	12,075	12.9	60,130	0
Subtotal Streetlights	12,075	12.9	60,130	0
Traffic Lights				
Electricity Riverside-2000	35	0.0	172	0
Subtotal Traffic Lights	35	0.0	172	0
Subtotal Streetlights	12,109	12.9	60,302	0

Government Greenhouse Gas Emissions in 2000
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Water/Sewage				
Riverside, California				
Aggregated Data				
Stationary Diesel	3	0.0	37	0
Natural Gas	1,320	1.4	21,369	0
Sewage Gas	0	0.0	98,539	0
Electricity Riverside-2000	15,727	16.7	78,317	1,945,448
Subtotal Aggregated Data	17,050	18.2	198,261	1,945,448
Subtotal Water/Sewage	17,050	18.2	198,261	1,945,448
Waste				
Riverside, California				
Landfill Waste			*Disposal Method - Managed Landfill*	
Paper Products	28,921	30.8		0
Food Waste	4,072	4.3		0
Plant Debris	3,814	4.1		0
Wood/Textiles	208	0.2		0
Subtotal Landfill Waste	37,015	39.4		0
Subtotal Waste	37,015	39.4		0
Total	93,898	100.0	521,063	3,174,410

Government Greenhouse Gas Emissions in 2007

- Report by Source
- Detailed Report

Riverside

Government Greenhouse Gas Emissions in 2007
Report by Source

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
CNG	1,048	1.1	16,553	0
Diesel (ULSD)	2,572	2.7	29,658	0
Electricity Riverside-2007	36,942	38.2	185,669	2,932,932
Ethanol (E-85)	7	0.0	527	0
Food Waste	4,411	4.6		0
Gasoline	12,625	13.0	148,066	0
Hydrogen	1	0.0	19	0
LPG	30	0.0	403	0
Natural Gas	3,882	4.0	62,833	0
Paper Products	30,633	31.6		0
Plant Debris	4,132	4.3		0
Sewage Gas	0	0.0	207,509	0
Solar	0	0.0	535	0
Stationary Diesel	305	0.3	3,516	0
Wood/Textiles	225	0.2		0
Total	96,815	100.0	655,287	2,932,932

Fuel costs include Buildings, Vehicle Fleet, Streetlights and Water/Sewage sectors only.
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Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings				
Riverside, California				
Administration				
Natural Gas	183	0.2	2,958	0
Electricity Riverside-2007	688	0.7	3,459	19,006
Subtotal Administration	871	0.9	6,417	19,006
Aggregated Solar Generation Data				
Solar	0	0.0	535	0
Subtotal Aggregated Solar Generation Data	0	0.0	535	0
Airport				
Natural Gas	11	0.0	182	0
Electricity Riverside-2007	375	0.4	1,884	42,500
Subtotal Airport	386	0.4	2,066	42,500
Fire				
Natural Gas	75	0.1	1,216	0
Electricity Riverside-2007	832	0.9	4,182	95,307
Subtotal Fire	907	0.9	5,398	95,307
Fleet Management				
Natural Gas	119	0.1	1,924	0
Electricity Riverside-2007	969	1.0	4,871	108,530
Subtotal Fleet Management	1,088	1.1	6,795	108,530
Generators				
Stationary Diesel	302	0.3	3,480	0
Subtotal Generators	302	0.3	3,480	0
Libraries				
Natural Gas	29	0.0	469	0

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Electricity Riverside-2007	480	0.5	2,412	49,694
Subtotal Libraries	509	0.5	2,881	49,694
Meters				
Electricity Riverside-2007	703	0.7	3,534	87,298
Subtotal Meters	703	0.7	3,534	87,298
Museums				
Natural Gas	10	0.0	166	0
Electricity Riverside-2007	163	0.2	817	18,275
Subtotal Museums	173	0.2	983	18,275
Parking Facilities				
Electricity Riverside-2007	73	0.1	368	-22
Subtotal Parking Facilities	73	0.1	368	-22
Parks/Community Centers				
Natural Gas	644	0.7	10,422	0
Electricity Riverside-2007	3,943	4.1	19,815	426,935
Subtotal Parks/Community Centers	4,586	4.7	30,237	426,935
Poles				
Electricity Riverside-2007	36	0.0	182	27,771
Subtotal Poles	36	0.0	182	27,771
Police				
Natural Gas	12	0.0	197	0
Electricity Riverside-2007	370	0.4	1,858	38,096
Subtotal Police	382	0.4	2,055	38,096
Public Utilities				
Natural Gas	100	0.1	1,612	0
Electricity Riverside-2007	638	0.7	3,205	71,760
Subtotal Public Utilities	737	0.8	4,817	71,760

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Redevelopment Agency Properties				
Natural Gas	1	0.0	12	0
Electricity Riverside-2007	25	0.0	125	5,930
Subtotal Redevelopment Agency Properties	26	0.0	137	5,930
Unidentified Buildings				
Electricity Riverside-2007	575	0.6	2,888	73,342
Subtotal Unidentified Buildings	575	0.6	2,888	73,342
Subtotal Buildings	11,354	11.7	72,772	1,064,421
Vehicle Fleet				
Riverside, California				
Backhoes, Loaders, Graders				
Diesel (ULSD)	279	0.3	3,215	0
Subtotal Backhoes, Loaders, Graders	279	0.3	3,215	0
Dozers				
Diesel (ULSD)	23	0.0	268	0
Subtotal Dozers	23	0.0	268	0
Dump Trucks				
Gasoline	24	0.0	286	0
CNG	67	0.1	1,065	0
Diesel (ULSD)	261	0.3	3,005	0
Subtotal Dump Trucks	352	0.4	4,356	0
Fire Trucks				
Diesel (ULSD)	587	0.6	6,763	0
Subtotal Fire Trucks	587	0.6	6,763	0
Flatbed Trucks				
Gasoline	114	0.1	1,357	0

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
CNG	0	0.0	2	0
Diesel (ULSD)	21	0.0	242	0
Subtotal Flatbed Trucks	135	0.1	1,602	0
Forklifts				
Diesel (ULSD)	0	0.0	1	0
LPG	4	0.0	56	0
Subtotal Forklifts	4	0.0	57	0
Large Line, Other Heavy Trucks				
Gasoline	463	0.5	5,490	0
CNG	50	0.1	788	0
Diesel (ULSD)	598	0.6	6,900	0
LPG	6	0.0	81	0
Subtotal Large Line, Other Heavy Trucks	1,117	1.2	13,259	0
Pickup Trucks				
Gasoline	1,361	1.4	15,978	0
CNG	310	0.3	4,895	0
LPG	8	0.0	109	0
Subtotal Pickup Trucks	1,679	1.7	20,983	0
Police Department Aggregated Data				
Gasoline	3,079	3.2	36,181	0
CNG	9	0.0	146	0
Subtotal Police Department Aggregated Data	3,089	3.2	36,328	0
Refuse Packers				
Gasoline	1	0.0	11	0
CNG	190	0.2	2,997	0
Diesel (ULSD)	404	0.4	4,655	0
Subtotal Refuse Packers	595	0.6	7,664	0

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
RV				
Gasoline	1	0.0	6	0
Subtotal RV	1	0.0	6	0
Scooters				
Gasoline	4	0.0	50	0
Subtotal Scooters	4	0.0	50	0
Sedans - Compact				
Gasoline	1	0.0	13	0
CNG	85	0.1	1,327	0
Subtotal Sedans - Compact	86	0.1	1,340	0
Sedans - Compact Hybrid				
Gasoline	19	0.0	226	0
Subtotal Sedans - Compact Hybrid	19	0.0	226	0
Sedans - Full size				
Gasoline	51	0.1	603	0
Subtotal Sedans - Full size	51	0.1	603	0
Sedans - Mid-size Hydrogen				
Hydrogen	1	0.0	19	0
Subtotal Sedans - Mid-size Hydrogen	1	0.0	19	0
SUVs				
Gasoline	126	0.1	1,476	0
Ethanol (E-85)	7	0.0	527	0
Subtotal SUVs	133	0.1	2,003	0
SUVs - Hybrid				
Gasoline	167	0.2	1,958	0
Subtotal SUVs - Hybrid	167	0.2	1,958	0

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Sweepers				
CNG	43	0.0	674	0
Diesel (ULSD)	202	0.2	2,328	0
Subtotal Sweepers	245	0.3	3,001	0
Tar Pots, Spray Units				
Gasoline	15	0.0	182	0
Subtotal Tar Pots, Spray Units	15	0.0	182	0
Tractor				
Diesel (ULSD)	6	0.0	70	0
Subtotal Tractor	6	0.0	70	0
Trailers				
Gasoline	4	0.0	44	0
Diesel (ULSD)	29	0.0	331	0
Subtotal Trailers	32	0.0	374	0
Vanpool/Vans				
Gasoline	256	0.3	3,004	0
CNG	294	0.3	4,660	0
LPG	12	0.0	157	0
Subtotal Vanpool/Vans	561	0.6	7,820	0
Water Trucks				
Gasoline	21	0.0	249	0
Diesel (ULSD)	138	0.1	1,593	0
Subtotal Water Trucks	159	0.2	1,842	0
Welders, Rodders, Power Moles				
Gasoline	2	0.0	24	0
Diesel (ULSD)	1	0.0	13	0
Subtotal Welders, Rodders, Power Moles	3	0.0	36	0
Subtotal Vehicle Fleet	9,345	9.7	114,022	0

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Employee Commute				
Riverside, California				
All Employee Commute				
Gasoline	6,915	7.1	80,928	
Diesel (ULSD)	24	0.0	276	
Subtotal All Employee Commute	6,939	7.2	81,203	
Subtotal Employee Commute	6,939	7.2	81,203	
Streetlights				
Riverside, California				
Streetlights				
Electricity Riverside-2007	10,358	10.7	52,060	0
Subtotal Streetlights	10,358	10.7	52,060	0
Traffic Lights				
Electricity Riverside-2007	34	0.0	172	0
Subtotal Traffic Lights	34	0.0	172	0
Subtotal Streetlights	10,392	10.7	52,232	0
Water/Sewage				
Riverside, California				
Aggregate data				
Stationary Diesel	3	0.0	37	0
Natural Gas	2,698	2.8	43,675	0
Sewage Gas	0	0.0	207,509	0
Electricity Riverside-2007	16,681	17.2	83,837	1,868,511
Subtotal Aggregate data	19,382	20.0	335,057	1,868,511
Subtotal Water/Sewage	19,382	20.0	335,057	1,868,511

Government Greenhouse Gas Emissions in 2007
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Waste				
Riverside, California				
Landfill Waste			*Disposal Method - Managed Landfill*	
Paper Products	30,633	31.6		0
Food Waste	4,411	4.6		0
Plant Debris	4,132	4.3		0
Wood/Textiles	225	0.2		0
Subtotal Landfill Waste	39,402	40.7		0
Subtotal Waste	39,402	40.7		0
Total	96,815	100.0	655,287	2,932,932

Government Greenhouse Gas Emissions in 2012

- Report by Source
- Detailed Report

Riverside

Government Greenhouse Gas Emissions in 2012
Report by Source

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
CNG	2,103	2.3	33,231	0
Diesel (ULSD)	1,572	1.7	18,119	0
Electricity Riverside-2012	31,562	34.0	190,350	2,086,504
Ethanol (E-85)	9	0.0	640	0
Food Waste	4,653	5.0		0
Gasoline	12,047	13.0	141,357	0
Hydrogen	1	0.0	20	0
LPG	107	0.1	1,453	0
Natural Gas	3,601	3.9	58,279	0
Paper Products	32,316	34.8		0
Plant Debris	4,359	4.7		0
Sewage Gas	0	0.0	235,364	0
Solar	0	0.0	535	0
Stationary Diesel	319	0.3	3,679	0
Wood/Textiles	237	0.3		0
Total	92,886	100.0	683,027	2,086,504

Fuel costs include Buildings, Vehicle Fleet, Streetlights and Water/Sewage sectors only.
This report has been generated for Riverside, California using STAPPA/ALAPCO and ICLEI's Clean Air and Climate Protection Software developed by Torrie Smith Associates Inc.

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings				
Riverside, California				
Aggregated Buildings				
Stationary Diesel	316	0.3	3,642	0
Natural Gas	1,239	1.3	20,055	0
Electricity Riverside-2012	8,347	9.0	50,339	0
Subtotal Aggregated Buildings	9,902	10.7	74,036	0
Solar Generation				
Solar	0	0.0	535	0
Subtotal Solar Generation	0	0.0	535	0
Subtotal Buildings	9,902	10.7	74,570	0
Vehicle Fleet				
Riverside, California				
Backhoes, Loaders, Graders				
Diesel (ULSD)	294	0.3	3,391	0
Subtotal Backhoes, Loaders, Graders	294	0.3	3,391	0
Dozers				
Diesel (ULSD)	24	0.0	282	0
Subtotal Dozers	24	0.0	282	0
Dump Trucks				
Gasoline	8	0.0	100	0
CNG	189	0.2	2,985	0
Diesel (ULSD)	92	0.1	1,057	0
Subtotal Dump Trucks	289	0.3	4,142	0
Fire Trucks				
Diesel (ULSD)	619	0.7	7,135	0
Subtotal Fire Trucks	619	0.7	7,135	0

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Flatbeds				
Gasoline	40	0.0	475	0
CNG	37	0.0	579	0
Diesel (ULSD)	7	0.0	85	0
Subtotal Flatbeds	85	0.1	1,139	0
Forklifts				
Diesel (ULSD)	0	0.0	1	0
LPG	5	0.0	69	0
Subtotal Forklifts	5	0.0	70	0
Large Line, Other Heavy Trucks				
Gasoline	162	0.2	1,922	0
CNG	435	0.5	6,866	0
Diesel (ULSD)	210	0.2	2,426	0
LPG	52	0.1	707	0
Subtotal Large Line, Other Heavy Trucks	859	0.9	11,921	0
Pickup Trucks				
Gasoline	972	1.0	11,417	0
CNG	726	0.8	11,523	0
LPG	30	0.0	406	0
Subtotal Pickup Trucks	1,728	1.9	23,346	0
Police Department				
Gasoline	3,140	3.4	36,906	0
CNG	10	0.0	154	0
Subtotal Police Department	3,150	3.4	37,060	0
Refuse Packers				
Gasoline	0	0.0	4	0
CNG	370	0.4	5,833	0

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Diesel (ULSD)	142	0.2	1,637	0
Subtotal Refuse Packers	512	0.6	7,474	0
RV				
Gasoline	1	0.0	7	0
Subtotal RV	1	0.0	7	0
Scooters				
Gasoline	2	0.0	18	0
LPG	3	0.0	33	0
Subtotal Scooters	4	0.0	51	0
Sedan- Compact Hybrid				
Gasoline	21	0.0	240	0
Subtotal Sedan- Compact Hybrid	21	0.0	240	0
Sedans - Compact				
Gasoline	0	0.0	4	0
CNG	90	0.1	1,406	0
Subtotal Sedans - Compact	91	0.1	1,411	0
Sedans - Full Size				
Gasoline	17	0.0	202	0
CNG	20	0.0	316	0
Subtotal Sedans - Full Size	37	0.0	519	0
Sedans - Mid-size Hydrogen				
Hydrogen	1	0.0	20	0
Subtotal Sedans - Mid-size Hydrogen	1	0.0	20	0
SUVs				
Gasoline	90	0.1	1,055	0
Ethanol (E-85)	9	0.0	640	0
Subtotal SUVs	98	0.1	1,695	0

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
SUVs - Hybrid				
Gasoline	192	0.2	2,251	0
Subtotal SUVs - Hybrid	192	0.2	2,251	0
Sweepers				
CNG	116	0.1	1,824	0
Diesel (ULSD)	71	0.1	819	0
Subtotal Sweepers	187	0.2	2,642	0
Tar Pots, Spray Units				
Gasoline	16	0.0	191	0
Subtotal Tar Pots, Spray Units	16	0.0	191	0
Tractor				
Diesel (ULSD)	6	0.0	74	0
Subtotal Tractor	6	0.0	74	0
Trailers				
Gasoline	4	0.0	46	0
Diesel (ULSD)	30	0.0	349	0
Subtotal Trailers	34	0.0	395	0
Vans				
Gasoline	89	0.1	1,044	0
CNG	45	0.0	708	0
LPG	18	0.0	238	0
Subtotal Vans	151	0.2	1,990	0
Water Trucks				
Gasoline	7	0.0	87	0
CNG	66	0.1	1,035	0
Diesel (ULSD)	49	0.1	560	0
Subtotal Water Trucks	121	0.1	1,682	0

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Welders, Rodders, Power Moles				
Gasoline	2	0.0	25	0
Diesel (ULSD)	1	0.0	13	0
Subtotal Welders, Rodders, Power Moles	3	0.0	38	0
Subtotal Vehicle Fleet	8,529	9.2	109,167	0
Employee Commute				
Riverside, California				
All Employee Commute				
Gasoline	7,285	7.8	85,363	
Diesel (ULSD)	25	0.0	290	
Subtotal All Employee Commute	7,310	7.9	85,653	
Subtotal Employee Commute	7,310	7.9	85,653	
Streetlights				
Riverside, California				
Streetlights				
Electricity Riverside-2012	8,632	9.3	52,060	0
Subtotal Streetlights	8,632	9.3	52,060	0
Traffic Lights				
Electricity Riverside-2012	29	0.0	172	0
Subtotal Traffic Lights	29	0.0	172	0
Subtotal Streetlights	8,660	9.3	52,232	0

Government Greenhouse Gas Emissions in 2012
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Water/Sewage				
Riverside, California				
Aggregated				
Stationary Diesel	3	0.0	37	0
Natural Gas	2,362	2.5	38,224	0
Sewage Gas	0	0.0	235,364	0
Electricity Riverside-2012	14,555	15.7	87,779	2,086,504
Subtotal Aggregated	16,919	18.2	361,404	2,086,504
Subtotal Water/Sewage	16,919	18.2	361,404	2,086,504
Waste				
Riverside, California				
Landfill Waste			*Disposal Method - Managed Landfill*	
Paper Products	32,316	34.8		0
Food Waste	4,653	5.0		0
Plant Debris	4,359	4.7		0
Wood/Textiles	237	0.3		0
Subtotal Landfill Waste	41,566	44.7		0
Subtotal Waste	41,566	44.7		0
Total	92,886	100.0	683,027	2,086,504