CITY OF
HAYWARD
HEART OF THE BAY

WS#3

DATE: July 29, 2008

TO: Mayor and City Council

FROM: Director of Community and Economic Development

SUBJECT: Climate Action Plan Update

RECOMMENDATION

That Council reads and comments on this report.

BACKGROUND

On February 26, 2008, the Council authorized staff to enter into a contract with the Bay Area Air Quality Management District for the receipt of $40,000 to be spent on the preparation of a Climate Action Plan (CAP). An additional $40,000 of Measure 'D' funds were allocated to match the grant. The Council also authorized staff to issue a request for proposals and execute a contract with a consultant for the preparation of a CAP. Since that authorization, the City hired the team of HDR and Town Green to assist with the preparation of the CAP, which will set greenhouse gas (GHG) emission reduction targets and outline the ways in which the City can achieve such reductions; and will provide implementation and monitoring strategies.

DISCUSSION

Plan Committees -

Staff has assembled a working group from all City Departments. The group, which will meet on a regular basis, will assist with creating an inventory of current City efforts to reduce emissions of greenhouse gases (GHGs), and provide direction to the core project team on implementation strategies. As indicated in the project timeline (Exhibit A), the first meeting took place on July 16.

In addition, the Mayor is in the process of establishing an Advisory Committee comprised of representatives from the following seven entities: Assembly Member Mary Hayashi, the Chamber of Commerce, AC Transit, Hayward Unified School District, California State University East Bay in Hayward, the Keep Hayward Clean and Green Task Force, and Stopwaste.org. The Advisory Committee may also select members of their staff to participate. Committee members will serve as advocates for the CAP, while representing their constituencies. The Committee would only meet on

an as-needed basis, and would be introduced at community meetings, work sessions with the Planning Commission and City Council, and selected Council Sustainability Committee meetings.

Greenhouse Gas Emissions Inventory –

ICLEI was founded in 1990 as the International Council for Local Environmental Initiatives as an international association of local governments and national and regional local government organizations that have made a commitment to sustainable development. In 2003, ICLEI's members voted to change the name to "ICLEI – Local Governments for Sustainability". ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level.

ICLEI prepared the City's inventory of greenhouse gas emissions for 2005 and recently completed an update to the report that was prepared in 2006 (Exhibit B). The updated inventory indicates that the transportation section accounted for 63 percent of community-wide emissions in 2005, and that emissions associated with municipal operations accounted for less than 1 percent of community-wide emissions. The report released in 2006 estimated Hayward emitted 764,529 tons of equivalent CO^2 in 2005, while the current updated report estimates 1,279,438 tons were emitted in 2005, based on improved data for that year. The reasons for the significant increase are changes in the methodology used to calculate emissions, which are explained below.

The overall 67 percent increase in emissions is due primarily to calculated emissions from the transportation sector, which increased from 342,581 tons to 809,192 tons. The previous inventory used only estimates of vehicle miles travelled (VMT) on local streets and roads, and completely excluded freeways and state highways, while the updated inventory uses actual data from the Metropolitan Transportation Commission (MTC) for *all* roads, including local roadways, freeways, and state highways. As reflected in Appendix A of the inventory, the data from MTC resulted in a small decrease compared to the estimates that ICLEI had provided for local roads. The inclusion of highway and freeway VMT resulted in higher overall emissions in the community-wide transportation sector.

The update also includes revisions to the calculation of residential building energy use, based on more accurate data from PG&E, which indicates lower emissions than previously calculated for the residential sector for 2005. Emissions from the commercial/industrial sector are also lower, due to California's cleaner electricity grid, and cleaner burning natural gas, which results in lower emissions than those calculated using the defaults in the emission calculation software.

Finally, the methodology for calculating emissions related to waste was changed to better represent emissions coming from landfills and capture the benefits of reducing waste going to landfills through recycling and composting efforts. A more detailed explanation is included in the report (Exhibit B).

Community Meeting –

A community meeting is scheduled for Saturday, July 26, 2008, at City Hall, from 9:00 a.m. to 12:30 p.m. The purpose of the meeting is to introduce the scope and purpose of development of the

CAP to the community, educate attendees about the importance of the Plan, summarize the updated emissions inventory, explain what efforts the City is making in terms of how it is reducing greenhouse gas (GHG) emissions, determine what people are already doing to reduce their GHG emissions, and begin the dialogue with citizens and businesses. It is hoped the meeting will begin the process for the Hayward community as a whole to continuously commit to reducing future GHG emissions. Ideas and suggestions received at the community meeting will be used to help guide the City's project consultants in terms of the types of GHG reduction strategies that will be studied and included in the draft CAP.

As indicated by the agenda (Exhibit C), we will have two guest speakers for the July 26 workshop. One speaker is Doug Grandt. Mr. Grandt is a Hayward resident, a member of the Keep Hayward Clean and Green Task Force, a staff member of the California Air Resources Board, and a member of The Climate Project – a group of volunteers trained to give presentations based on Al Gore's *Inconvenient Truth.* Mr. Grandt will discuss the importance of the GHG emissions and seek to inspire individual action to reduce emissions. The other speaker will be Ann Hancock, Executive Director and Co-Founder of Sonoma County's Climate Protection Campaign. Ms. Hancock will speak on her experiences working with local governments and citizen groups in Sonoma County preparing Climate Action Plans.

The following work products are expected to be completed by the consultant the week prior to the community meeting. These documents will be made available at the July 29 work session:

- Potential GHG reduction targets
- Preliminary report on strategies
- HDR's preliminary evaluation of Hayward's General Plan, Municipal Code, and other documents related to GHG emissions

Information on the City's Website –

An informative website is a crucial component to keeping the community informed and engaged in the preparation of the Plan. Staff has prepared a page for the City's website that will eventually include the following:

1. An introduction to the project;
2. Background information (inventory report and information about state law and policy related to GHG emission reduction targets);
3. A 'comments and questions' board;
4. Specific event notifications;
5. Interactive questionnaire
6. Graphic indicators showing progress toward meeting GHG reduction goals by category;
7. Draft CAP with comment/question board;
8. Final CAP with comment/question board;
9. GHG emission reduction tips; and
10. A possible on-line Climate Action Pledge.

FISCAL IMPACT

The existing contract with HDR is for $80,000. The contract is being paid for with a combination of a $40,000 grant from the Bay Area Air Quality Management District and $40,000 in Measure 'D' funds, which were authorized by the City Council on February 26, 2008. Measure D is a County initiative that assesses a per-ton disposal surcharge on all waste disposed in Alameda County. Fees are collected by disposal sites and transfer stations within Alameda County. The initiative was approved by Alameda County voters in 1990 and provides jurisdictions in Alameda County with funds to support waste reduction and recycling programs. No funding from the General Fund for the HDR contract is required, though approximately $100,000 of staff time will be suported by the General Fund. Implementation of the CAP is expected to present short-term costs and long-term savings associated with various GHG reduction strategies, details of which will be known with the release of the draft CAP.

PUBLIC CONTACT

A work session was conducted with the Planning Commission on July 24, 2008 and a community meeting will be held on July 26, 2008. Notice of the community meeting has been provided to an extensive list of entities including neighborhood organizations, the Chamber of Commerce, public transit providers, the school district, California State University East Bay in Hayward, Chabot College, Alameda County, Hayward Area Recreation District, and others. Staff will make a verbal report during the work session to summarize the community meeting.

SCHEDULE

A work session with the Council is scheduled for July 29, 2008. As noted in the attached schedule, an update is tentatively scheduled to be provided to the Council Sustainability Committee on September 3, 2008. A draft CAP is expected to be made available in December or January, and a second community meeting, to discuss the draft Plan, is tentatively scheduled for February of 2009. Work sessions will be held with the Council and Planning Commission in early 2009 to review the draft Plan.

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Exhibits:
A. Project Timeline
B. Baseline Greenhouse Gas Emissions Inventory Report, dated June 2008
C. Draft Agenda for July 26, 2008 meeting

7/16/2008

Climate Action Plan Timeline

Deliverable	Anticipated Completion Date
First Working Group Meeting	July 16, 2008
PC Work Session	July 24, 2008
First Community Meeting	July 26, 2008
CC Work Session	July 29, 2008
Prepare Draft Climate Action Plan	August 2008 – Dec. 2008
Briefing for Sustainability Committee (tentative)	September 3, 2008
Briefing for Sustainability Committee	December 3, 2008
Second Quarterly Report Due to BAAQMD	December 31, 2008
Second Community Meeting - Review Draft Plan	February 2009
Planning Commission Work Session on Draft Plan	February 2009
City Council Work Session on Draft Plan	February 2009
Prepare Final Climate Action Plan	February - May
Planning Commission Review of Final Plan	May 2009
Third Quarterly Report Due to BAAQMD	June 30, 2009
Adoption by City Council of Final Plan	November 2009
Fourth and Final Quarterly Report Due to BAAQMD	December 31, 2009

Exhibit B

City of Hayward

Baseline Greenhouse Gas Emissions Inventory Report

June 2008

ICLEI
Local Governments for Sustainability

Conducted by ICLEI's Cities for Climate Protection® Campaign
in partnership with the City of Hayward

City of Hayward Baseline Greenhouse Gas Emissions Inventory

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Acknowledgements

This Greenhouse Gas Emissions Inventory Report was completed through the generous support of many individuals and organizations. The staff at the City of Hayward has been most helpful in gathering the data and doing the subsequent analysis. Particular thanks go to Vera Dahle-Lacaze, Solid Waste Manager at the City of Hayward.

Many thanks are also due to StopWaste.Org. Their generous support of ICLEI and the jurisdictions in Alameda County was instrumental to this project's success.

I. Introduction

Since the early 1990's scientific consensus holds that the world's population is releasing greenhouse gases faster than the earth's natural systems can absorb them. These gases are released as by-products of fossil fuel combustion, waste disposal, energy use, land-use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), creates a blanket around the earth that allows light to pass through but traps heat at the surface preventing its escape into space. Known as the greenhouse effect or global climate change, models show that this phenomenon will lead to a 2°F to 10°F temperature increase over the next 100 years. Already the Intergovernmental Panel on Climate Change warns that most of the warming observed over the last 50 years is attributable to human activities.

Changes in the earth's temperature will have impacts for residents of Hayward, California. These impacts could include:

- Increased heat waves
- Increased annual rainfall of 20 to 30 percent leading to more serious storm events
- Rising sea levels that will threaten coastal infrastructure, ecosystems, and water supplies
- Decrease in the Sierra snow pack that will effect fresh water availability and tourism opportunities
- Increase in insect born diseases

Although one city cannot independently resolve the issue of climate change, local governments can make a positive impact through cumulative local action. Cities and counties have the ability to reduce greenhouse gas emissions through effective land use and transportation planning, wise waste management, and the efficient use of energy.

A. Baseline Emissions Inventory Report: Purpose

This report presents the results of the City of Hayward's baseline greenhouse gas emissions inventory. The inventory was conducted by ICLEI – Local Governments for Sustainability in partnership with the City of Hayward. The purpose of the baseline emissions inventory is to determine the levels of greenhouse gas emissions that the City of Hayward emits in its base year, 2005, on a municipal operations level and a community-wide level. This information will be used to help the city adopt an emissions reduction target and develop an emissions reduction action plan. The inventory provides important information on the jurisdictions emissions profile so that subsequent emissions reduction strategies can be tailored to the community's specific situation.

B. The Alameda County Climate Protection Project

In June 2006 the City of Hayward, along with 10 other local governments in Alameda County, committed to becoming a member of ICLEI and participating in the Alameda County Climate Protection Project. The project was launched by ICLEI in partnership with StopWaste.Org and the Alameda County Conference of Mayors. In committing to the project, the City of Hayward embarked on an ongoing, coordinated effort to reduce the emissions that cause global warming, improve air quality, reduce waste, cut energy use and save money.

C. ICLEI and the Cities for Climate Protection Campaign

ICLEI's mission is to improve the global environment through local action. The Cities for Climate Protection® (CCP) Campaign is ICLEI's flagship campaign designed to educate and empower local governments worldwide to take action on climate change. ICLEI provides resources, tools, and technical assistance to help local governments measure and reduce greenhouse gas emissions in their communities and their internal municipal operations.

ICLEI's CCP Campaign was launched in 1993 when municipal leaders, invited by ICLEI, met at the United Nations in New York and adopted a declaration that called for the establishment of a worldwide movement of local governments to reduce greenhouse gas emissions, improve air quality, and enhance urban sustainability. The CCP Campaign achieves these results by linking climate change mitigation with actions that improve local air quality, reduce local government operating costs, and improve quality of life by addressing other local concerns. The CCP Campaign seeks to achieve significant reductions in U.S. greenhouse gas emissions by assisting local governments in taking action to reduce emissions and realize multiple benefits for their communities.

ICLEI uses the performance-oriented framework and methodology of the CCP Campaign's Five Milestones to assist U.S. local governments in developing and implementing harmonized local approaches for reducing global warming and air pollution emissions, with the additional benefit of improving community livability. The milestone process consists of:

- Milestone 1: Conduct a baseline emissions inventory and forecast
- Milestone 2: Adopt an emissions reduction target
- Milestone 3: Develop a Climate Action Plan for reducing emissions
- Milestone 4: Implement policies and measures
- Milestone 5: Monitor and verify results

In 2006 the City of Hayward adopted a resolution to take action for climate protection and officially joined ICLEI's Cities for Climate Protection Campaign.

II. Emissions Inventory

A. Reasoning, Methodology & Model

ICLEI's Cities for Climate Protection methodology enables local governments to systematically estimate and track greenhouse gas emissions from energy use and waste related activities at the community-wide scale and those resulting directly from municipal operations. The municipal operations inventory is a subset of the community-scale inventory.

Once completed, these inventories provide the basis for creating an emissions forecast and reduction target, and enable the quantification of emissions reductions associated with implemented and proposed measures.

1. Emissions Analysis Software

To facilitate local government efforts to identify and reduce greenhouse gas emissions, ICLEI developed the Clean Air and Climate Protection (CACP) software package in partnership with the State and Territorial Air Pollution Program Administrators (STAPPA), the Association of Local Air Pollution Control Officials (ALAPCO), and Torrie Smith Associates. This software estimates emissions derived from energy consumption and waste generation within a community. The CACP software determines emissions using specific factors (or coefficients) according to the type of fuel used. Emissions are aggregated and reported in terms of equivalent carbon dioxide units, or CO_2e. Converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is twenty-one times more powerful than carbon dioxide in its capacity to trap heat, so the model converts one ton of methane emissions to 21 tons of CO_2e.

The emissions coefficients and methodology employed by the software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National GHG Emissions Inventories), the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form1605), and, for emissions generated from solid waste, the U.S. EPA's Waste Reduction Model (WARM).

The CACP software has been and continues to be used by over 200 U.S. cities and counties to quantify the reduction in their greenhouse gas emissions. However, it is worth noting that, although the software provides cities/counties with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation, rather than an exact value.

2. Inventory Sources and Data Collection Process

An inventory of greenhouse gas emissions requires the collection of information from a variety of sectors and sources. For community electricity and natural gas data, ICLEI consulted Pacific Gas & Electric Company (PG&E). The Metropolitan Transportation Commission (MTC), CalTrans, Bay Area Air Quality Management District (BAAQMD), and Bay Area Rapid Transit (BART) served as sources of transportation data. Solid waste data was gathered from the California Integrated Waste Management Board Disposal Reporting System, http://www.ciwmb.ca.gov/lgcentral/DRS/Reports/default.asp.

Vera Dahle-Lacaze, Solid Waste Manager at the City of Hayward, coordinated the City's municipal data collection process.

These data were entered into the software to create a community emissions inventory and a municipal operations emissions inventory. The community inventory represents all the energy used and waste

produced within the City of Hayward and its contribution to greenhouse gas emissions. The municipal inventory is a subset of the community inventory, and includes emissions derived from internal government operations.

There are two main reasons for completing separate emissions inventories for community and municipal operations. First, the government is committed to action on climate change, and has a higher degree of control to achieve reductions in its own municipal emissions than those created by the community at large. Second, by proactively reducing emissions generated by its own activities, the Hayward government takes a visible leadership role in the effort to address climate change. This is important for inspiring local action in Hayward as well as for inspiring other communities.

The City of Hayward's inventory is based on the year 2005. When calculating Hayward's emissions inventory, all energy consumed within the city limits was included with the exception of electricity and natural gas consumption in County-owned facilities. This means that, even though the electricity used by Hayward's residents is produced elsewhere, the energy and emissions associated with it appears in Hayward's inventory. The decision to calculate emissions in this manner reflects the general philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

B. Inventory Results

The results below represent the City of Hayward's completion of the first milestone of ICLEI's CCP campaign.

1. Community Emissions Inventory

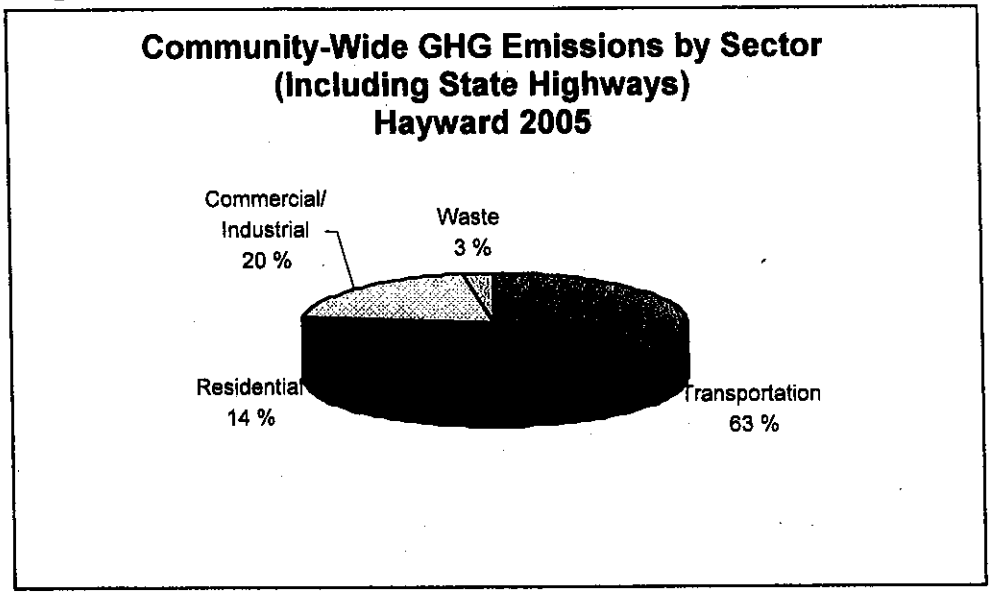
In the base year 2005, the City of Hayward emitted approximately 1,279,438 tons of CO_2e from the residential, commercial, industrial, transportation and waste sectors. Burning fossil fuels in vehicles and for energy use in buildings and facilities is a major contributor to Hayward's greenhouse gas emissions. Fuel consumption in the transportation sector is the single biggest source of emissions, contributing 63 percent of total emissions. Table (1) and Figure (a) below show Hayward's total greenhouse gas emissions from all major sources for the year 2005. The residential, commercial, and industrial sectors represent emissions that result from electricity and natural gas used in both private and public sector buildings and facilities. The transportation sector includes emissions from private, commercial and fleet vehicles driven within the City's geographical boundaries as well as the emissions from transit vehicles and the city-owned fleet.

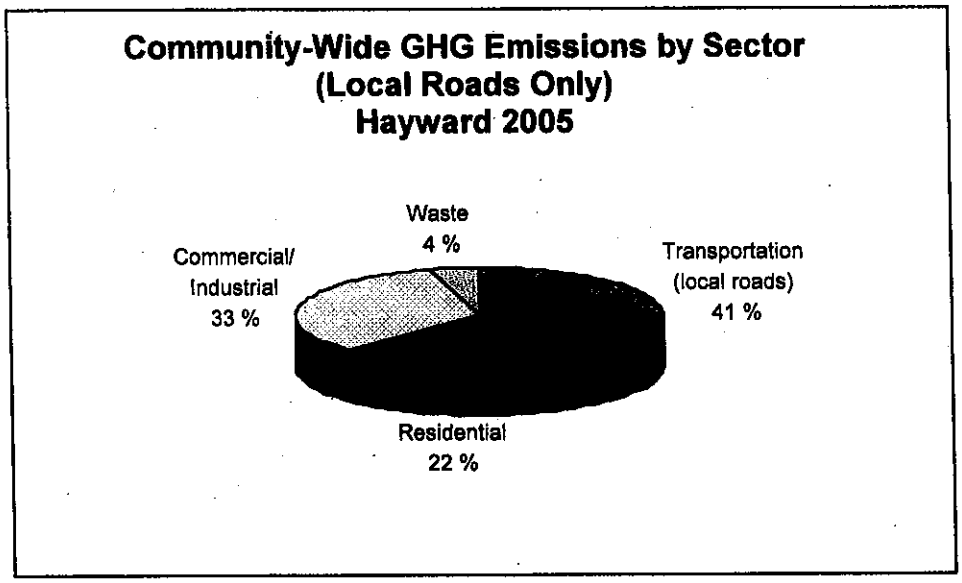
Table (1): Hayward Community Emissions Summary

Residential	174,748	2,777,925
Commercial/Industrial	262,600	3,933,436
Transportation	809,192	9,907,782
Waste	32,898	0
TOTAL	1,279,438	16,619,143

Source: CACP Model output

Figure (a): Hayward Community Greenhouse Gas Emissions - Year 2005





Source: CACP Model output

Energy / Stationary Source Emissions

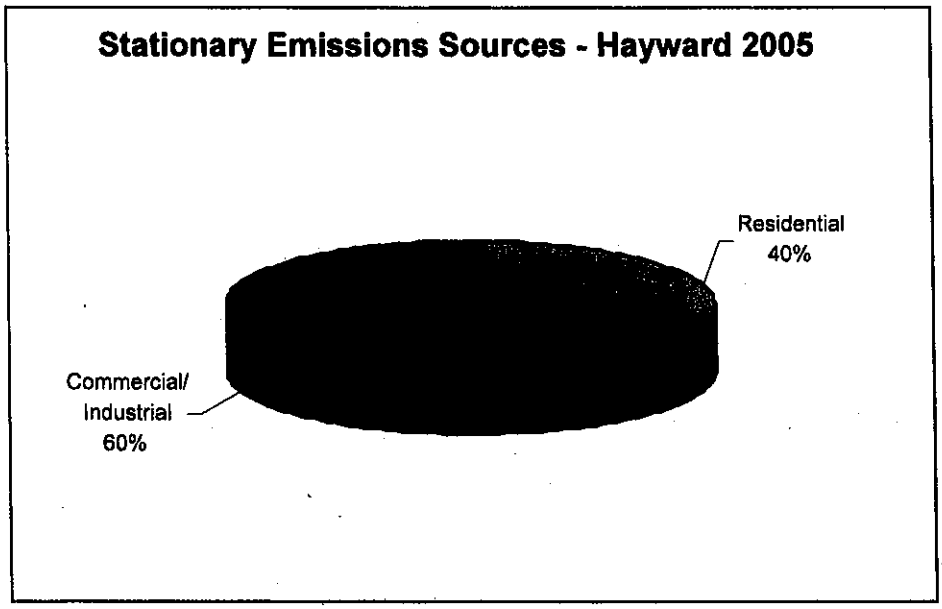
In 2005, Hayward's total stationary energy consumption was about 921,663,764 kWh of electricity and 35,657,511 therms of natural gas. Stationary energy use by all sectors (residential, commercial and industrial activities) accounts for 34 % of total greenhouse gas emissions in Hayward. These emissions are a result of the combustion of fossil fuel. Hayward's stationary energy use resulted in a total of approximately 437,348 tons of CO_2e emissions in 2005.

The City of Hayward receives its electricity from Pacific Gas & Electric Company (PG&E). The 2005 emissions coefficients for electricity provided by PG&E are included in the notes in Appendix A (Data Summary Reports and Inventory Detailed Reports). The types of power sources that make up a utility's electricity generation mix have a significant impact on a city's greenhouse gas emissions. A coal fired

power plant, for example, releases 1.3 tons of CO_2e per megawatt-hour of electricity generated versus 0.7 tons for gas turbines and 0 tons for renewable sources such as solar, wind, or hydroelectric power.

Figure (b) shows the breakdown of greenhouse gas emissions by sector for both electricity and natural gas combined. Of the total 437,348 tons of CO_2e emitted due to stationary energy use, 40 % was from residential buildings and 60 % was from commercial/industrial buildings.

Figure (b): Hayward Community Greenhouse Gas Emissions Breakdown (Residential and Commercial/Industrial) - Year 2005



Source: CACP Model output

Residential

In 2005, Hayward's 146,300 residents consumed 242,674,455 kWh of electricity, or about 5,253 kWh per household, and 19,496,850 therms of natural gas, or about 422 therms per household. This consumption resulted in a release of 174,748 tons of CO_2e. Major residential energy uses include refrigeration, lighting and water heating.

Commercial/Industrial

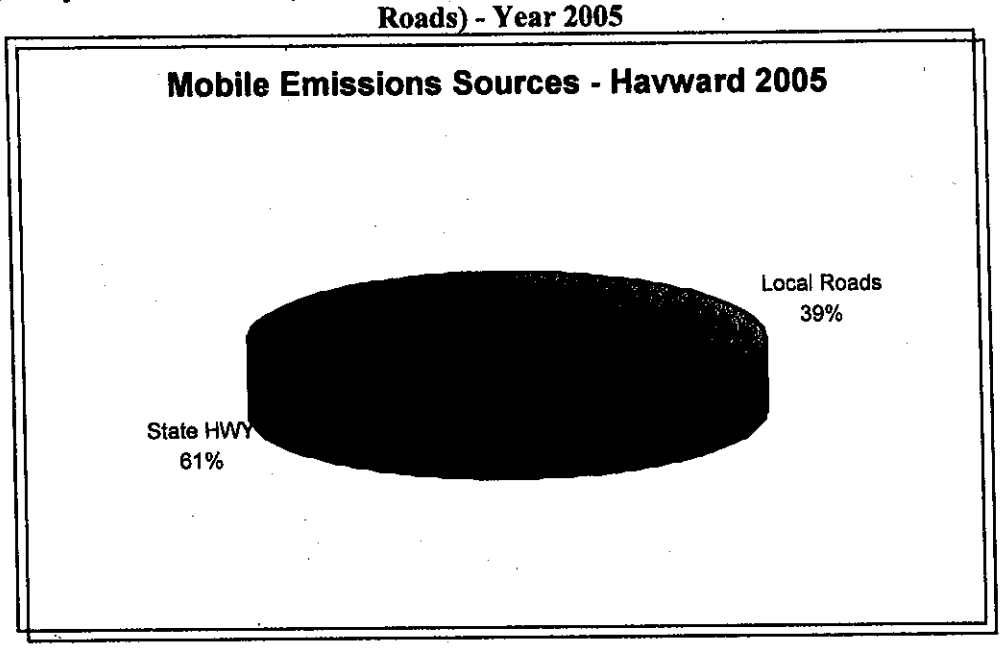
In 2005, Hayward's commercial/industrial sector buildings consumed 678,989,309 kWh of electricity and 16,160,661therms of natural gas. This consumption resulted in a release of 262,600 tons of CO_2e into the atmosphere.

Transportation Emissions

When including vehicles on state highways and local roads, the transportation sector is responsible for about 63 % of Hayward's greenhouse gas emissions. Motor vehicles driven within the City's geographical boundaries on both local and state roads emitted approximately 809,192 tons of CO_2 e in 2005.

Figure (c) shows the breakdown of greenhouse gas emissions by VMT from local roads and VMT from state highways. Of the total 809,192 tons of CO_2e emitted due to stationary energy use, 39 % was from local roads and 61 % was from state highways.

Figure (c): Hayward Community Greenhouse Gas Emissions Breakdown (Local Roads and State Roads) - Year 2005



Calculations for transportation emissions are based on figures for total vehicle miles traveled (VMT) in the City of Hayward. MTC supplied the necessary VMT data, while BAAQMD provided data that enabled us to break down total VMT by percentage driven by a given vehicle type.

Solid Waste Emissions

In 2005, Hayward sent approximately 173,503 tons of solid waste to landfills resulting in 32,898 tons of CO_2 e emissions. Hayward has recycling measures in place to reduce the amount of waste sent to landfills.

Emissions from waste result from organic materials decomposing in the anaerobic environment of a landfill which produces methane—a greenhouse gas 21 times more potent than carbon dioxide. Table (2) shows the approximate breakdown of the materials Hayward sent to landfills in 2005. Materials that do not release greenhouse gases as they decompose are included in the "All Other Waste" category.

Table (2): Hayward Waste Composition

Paper Products	21.7 %
Food Waste	12.0 %
Plant Debris	4.5 %
Wood/Textiles	20.3 %
All Other Waste	41.5 %
Total	100 %

Source: StopWaste.Org

Some landfills recover this methane either for energy generation or flaring converting it back into carbon dioxide. The EPA estimates that 60 to 80 % of methane is recovered at the landfills to which Hayward sends its waste. Recent studies have begun to question the U.S. EPA's estimates for the amount of methane that is actually captured by methane recovery systems at landfills. Many hypothesize that the

efficiency with which methane recovery systems capture methane is currently overestimated, and that much more of the potent greenhouse gas is actually escaping from landfills into the atmosphere. In the absence of exact data, the Inter-governmental Panel on Climate Change recommends using the conservative end of that range to estimate the percentage of methane recovery at landfills. ICLEI chose to follow the recommendation and used a 60 % methane recovery factor for Hayward's inventory.

The CACP software calculates emissions from waste disposal using a model based on the U.S. EPA's Waste Reduction Model (WARM) and is therefore consistent with national standards. The CACP software is designed to follow EPA guidelines regarding methane recovery and the tool will be updated appropriately as guidelines change.

Recycling and composting programs are reflected in the CACP software model as reduced total tonnage of waste going to the landfills. The CACP model, however, does not accurately capture the associated emissions reductions in "upstream" energy use from recycling. Despite this limitation, *recycling and composting programs can have a significant impact on GHG emissions.* Manufacturing products with recycled materials avoids emissions from the energy that would have been used during extraction, transporting and processing of virgin raw materials. Recycling paper also conserves forests, which contribute to carbon sequestration – a process that removes carbon from the atmosphere and stores it for long periods of time. Recycling plastic reduces the need for the oil needed to produce new plastics. For example, if Hayward recycled an additional 20,000 tons of waste, then the City would reduce CO_2e emissions by another 53,000 tons.

2. Municipal Operations Emissions Inventory

ICLEI's emissions analysis software and methodology enable a jurisdiction to inventory the emissions that result from municipal operations. As was noted earlier, the municipal inventory is a subset of the community inventory.

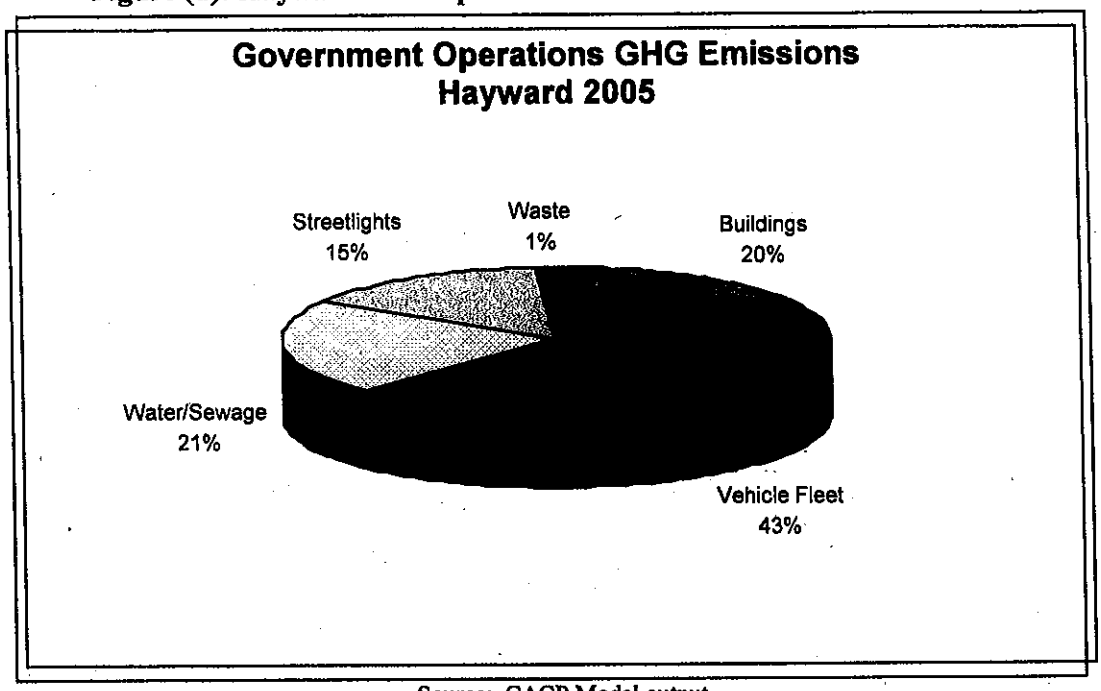
In the base year of 2005, Hayward's municipal operations generated 10,562 tons of CO_2e. As Table (3) and Figure (d) show, the City's vehicle fleet accounted for the majority of emissions at 43 %

Table (3): Hayward Municipal Emissions Summary

Buildings	2,061	31,329
Vehicle Fleet	4,525	52,530
Streetlights	1,590	22,020
Water/Sewage	2,265	31,905
Waste	121	0
TOTAL	10,562	137,784

Source: CACP Model output

Figure (d): Hayward Municipal Greenhouse Gas Emissions – Year 2005



Source: CACP Model output

Municipal emissions in Hayward constitute less than one percent of Hayward's total emissions. Local government emissions typically fall between one and five percent of overall community emissions. Appendix B shows the results of the CACP analysis. As a minor contributor to total emissions, actions to reduce municipal energy use may have a limited impact on Hayward's overall community emissions levels. However, municipal action can help reduce operation costs and has symbolic value demonstrating leadership that extends beyond the magnitude of emissions actually reduced.

Energy/Stationary Source Emissions

In 2005, Hayward municipal buildings, facilities, streetlights, and water distribution consumed 18,676,797 kWh of electricity and 180,978 therms of natural gas, which resulted in a release of 5,916 tons of CO_2e emissions into the atmosphere.

Transportation Emissions

The City's vehicle fleet consumed 203,512 gallons of fuel and emitted about 4,525 tons of CO_2e. The municipal fleet includes all vehicles owned and operated by the City of Hayward plus some contractor vehicles performing City functions.

Solid Waste Emissions

The City of Hayward government operations reported sending 680 tons of waste to the landfill resulting in 121 tons of CO2e according to method described above. The city does have recycling programs in place to reduce waste stream.

III. Forecast for Greenhouse Gas Emissions

Based on the community and municipal operations emissions inventories developed for Hayward for the base year 2005, the next step was to forecast future emissions for the year 2020. The emission forecast represents a business-as-usual prediction of how greenhouse gas (GHG) emissions may change in the City of Hayward over time for the community sector.

The forecast projects the growth (or reduction) in greenhouse gas emissions that will occur in a given future year. Projections are based on the assumption that energy consumption will grow as population increases. For the community analysis, the forecast was conducted by applying population growth factors to Hayward's base year residential, commercial/industrial, and transportation data resulted in a forecast of 10.2 % growth in emissions based on a business-as-usual scenario. For the municipal government analysis, no growth was anticipated in the municipal government operations. Table (4) provides an emissions summary for Hayward's base year and forecast year.

Table (4): Hayward's Emissions Summary

Hayward's Emissions Summary		
	Community Analysis	**Municipal Operations Analysis**
Base year	2005	2005
Indicators used to generate forecast	.65 % (Annual population growth rate based on ABAG data)	No growth anticipated
Quantity of CO_2e emissions in base year (tons)	1,279,438	10,562
Forecast year	2020	2020
Business-as-usual projection of CO_2e emissions in 2020 (tons) 10.2 % increase over baseline	1,410,022	10,562

Source: CACP Model Output and ABAG

Conducting an emissions forecast is essential for setting an emissions reduction target, since the amount of GHG emissions Hayward pledges to reduce will be derived from projected emissions. Appendix C provides the results of the CACP analysis.

IV. Conclusion

This baseline greenhouse gas emissions inventory report represents a profile of the greenhouse gases that the City of Hayward emits in its base year, 2005, on a community-wide level and a municipal level. The report also approximates the greenhouse gases that the City will emit in the year 2020.

This information will be used to help the City adopt an emissions reduction target and develop a climate action plan. The climate action plan consists of policies and measures that, when implemented, will serve the City to achieve its target. The inventory also serves to inform the City regarding the major sources of greenhouse gas emissions. For example, the community-wide inventory for the City of Hayward reveals that the transportation sector is responsible for 63 % of total emissions.

The inventory also reveals the fact that in Hayward, like all cities, the municipal government emissions represent a small percentage of community-wide emissions, in this case less than one percent. That being said, by proactively reducing emissions generated by its own activities, the Hayward government takes a visible leadership role in the effort to address climate change. This is important for inspiring local action in Hayward as well as for inspiring action in other communities.

Appendix A – CACP Reports by Sector, Data Sources, Assumptions and Notes for the Community Inventory

See PDF file, Appendix A_Hayward Community-Wide CACP Reports.pdf

Community Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)
Residential			
Hayward, CA			
Hayward Community Residential			
Electricity	59,802	4.7	828,240
Natural Gas	114,945	9.0	1,949,685
Subtotal Hayward Community Residential	174,748	13.7	2,777,925
Subtotal Residential	174,748	13.7	2,777,925
Commercial			
Hayward, CA			
Community Commercial/Industrial			
Electricity	167,323	13.1	2,317,370
Natural Gas	95,277	7.4	1,616,066
Subtotal Community Commercial/Industrial	262,600	20.5	3,933,436

Data Sources:

1. Community electricity and natural gas data provided by Data collection coordinator byVera Dahle Lacaze, Solid Waste Manager, Hayward City, Vera.Dahle-Lacaze@hayward-ca.gov, (510) 583-4725
2. Request for electricity and natural gas data processed by Greg San Martin, Climate Protection Program Manager, PG&E, GJS8 @pge.com, (415)973-6905 and Jasmin Ansar, Manager, Environmental Policy, PG&E, JxA2@pge.com, (415)973-4570.

Notes:

1. Updated coefficients provided by PG&E and BAAQMD. See file Coefficient sets for ACP.xls for specific updates. Update performed by Jonathan Strunin, ICLEI Program Officer in June 2008.
2. Industrial consumption data is reported within the Commercial sector due to PUC confidentiality rules that prohibit the release of such data in certain cases. As a result, NOx and criteria air pollutants are underreported. Hence the commercial sector includes energy consumed in the industrial sector of the city. The commercial sector also includes energy consumed by city buildings/operations and facilities as well as the district facilities like the East Bay Municipal Utility District (EBMUD), Bay Area Rapid Transit (BART) and School Districts.

Data entry: Data entered on September 27, 2006 by Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org. ICLEI supervisor, Timothy Burroughs, timothy.burroughs@iclei.org.
Reference file: ICLEI Hayward Summary Report

Subtotal Commercial	262,600	20.5	3,933,436

Community Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)
Transportation			
Hayward, CA			
Community Transportation			
Gasoline	250,778	19.6	3,161,520
Diesel	65,510	5.1	711,123
Subtotal Community Transportation	316,288	24.7	3,872,643

Data Sources:
1. Citywide Vehicles Miles Traveled (VMT) data provided on July 18, 2006 by Harold Brazil, Air Quality Associate, Metropolitan Transportation Commission (MTC) hbrazil@mtc.ca.gov, (510) 817-5747
2. VMT by vehicle type data provided on July 5, 2006 by Amir Fanai, Principal Air Quality Engineer, Bay Area Air Quality Management District, AFanai@baaqmd.gov
3. EMFAC provided vehicle type and efficiencies estimates.

Notes:
1. The VMT data provided by MTC Daily VMT (DVMT) is in thousands. VMT= DVMT *1000*365
2. VMT updates and EMFAC factors updated by Jonathan Strunin, ICLEI Program Officer in June 2008.

Data entry:
Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844-0699, on August 25, 2006. Timothy Burroughs, Supervisor, timothy.burroughs@iclei.org.
Reference file ICLEI Hayward Summary Report

Hawyard State Hwy VMT			
Gasoline	390,814	30.5	4,926,923
Diesel	102,090	8.0	1,108,216
Subtotal Hawyard State Hwy VMT	492,904	38.5	6,035,140
Subtotal Transportation	809,192	63.2	9,907,782

Waste			
Hayward, CA			
ADC Tonnage			*Disposal Method - Managed Landfill*
Plant Debris	78	0.0	
Subtotal ADC Tonnage	78	0.0	

Notes:
1. In 2005, the City of Hayward's waste was covered with 1,435 tons of Alternative Daily Cover (ADC). Because 74.5% of the methane produced by the City's ADC is estimated to be recovered, waste emissions appear to be negative: -309 tons. Many cities choose to eliminate this emissions "credit" by replacing the waste tonnage input data with zero. StopWaste.Org urged ICLEI to do so for the purposes of this inventory. For future reference, the notes below include the original waste data that resulted in the negative emissions number.
2. ADC includes Green Materials categorized as 'Plant Debris' and ADC like the Solidify Class II Cover, C & D, Roofing, Auto shred fluff , Roofing, Sludge/ biosolid waste categorized as 'All Other waste'.

Community Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)

3. ADC waste composition is the following (all green materials are categorized as 'Plant Debris' in the software and all other types of ADCs are added together and categorized as 'All other types of wastes' in the software):

   a. Plant Debris: 31.8%
   b. All Other Waste: 68.2%

Data Sources:
1. ADC tonnage data provided on July 20, 2006 by Meghan Starkey, Senior Program Manager, Alameda County Waste Management Authority (StopWaste.org), mstarkey@stopwate.org, (510) 614-1699 - http://www.stopwaste.org/home/index.asp?page=590
2. Methane recovery factors for individual landfill sites (explained in the notes above) provided by Victoria Ludwig, Program Manager at EPA Landfill Methane Outreach Program, Ludwig.Victoria@epamail.epa.gov

Landfill Waste		*Disposal Method - Managed Landfill*
Paper Products	19,960	1.6
Food Waste	6,248	0.5
Plant Debris	1,328	0.1
Wood/Textiles	5,285	0.4
All Other Waste	0	0.0
Subtotal Landfill Waste	32,820	2.6

1. In 2005, the City of Hayward sent approximately 172,068 tons of solid waste to landfills. Because 74.5% of the methane produced by Hayward's solid waste is estimated to be recovered, waste emissions appear to be negative: -39,648 tons. Many cities choose to eliminate this emissions "credit" by replacing the waste tonnage input data with zero. StopWaste.Org urged ICLEI to do so for the purposes of this inventory. For future reference, the notes below include the original waste data that resulted in the negative emissions number.

2. Hayward's waste tonnage by landfill:
a. Altamont : 155,855 tons
b. Vasco Road : 12,298 tons
c. Others (This includes landfills that receive less than 1% of the total city waste landfilled) : 3915 tons

3. Hayward's waste composition:
a. Paper products: 21.7%
b. Food Waste: 12.0%
c. Yard Waste: 4.5%
d. Wood, textile waste: 20.3%
e. All other types: 41.5%
Total: 100%

4. Weighted average methane recovery factor for Hayward was calculated based on tonnage - 74.5%

5. Recycling and compost tonnage has been omitted from this analysis as complete recycling and compost data was not available.

Sources:
1. Landfill data provided on July 20, 2006 by Meghan Starkey, Senior Program Manager, Alameda County Waste Management Authority (StopWaste.org), mstarkey@stopwate.org, (510) 614-1699

Community Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)

2. Waste characterization of the Landfill waste data based on 2000 Alameda County Waste Characterization study available online at http://www.stopwaste.org/home/index.asp?page=590
3. Methane recovery factors for individual landfill sites provided by Victoria Ludwig, Program Manager EPA Landfill Methane Outreach Program, Ludwig.Victoria@epamail.epa.gov
4. Growth rate based on Projections 2005, published by the Association of Bay Area Governments

Data entry:
Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844-0699, on August 25, 2006. Timothy Burroughs, Supervisor, timothy.burroughs@iclei.org.
Reference file: ICLEI_Hayward_CommunityWaste_2005

Subtotal Waste	32,898	2.6	
Total	1,279,438	100.0	16,619,144

Hayward

Community Greenhouse Gas Emissions in 2005

Indicators Report

	Equiv CO_2 (tons)	Energy (MMBtu)
Residential		
Hayward Community Residential		
Per household	3.8	60.1
Sector Average		
Per capita	1.2	19.0
Per household	3.8	60.1
Commercial		
Sector Average		
Per capita	1.8	26.9
Transportation		
Sector Average		
Per capita	5.5	67.7
Waste		
Sector Average		
Per capita	0.2	

Appendix B – CACP Reports by Sector, Data Sources, Assumptions and Notes for the Municipal Inventory

See PDF file, Appendix B_Hayward Government Operations CACP Reports.pdf

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings				
Hayward, CA				
Hayward Centennial Hall				
Electricity	84	0.8	1,160	39,177
Natural Gas	71	0.7	1,204	14,465
Subtotal Hayward Centennial Hall	155	1.5	2,363	53,642

Centennial Hall will be replaced with a larger conference center in near future.

Hayward City Ctr. Bldg Parking Garage				
Electricity	38	0.4	521	17,726
Subtotal Hayward City Ctr. Bldg Parking Garage	38	0.4	521	17,726

No electricity will be consumed for the City Center Parking Garage for Hayward because it will no longer be owned by City Of Hayward after January 2007.

Hayward City Hall				
Electricity	371	3.5	5,135	202,967
Natural Gas	209	2.0	3,547	40,860
Subtotal Hayward City Hall	580	5.5	8,682	243,827
Hayward City Hall Parking Garage				
Electricity	37	0.4	515	19,404
Subtotal Hayward City Hall Parking Garage	37	0.4	515	19,404

Data for usage levels for the City Hall Parking Garage reflects partial usage in 2005 and it would increase in 2020.

Hayward Equipment Management				
Electricity	23	0.2	317	13,982
Natural Gas	17	0.2	282	2,303
Subtotal Hayward Equipment Management	40	0.4	599	16,285

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Hayward Facilities				
Electricity	82	0.8	1,139	42,269
Natural Gas	188	1.8	3,195	27,778
Subtotal Hayward Facilities	271	2.6	4,334	70,047

This record includes Barnes Ct., Animal Shelter, Facilities Division and Landscape Division

Hayward Fire Stations				
Electricity	124	1.2	1,724	68,028
Natural Gas	162	1.5	2,747	33,757
Subtotal Hayward Fire Stations	286	2.7	4,471	101,785

New Fire Station #7 will utilize slightly more gas and electricity than the current station for the forecast year because the facility's square footage is expected to increase. The current data includes 10 fire stations, 9 of which are operating and Fairview (formerly #8) used as storage and requires electricity usage for alarms, phones, etc.

Hayward Main Library				
Electricity	70	0.7	971	41,118
Natural Gas	36	0.3	613	7,492
Subtotal Hayward Main Library	106	1.0	1,584	48,610

By 2020, Main Library will be replaced by a larger facility.

Hayward Police Department				
Electricity	257	2.4	3,558	12,739
Natural Gas	169	1.6	2,866	24,656
Subtotal Hayward Police Department	426	4.0	6,424	37,395

The square footage for the Police Department building will increase by 5% by 2020.

Hayward Police Radio Tower				
Electricity	13	0.1	182	8,139
Subtotal Hayward Police Radio Tower	13	0.1	182	8,139

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Hayward Streets and Water Department Buildings				
Electricity	16	0.2	224	10,240
Natural Gas	26	0.2	443	5,375
Subtotal Hayward Streets and Water Department Buildings		0.4	667	15,615
Hayward Utilities Building				
Electricity	29	0.3	396	16,413
Natural Gas	10	0.1	171	2,164
Subtotal Hayward Utilities Building	39	0.4	567	18,577
Hayward Weekes Library				
Electricity	22	0.2	308	12,993
Natural Gas	7	0.1	112	1,516
Subtotal Hayward Weekes Library	29	0.3	420	14,509

Notes:

1. The data here includes energy consumption in terms of electricity (kwh) and natural gas (therms) in all municipal buildings owned and operated by Hayward.
2. PG&E specific eCO2 emissions factor of 0.525 lbs/kWh (or 262.5 short tons CO2/GWh) of delivered electricity in 2005 provided by Greg San Martin.
3. The PG&E coefficient set is based on the PG&E - specific eCO2 emissions factor for 2005 and default criteria air pollutant emissions factors for the 2004 Region 13 - Western Systems Coordinating Council/CNV Average Grid Electricity Set. The PG&E coefficient set does not have emissions factors for CH4 and N2O as the eCO2 emissions factor includes CH4 and N2O emissions in CO2 equivalents.
4. The eCO2 emissions factor is pending independent verification and certification from the California Climate Action Registry; the confirmed eCO2 factor will be made public by CCAR at the end of 2006, at which time the emissions factor used in this analysis should be updated if it has changed.
5. In calculating the cost - Assumption: average cost of kwh =$.14 average cost of therm = $1.22
6. The projection for 2020 assumes changes in energy consumption but no change in the PG & E eCO2 emissions factor.

Data Source
ICLEI_Hayward_Buildings_CY2005, Data submitted on July, 27, 2006 by Vera Dahle Lacaze, Solid Waste Manager, Hayward City, Vera.Dahle-Lacaze@hayward-ca.gov, (510) 583-4725.
Data entered on Aug, 18, 2006 by Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844 0699. Reference files:

- For Municipal Operations and facilities - ICLEI_Hayward_Buildings_CY2005
- For Street Lights - ICLEI_Hayward_Streetlights_CY2005
- For Water/Sewage - ICLEI_WstWtrTrtmntPlnt_CY2005
- For Waste - ICLEI_Hayward_MunicipalSolidWaste_CY2005

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Buildings	2,061	19.5	31,329	665,561
Vehicle Fleet				
Hayward, CA				
Building Inspection fleet - Hayward				
Gasoline	40	0.4	464	9,110
CNG	0	0.0	0	1,096
Subtotal Building Inspection fleet - Hayward	40	0.4	464	10,206
Community Preservation fleet - Hayward				
Gasoline	6	0.1	64	1,273
Subtotal Community Preservation fleet - Hayward	6	0.1	64	1,273
Construction Inspection fleet - Hayward				
Gasoline	39	0.4	455	9,076
CNG	0	0.0	0	2,505
Subtotal Construction Inspection fleet - Hayward	39	0.4	455	11,581
Engineering department fleet - Hayward				
Gasoline	7	0.1	76	1,525
Subtotal Engineering department fleet - Hayward	7	0.1	76	1,525
Equipment Management fleet- Hayward				
Gasoline	23	0.2	265	5,228
Subtotal Equipment Management fleet- Hayward	23	0.2	265	5,228
Facilities department fleet - Hayward				
Gasoline	44	0.4	518	10,094
Subtotal Facilities department fleet - Hayward	44	0.4	518	10,094
Fire department fleet - Hayward				
Gasoline	88	0.8	1,027	18,709
Diesel	54	0.5	625	11,038
Subtotal Fire department fleet - Hayward	142	1.3	1,652	29,747
Hayward Airport fleet				
Gasoline	67	0.6	781	14,354
Diesel	10	0.1	110	1,917
Subtotal Hayward Airport fleet	76	0.7	892	16,271

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Hayward Housing (Conservation and Inspection)				
Gasoline	9	0.1	110	2,185
Subtotal Hayward Housing (Conservation and Inspection)		0.1	110	2,185
Hayward Landscape Department				
Gasoline	191	1.8	2,236	43,772
Diesel	11	0.1	123	2,726
Subtotal Hayward Landscape Department	201	1.9	2,359	46,498
Hayward Library				
Gasoline	3	0.0	35	698
Subtotal Hayward Library	3	0.0	35	698
Hayward Mayor fleet				
Gasoline	2	0.0	20	403
Subtotal Hayward Mayor fleet	2	0.0	20	403
Hayward Police Department Fleet				
Gasoline	1,031	9.8	12,091	235,794
Subtotal Hayward Police Department Fleet	1,031	9.8	12,091	235,794
Hayward Source Control				
Gasoline	20	0.2	239	4,651
Subtotal Hayward Source Control	20	0.2	239	4,651
Hayward Streets Maintenance				
Gasoline	78	0.7	918	18,252
Diesel	55	0.5	639	13,700
Subtotal Hayward Streets Maintenance	134	1.3	1,557	31,952
Hayward Traffic Maintenance				
Gasoline	20	0.2	232	4,496
Subtotal Hayward Traffic Maintenance	20	0.2	232	4,496

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Hayward Trans. Services				
Gasoline	3	0.0	34	670
Subtotal Hayward Trans. Services	3	0.0	34	670
Hayward Utilities				
Gasoline	49	0.5	573	11,302
Diesel	17	0.2	197	4,075
CNG	0	0.0	0	3,300
Subtotal Hayward Utilities	66	0.6	770	18,677
Hayward Waste Management Fleet				
Gasoline	1	0.0	9	0
Diesel	2,455	23.2	28,306	0
CNG	0	0.0	1	0
Subtotal Hayward Waste Management Fleet	2,456	23.3	28,317	0

Data Sources:
Data submitted by David Tucker at Waste Management, DTucker2@wm.com on Oct 03, 2006.
The record represents the fuel consumed by vehicles of Waste Management Company that are used to manage the waste of the city.

Notes:
1. The City of Hayward does not own or operate the Waste Management Inc. fleet. However, it is included in the emissions inventory because waste hauling is an essential municipal service. This record comprises the portion of fuel consumed by the WM fleet for all service within the city, including the commercial/industrial, residential and government sectors.
2. Cost data provided by Waste Management, Inc. for gasoline is currently under review by Waste Management staff. ICLEI will provide updated cost data should the numbers need to be revised.
3. CNG data provided by Waste Management, Inc. is currently under review by Waste Management staff. ICLEI will provide updated CNG data should the numbers need to be revised.

Hayward Waste Water Fleet				
Gasoline	25	0.2	291	5,393
Diesel	6	0.1	63	998
Subtotal Hayward Waste Water Fleet	30	0.3	354	6,390
Hayward Water Distribution Fleet				
Gasoline	121	1.1	1,415	27,774
Diesel	53	0.5	609	13,116
CNG	0	0.0	0	2,654
Subtotal Hayward Water Distribution Fleet	174	1.6	2,025	43,544

Data submitted on July, 27, 2006 by Vera Dahle Lacaze, Solid Waste Manager, Hayward City, Vera.Dahle-Lacaze@hayward-ca.gov, (510) 583-4725 with the help of Scott Estes, Equipment Manager, Scott.Estes@hayward-ca.gov <mailto:Scott.Estes@hayward-ca.gov>, (510) 881-7914

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Data entered on Aug, 21, 2006 by Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844 0699.

Notes:
1. Vehicles classified into types using the www.fueleconomy.gov.
1.CNG vehicles will be phased out by 2020 and so zero fuel consumption is noted. The projections for 2020 is provided by Scott Estes, Equipment Manager, Hayward.

Subtotal Vehicle Fleet	4,525	42.8	52,530	481,884
Streetlights				
Hayward, CA				
Streetlights				
Electricity	1,236	11.7	17,122	552,000
Subtotal Streetlights	1,236	11.7	17,122	552,000
Traffic Signals - City Owned				
Electricity	107	1.0	1,485	74,000
Subtotal Traffic Signals - City Owned	107	1.0	1,485	74,000
Untitled				
Electricity	246	2.3	3,413	0
Subtotal Untitled	246	2.3	3,413	0
Subtotal Streetlights	1,590	15.1	22,020	626,000
Water/Sewage				
Hayward, CA				
Hayward Lift Stations				
Electricity	138	1.3	1,916	151,401
Subtotal Hayward Lift Stations	138	1.3	1,916	151,401

The record includes energy consumed in the Lift stations only.

Wastewater Treatment Plant - Hayward				
Electricity	1,164	11.0	16,120	521,000
Natural Gas	172	1.6	2,919	34,000
Subtotal Wastewater Treatment Plant - Hayward	1336	12.6	19,039	555,000

Current inflow for the treatment plant is 13.5 MGD. The Water Pollution Control Facities (WPCF) produces and uses electricity through bio-methane generation. Hence its consumption is not covered here. Bio-methane is produced by anaerobic digestion process and burned in the co-generation equipment.

Government Greenhouse Gas Emissions in 2005
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Water supply - Hayward				
Electricity	791	7.5	10,950	378,854
Subtotal Water supply - Hayward	791	7.5	10,950	378,854

This record includes energy consumed in pump stations, reservoir, wells, cathodic protection system, PR station, underpass etc.

Subtotal Water/Sewage	2,265	21.4	31,905	1,085,255

Waste

Hayward, CA

Municipal Operations			*Disposal Method - Managed Landfill*
Paper Products	36	0.3	0
Food Waste	31	0.3	0
Plant Debris	17	0.2	0
Wood/Textiles	36	0.3	0
Subtotal Municipal Operations	121	1.1	0

Notes:

1. Hayward's municipal waste composition:
   a. Paper products: 10%
   b. Food Waste: 15%
   c. Yard Waste: 15%
   d. Wood, textile waste: 35%
   e. All other types: 25%

3. Weighted average methane recovery factor for Hayward was calculated based on tonnage equals 74.5%

4. Recycling and compost tonnage has been omitted from this analysis as complete recycling and compost data was not available.

(2020 scenario)
The number of employees are projected to increase from 869 to 912 and so proportionately the paper and food waste should go up. It is estimated that the total waste tonnage for 2020 for 912 employees would be 738. The composition is assumed to be the same.

Sources:

1. Data submitted on July, 27, 2006 by Vera Dahle Lacaze, Solid Waste Manager, Hayward City, Vera.Dahle-Lacaze@hayward-ca.gov, (510) 583-4725.

2. Data entered on Aug, 18, 2006 by Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844 0699.

Subtotal Waste	121	1.1		0
Total	10,562	100.0	137,784	2,858,700

Appendix C – CACP Summary Report for the Community Emissions Forecast

See PDF file, Appendix C_Hayward Community-Wide CACP Forecast Report.pdf

Community Greenhouse Gas Emissions in 2020
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)
Residential			
Hayward, CA			
Hayward Community Residential			
Electricity	65,906	4.7	912,774
Natural Gas	126,677	9.0	2,148,677
Subtotal Hayward Community Residential	192,583	13.7	3,061,451
Subtotal Residential	192,583	13.7	3,061,451
Commercial			
Hayward, CA			
Community Commercial/Industrial			
Electricity	184,401	13.1	2,553,889
Natural Gas	105,001	7.4	1,781,008
Subtotal Community Commercial/Industrial	289,402	20.5	4,334,897

Data Sources:

1. Community electricity and natural gas data provided by Data collection coordinator byVera Dahle Lacaze, Solid Waste Manager, Hayward City, Vera.Dahle-Lacaze@hayward-ca.gov, (510) 583-4725
2. Request for electricity and natural gas data processed by Greg San Martin, Climate Protection Program Manager, PG&E, GJS8 @pge.com, (415)973-6905 and Jasmin Ansar, Manager, Environmental Policy, PG&E, JxA2@pge.com, (415)973-4570.

Notes:

1. Updated coefficients provided by PG&E and BAAQMD. See file Coefficient sets for ACP.xls for specific updates. Update performed by Jonathan Strunin, ICLEI Program Officer in June 2008.
2. Industrial consumption data is reported within the Commercial sector due to PUC confidentiality rules that prohibit the release of such data in certain cases. As a result, NOx and criteria air pollutants are underreported. Hence the commercial sector includes energy consumed in the industrial sector of the city. The commercial sector also includes energy consumed by city buildings/operations and facilities as well as the district facilities like the East Bay Municipal Utility District (EBMUD), Bay Area Rapid Transit (BART) and School Districts.

Data entry: Data entered on September 27, 2006 by Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org. ICLEI supervisor, Timothy Burroughs, timothy.burroughs@iclei.org.
Reference file: ICLEI Hayward Summary Report

Subtotal Commercial	289,402	20.5	4,334,897

Community Greenhouse Gas Emissions in 2020
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)
Transportation			
Hayward, CA			
Community Transportation			
Gasoline	276,374	19.6	3,484,196
Diesel	72,196	5.1	783,703
Subtotal Community Transportation	348,569	24.7	4,267,899

Data Sources:
1. Citywide Vehicles Miles Traveled (VMT) data provided on July 18, 2006 by Harold Brazil, Air Quality Associate, Metropolitan Transportation Commission (MTC) hbrazil@mtc.ca.gov, (510) 817-5747
2. VMT by vehicle type data provided on July 5, 2006 by Amir Fanai, Principal Air Quality Engineer, Bay Area Air Quality Management District, AFanai@baaqmd.gov
3. EMFAC provided vehicle type and efficiencies estimates.

Notes:
1. The VMT data provided by MTC Daily VMT (DVMT) is in thousands. VMT= DVMT *1000*365
2. VMT updates and EMFAC factors updated by Jonathan Strunin, ICLEI Program Officer in June 2008.

Data entry:
Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844-0699, on August 25, 2006. Timothy Burroughs, Supervisor, timothy.burroughs@iclei.org.
Reference file ICLEI Hayward Summary Report

Hawyard State Hwy VMT			
Gasoline	430,702	30.5	5,429,783
Diesel	112,510	8.0	1,221,325
Subtotal Hawyard State Hwy VMT	543,212	38.5	6,651,108
Subtotal Transportation	891,781	63.2	10,919,007

Waste			
Hayward, CA			
ADC Tonnage			*Disposal Method - Managed Landfill*
Plant Debris	86	0.0	
Subtotal ADC Tonnage	86	0.0	

Notes:
1. In 2005, the City of Hayward's waste was covered with 1,435 tons of Alternative Daily Cover (ADC). Because 74.5% of the methane produced by the City's ADC is estimated to be recovered, waste emissions appear to be negative: -309 tons. Many cities choose to eliminate this emissions "credit" by replacing the waste tonnage input data with zero. StopWaste.Org urged ICLEI to do so for the purposes of this inventory. For future reference, the notes below include the original waste data that resulted in the negative emissions number.
2. ADC includes Green Materials categorized as 'Plant Debris' and ADC like the Solidify Class II Cover, C & D, Roofing, Auto shred fluff , Roofing, Sludge/ biosolid waste categorized as 'All Other waste'.

Community Greenhouse Gas Emissions in 2020
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	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)

3. ADC waste composition is the following (all green materials are categorized as 'Plant Debris' in the software and all other types of ADCs are added together and categorized as 'All other types of wastes' in the software):

   a. Plant Debris: 31.8%
   b. All Other Waste: 68.2%

Data Sources:

1. ADC tonnage data provided on July 20, 2006 by Meghan Starkey, Senior Program Manager, Alameda County Waste Management Authority (StopWaste.org), mstarkey@stopwate.org, (510) 614-1699 - http://www.stopwaste.org/home/index.asp?page=590
2. Methane recovery factors for individual landfill sites (explained in the notes above) provided by Victoria Ludwig, Program Manager at EPA Landfill Methane Outreach Program, Ludwig.Victoria@epamail.epa.gov

Landfill Waste		*Disposal Method - Managed Landfill*
Paper Products	21,997	1.6
Food Waste	6,885	0.5
Plant Debris	1,463	0.1
Wood/Textiles	5,824	0.4
All Other Waste	0	0.0
Subtotal Landfill Waste	36,170	2.6

1. In 2005, the City of Hayward sent approximately 172,068 tons of solid waste to landfills. Because 74.5% of the methane produced by Hayward's solid waste is estimated to be recovered, waste emissions appear to be negative: -39,648 tons. Many cities choose to eliminate this emissions "credit" by replacing the waste tonnage input data with zero. StopWaste.Org urged ICLEI to do so for the purposes of this inventory. For future reference, the notes below include the original waste data that resulted in the negative emissions number.

2. Hayward's waste tonnage by landfill:
a. Altamont : 155,855 tons
b. Vasco Road : 12,298 tons
c. Others (This includes landfills that receive less than 1% of the total city waste landfilled) : 3915 tons

3. Hayward's waste composition:
a. Paper products: 21.7%
b. Food Waste: 12.0%
c. Yard Waste: 4.5%
d. Wood, textile waste: 20.3%
e. All other types: 41.5%
Total: 100%

4. Weighted average methane recovery factor for Hayward was calculated based on tonnage - 74.5%

5. Recycling and compost tonnage has been omitted from this analysis as complete recycling and compost data was not available.

Sources:
1. Landfill data provided on July 20, 2006 by Meghan Starkey, Senior Program Manager, Alameda County Waste Management Authority (StopWaste.org), mstarkey@stopwate.org, (510) 614-1699

Community Greenhouse Gas Emissions in 2020
Detailed Report

	Equiv CO_2 (tons)	Equiv CO_2 (%)	Energy (MMBtu)

2. Waste characterization of the Landfill waste data based on 2000 Alameda County Waste Characterization study available online at http://www.stopwaste.org/home/index.asp?page=590
3. Methane recovery factors for individual landfill sites provided by Victoria Ludwig, Program Manager EPA Landfill Methane Outreach Program, Ludwig.Victoria@epamail.epa.gov
4. Growth rate based on Projections 2005, published by the Association of Bay Area Governments

Data entry:
Palak Joshi, Program Assistant, ICLEI, palak.joshi@iclei.org, (510) 844-0699, on August 25, 2006. Timothy Burroughs, Supervisor, timothy.burroughs@iclei.org.
Reference file: ICLEI_Hayward_CommunityWaste_2005

Subtotal Waste	36,256	2.6	
Total	1,410,022	100.0	18,315,355

Appendix D – Updated Coefficient Sets for CACP

See Excel file: Coefficient Sets for ACP.xls

AVERAGE GRID ELECTRICITY SET

(used for Community Analysis: Residential, Commercial, Industrial and for Gov Operations Analysis: Buildings, Streetlights, Water/Sewage

PG&E California*

lbs/kWh

Year	CO2	N2O	CH4	Nox	Sox	CO	VOC	PM10**
2003	0.6246947	0	0	0	0.001	0.001	0	0.001
2005	0.4928591	0	0	0	0.001	0.001	0	0.001

* custom coefficient set created by Ayrin Zahner per coefficients provided by Jasmin Ansar, PG&E

**coefficients for calculating criteria air pollutants are taken from the Region 13 Western States set included in CACP software

MARGINAL GRID ELECTRICITY SET

(used for Community Analysis: Residential, Commercial, Industrial and for Gov Operations Analysis: Buildings, Streetlights, Water/Sewage

13-Western Systems Coordinating Council/CNV*

* coefficient set provided by CACP

AVERAGE CHP HEAT SET

(used for Community Analysis: Residential, Commercial, Industrial and for Gov Operations Analysis: Buildings, Streetlights, Water/Sewage

USA total*

* coefficient set provided by CACP

RCI AVERAGE SET

(used for Community Analysis: Residential, Commercial, Industrial and for Gov Operations Analysis: Buildings, Streetlights, Water/Sewage

California Coefficients for Natural Gas*

kg/mmbtu

		N2O	CH4	Nox	Sox	CO	VOC	PM10**
Natural Gas	**Commercial**	0.001	0.006	0.076	0.003	0.02	0.004	0.002
Natural Gas	**Industrial**	0.001	0.006	0.133	0.064	0.038	0.007	0.005
Natural Gas	**Residential**	0.001	0.006	0.08	0.003	0.02	0.004	0.002

* custom coefficient set created by Ayrin Zahner per coefficients provided by Jasmin Ansar, PG&E

**coefficients for calculating criteria air pollutants are taken from the Region 13 Western States set included in CACP software

TRANSPORTATION AVERAGE SET

(MOBILE SOURCES-Measured by VMT)

(used for Community Analysis: Transportation)

(emission factors)

Alameda County EMFAC Emission Factors *

NO2 and CH4 coefficient were set as zero for all fuels and vehicle categories except Diesel Heavy Trucks and Gasoline Passenger Vehicles which are noted below.

2003 & 2005	Unit	N2O	CH4
Diesel-heavy truck	grams/mile	0.05	0.042
Gasoline-passenger vehicle	grams/mile	0.07	0.062

* custom coefficient set created by Ayrin Zahner per coefficients provided by BAAQMD using EMFAC

TRANSPORTATION AVERAGE SET

(MOBILE SOURCES-Measured by VMT)

(used for Community Analysis: Transportation)

(fuel efficiencies)

Alameda County EMFAC Emission Factors *

NO2 and CH4 coefficient set to zero for all fuels and vehicle categories except Diesel Heavy Trucks and Gasoline Passenger Vehicles which are noted below

2003 & 2005	Unit	Fuel Efficiency
Diesel-heavy truck	miles/us gal	6.4
Gasoline-passenger vehicle	miles/us gal	19.1

* custom coefficient set created by Ayrin Zahner per coefficients provided by BAAQMD using EMFAC

TRANSPORTATION AVERAGE SET

(MOBILE SOURCES-Measured by direct consumption)

(used for Gov Operations Analysis: Vehicle Fleet)

Default *

* coefficient set provided by CACP

FUEL CO2 SET **(STATIONARY SOURCES)** (used for Community Analysis: Residential, Commercial, Industrial and for Gov Operations Analysis: Buildings, Streetlights, Water/Sewage

California Coefficients for Natural Gas*

	kg/mmbtu						
	N2O	**CH4**	**Nox**	**Sox**	**CO**	**VOC**	**PM10****
Natural Gas Commercial	0.001	0.006	0.076	0.003	0.02	0.004	0.002
Natural Gas Industrial	0.001	0.006	0.133	0.064	0.038	0.007	0.005
Natural Gas Residential	0.001	0.006	0.08	0.003	0.02	0.004	0.002

* custom coefficient set created by Ayrin Zahner per coefficients provided by CCAR
**coefficients for calculating criteria air pollutants are taken from the Region 13 Western States set included in CACP software

FUEL CO2 SET **(MOBILE SOURCES-Measured by VMT)** (used for Community Analysis: Transportation)

EMFAC Emission Factors Alameda County*
CO2 coefficient set to zero for all fuels except Diesel and Gasoline which are noted below

	Unit	**CO2 Coefficient**
Diesel	grams/US gallon	10092
Gasoline	grams/US gallon	8599

* custom coefficient set created by Ayrin Zahner per coefficients provided by BAAQMD using EMFAC
**coefficients for calculating criteria air pollutants are taken from the Region 13 Western States set included in CACP software

FUEL CO2 SET **(MOBILE SOURCES-Measured by direct consumption)** (used for Gov Operations Analysis: Vehicle Fleet)

Default *
* coefficient set provided by CACP

WASTE PRODUCTS SET **(Waste)** (used for Community and Gov Operations Analysis: Waste Sector)

Gross GHG Emissions*

Waste Type	**Emissions Unit**	**Waste Unit**	**Methane**	**Sequestration at Site**	**Forest Sequestration**	**Upstream Energy**	**Upstream non-energy**
Paper Products	tonnes	tonnes	2.138	0	0	0	0
Food Waste	tonnes	tonnes	1.21	0	0	0	0
Plant Debris	tonnes	tonnes	0.686	0	0	0	0
Wood/Textile	tonnes	tonnes	0.605	0	0	0	0
All other waste	tonnes	tonnes	0	0	0	0	0

* custom coefficient set created by Ayrin Zahner per EPA WARM model and StopWaste.org

Exhibit C

Hayward Climate Action Plan

Agenda for Community Meeting
Saturday July 26th from 9 a.m. - 12:30 p.m.
Hayward City Hall, 777 B Street

I. Introduction: 9:00 a.m. – 9:15 a.m.

Mayor Michael Sweeney

II. What is Happening in Hayward: 9:15-9:30

Susan J. Daluddung, Ph.D., Director of Community and Economic Development

III. Guest speakers: 9:30 a.m. – 10:30 a.m.

Doug Grandt, Global Climate Change Expert
Overview of the Global Climate Change

Ann Hancock, Executive Director and Co-Founder of Sonoma County's Climate Protection Campaign
Experience, strategies, lessons learned from Sonoma County

IV. Workshop Overview: 10:30 a.m. – 10:45 a.m.

1. Overview of Hayward's 2005 Greenhouse Gas Inventory
2. Outline process for creating CAP
3. Explain workshop activities and desired outcomes
4. Introduce participants to category-based framework for thinking about GHG reductions. Categories include:
   a) Transportation
   b) Building Construction and Energy Use
   c) Waste Reduction, Recycling, and Composting
   d) Renewable Energy
   e) Environmental and Public Health
   f) Community and Business Engagement
   g) Personal/Family/Neighborhood
5. Divide into small groups based on interest in different categories.

V. Break Out into Small Groups: 10:45 a.m. – 12:15 p.m.

1. Brainstorming at tables
2. Each table group will attempt to arrive by consensus at a prioritized list or most-to-least desired strategies, and the reasons that support their decision.
3. Each person will complete their personal questionnaire (if not already completed).
4. Each table should designate a speaker to summarize the group's discussion

VI. Reconvene in Council Chambers: 12:15 p.m. – 12:30 p.m.

1. Each group will report their findings
2. Wrap up the morning events and briefly go over next steps

Thank you for coming! Please fill out your questionnaire and return it before you leave.