



MONDAY, SEPTEMBER 10, 2012

7:00 P.M. - REGULAR ENVIRONMENTAL COMMISSION MEETING

Council Chambers, Los Altos City Hall
One North San Antonio Road, Los Altos, California

ROLL CALL

PLEDGE OF ALLEGIANCE

PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA

Members of the audience may bring to the Commission's attention any item that is not on the agenda. Please complete a "Request to Speak" form and submit it to the Staff Liaison. Speakers are generally given two or three minutes, at the discretion of the Chair. Please be advised that, by law, the Commission is unable to discuss or take action on issues presented during the Public Comment Period. According to State Law (also known as "the Brown Act") items must first be noticed on the agenda before any discussion or action.

1. Commission Minutes
Approval of minutes – Regular Meeting of August 13, 2012.

DISCUSSION ITEMS

2. Climate Action Plan (CAP)
 - a. Presentation by Community Development staff and City Consultant (PMC) on the status of the Climate Action Plan
 - A. Report on the residential energy usage and travel patterns community surveys
 - B. Review of the updated Community-wide and Municipal Greenhouse Gas (GHG) emission inventories
 - C. Review of the City's GHG emissions forecast in 2020 and 2035
 - D. Discussion of setting GHG reduction targets
 - b. Activity progress report by Environmental Commission Task Force.

2-3 hours are anticipated for the reports and discussion.

3. Environmental Commission Work Plan Progress Review
Review and discussion of July action items in 2012-2013 Work Plan approved by Council at the Joint Meeting on April 3, 2012.

4. Announcements and Items for Information

- a. Report by Environmental Commissioner Hedden from the August 28, 2012 Council meeting; Sept. 11, 2012 Council meeting representation assigned to Vice Chair Eyre and Sept. 25, 2012 Council meeting representation assigned to Chair Bray.
- b. Report by Chair Bray on August 20, 2012 Mayor's meeting with Commission Chairs.
- c. Business Cards for Commissioners

COMMISSION REPORTS AND DIRECTIONS ON FUTURE AGENDA ITEMS

ADJOURNMENT

SPECIAL NOTICES TO PUBLIC

In compliance with the Americans with Disabilities Act, the City of Los Altos will make reasonable arrangements to ensure accessibility to this meeting. If you need special assistance to participate in this meeting, please contact the Human Resources Department 72 hours prior to the meeting at (650) 947-2607.

Agendas, Staff Reports and some associated documents for Environmental Commission items may be viewed on the Internet at <http://losaltosca.gov/committees-commissions/environmental/meetings.html>

On occasion the Environmental Commission may consider agenda items out of order.

All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, and that are distributed to a majority of the legislative body, will be available for public inspection at the Office of the City Clerk's Office, City of Los Altos, located at One North San Antonio Road, Los Altos, California at the same time that the public records are distributed or made available to the legislative body. Any draft contracts, ordinances and resolutions posted on the Internet site or distributed in advance of the Environmental Commission meeting may not be the final documents approved by the Commission. Contact the City Clerk at (650) 947-2720 for the final document.

If you wish to provide written materials, please provide the Environmental Commission Staff Liaison with **10 copies** of any document that you would like to submit to the Commissioners in order for it to become part of the public record.

For other questions regarding the meeting proceedings, please contact the City Clerk at (650) 947-2720.



AGENDA REPORT

MEETING DATE: September 10, 2012

TO: Environmental Commission

FROM: Zachary Dahl, Senior Planner

SUBJECT: Climate Action Plan Update

RECOMMENDATION: None

BACKGROUND:

State Assembly Bill 32 requires public agencies in California to implement measures to reduce greenhouse gas (GHG) emissions to year 1990 levels by 2020 – equivalent to a 15% reduction below 2005 GHG emission levels. While the great majority of this responsibility rests with the State and regional air quality boards, cities also need to have a plan in place that addresses carbon emissions when planning for programs and facilities and when issuing permits. This Climate Action Plan (CAP) is intended to provide a framework to achieve those goals.

City Council approved a capital project for FY 2011-2012 to prepare a CAP. On November 8, 2011, the City Council awarded Pacific Municipal Consultants (PMC) with a contract to prepare a CAP for the City of Los Altos. On March 12, 2012, PMC made a presentation to the Environmental Commission providing an overview of the CAP process. PMC presented an anticipated timeframe to prepare the CAP, discussed how the Environmental Commission would be involved in the project and answered questions from Commissioners.

On June 11, 2012, staff updated the Environmental Commission on the status of the CAP and presented two surveys that were developed to collect Los Altos specific information with regard to household energy and water usage, and individual resident travel patterns. The surveys were made available to the public on June 15, 2012 and survey data was collected through August 31, 2012. Two public notices encouraging members of the public to participate in the surveys were run in the Town Crier, a notice was posted on the City's website and outreach was conducted through various community networks. Overall, 117 people participated in the Residential Travel Patterns Survey and 83 people participated in the Household Energy and Water use Survey.

DISCUSSION:

The intent of this update is to provide the Environmental Commission with updated GHG emission inventories (both municipal and community-wide), GHG emission forecasts for 2020 and 2035, and a summary of the recently completed community surveys. Attached with this report are the updated inventories and GHG emission forecasts prepared by PMC. This information will provide the basis for the City's GHG emission reduction target and the subsequent policies that will help achieve that reduction. As noted on the attached documents, this information is still in draft form. Input from

the Environmental Commission and from members of the public will be factored in before it is finalized and incorporated into the CAP.

Resident Surveys

The goal of the surveys was to collect data and information that could help identify opportunities for GHG emission reduction specific to our community. While the number of people who responded to the surveys was lower than hoped for, there may be enough data to yield some useful information. But, it is also important to remember that these surveys are not scientific and it still remains to be seen if survey results can be of use during the CAP process.

While a more thorough analysis of the survey information has not yet taken place, here are a few interesting results from the surveys. One of the most noticeable trends was that survey participation appeared to be skewed toward the older age groups, with younger and family age individuals not as well represented.

Residential Travel Patterns Survey

- **Age:** Only 6% were under 41 years old, 23% were 41-50 year old, 31% were 51 to 60 years old and 39% were 61 years and older.
- **Percentage of Mileage driven within Los Altos in an average week:** 56% drive 20% or less of their miles within Los Altos and only 23% drive 60% or more of within Los Altos.
- **Employed in Los Altos:** 79% said their jobs are located outside of Los Altos.
- **How often do you use public transit outside of Los Altos:** 85% said never or rarely.
- **How often do you telecommute in place of traveling to work:** 21% do it often or every day and 35% choose not to or are not permitted.

Household Energy and Water Survey

- **Size of house:** 12% were 1,500 square feet or less, 43% were 1,501-2,500 square feet, 31% were 2,501-3,500 square feet and 13% were 3,501 square feet or more.
- **Year house was originally built:** 83% were built before 1970.
- **Has house been substantially remodeled:** 46% have had no substantial remodeling, 40% were sustainably remodeled in the 1990s or 2000s, and only 5% have been substantially remodeled since 2008.

Following this meeting, staff will work with the CAP Subcommittee of the Environmental Commission to further analyze the survey data. Depending on the outcome of that analysis, the survey data may be provided to PMC for further analysis and use in the CAP.

Next Steps

Following a review and discussion of the updated GHG emissions inventories and forecasts, staff will work with PMC to prepare a policy audit and establish the parameters for sector-specific reduction measures. This information will be presented to the Environmental Commission at a future meeting and be used to assist in the setting of a GHG emission reduction target.



MEMO

To: Zach Dahl, Senior Planner
CITY OF LOS ALTOS

From: Scott Davidson
Ayrin Zahner
PMC

Date: September 4, 2012

**Subject: LOS ALTOS CLIMATE ACTION PLAN:
UPDATED INVENTORIES, EMISSION FORECASTS, AND REDUCTION
TARGET SETTING**

We are pleased to provide you with updated municipal and community-wide greenhouse gas (GHG) emissions inventories as well as forecast information that evaluates existing and anticipated GHG emissions for the City of Los Altos. Together, these documents will be used to guide selection of an appropriate reduction target for Los Altos and to focus policy development in the Climate Action Plan on measures that will be most effective. As described in greater detail below and in the attached documents, this information will be used to guide City selection of GHG emissions reduction targets and strategies.

Greenhouse Gas Emission Inventories

The City has prepared an inventory of greenhouse gas emissions in Los Altos and a separate inventory of emissions from municipal operations. These inventories indicate how much greenhouse gas is emitted from community and municipal activities (e.g., travel, waste disposal). The inventories will act as a foundation for the City's Climate Action Plan by providing information about the largest sources of GHG emissions, and thus the largest opportunities for reductions. Building from the inventories, the Climate Action Plan will identify reduction strategies that respond to local emissions characteristics. The municipal and community-wide inventories have been updated to include methodologies and topics necessary to create a Qualified Climate Action Plan (also known as a Greenhouse Gas Reduction Strategy) in accordance with the Bay Area Air Quality Management District's requirements and the California Environmental Quality Act Guidelines.

Greenhouse Gas Emissions Forecast

GHG emissions estimates for the years 2020 and 2035 have been forecast for each sector identified in the GHG inventories. The estimates reflect anticipated growth in Los Altos under two scenarios: (1) the business-as-usual forecasts reflect the growth in emissions that would occur if there were no state, regional, or local actions to reduce emissions, and (2) the adjusted business-as-usual forecasts reflect the reductions expected to result from state programs and policies.

Forecast Years

The forecast years used to evaluate GHG emissions were selected to coincide with the reduction target dates established by the State through Assembly Bill 32 and Senate Bill 375. The City of Los Altos will establish GHG emissions reduction targets through the Climate Action Plan. Assembly Bill 32, adopted in 2006, includes the goal of reducing GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. These reduction targets were



set in order to maintain the 350 parts per million of carbon dioxide (CO₂) in the atmosphere, above which scientists say could trigger potentially dangerous climate changes. The Assembly Bill 32 Scoping Plan defines the local equivalent of 1990 emissions as a 15% reduction from the current year (generally 2005–2008) by 2020. State guidance to local governments is to achieve emissions reductions through creation of a Qualified Climate Action Plan.

California's Senate Bill 375 (Sustainable Communities and Climate Protection Act) was adopted in 2008 and established regional emissions reduction targets from passenger vehicles. Specifically, Senate Bill 375 establishes a per capita vehicle miles traveled (VMT) reduction target of 8–10% by 2020 and 16–18% by 2035.

Next Steps

Following review and discussion of the updated GHG emissions inventories and forecasts, staff will prepare a policy audit and initiate sector-specific reduction measures for presentation to the Environmental Commission.

Attachments

- 1) Greenhouse Gas Emission Forecast and Inventory Updates

**CITY OF LOS ALTOS
GREENHOUSE GAS EMISSIONS FORECAST
& INVENTORY UPDATES
DRAFT**

Prepared for the City of Los Altos
by



SEPTEMBER 2012

INTRODUCTION

In 2009, in partnership with ICLEI-Local Governments for Sustainability, the City of Los Altos prepared a 2005 baseline inventory of greenhouse gas (GHG) emissions from municipal facilities and activities. In 2010, the Los Altos Environmental Commission prepared a community-wide inventory of greenhouse gas (GHG) emissions. Since then, the Bay Area Air Quality Management District (BAAQMD) has established guidelines for creating GHG inventories and climate action plans as part of a Qualified Greenhouse Gas Reduction Strategy. Using these guidelines, the City of Los Altos commissioned an update to both the municipal and community-wide inventories, and the preparation of an emission forecast for both municipal and community-wide activities as part of the preparation for the development of a Climate Action Plan (CAP).

As described in greater detail below, this report summarizes the results of the updated inventories, and the business-as-usual and state adjusted emission forecasts for both municipal and community-wide activities in 2020 and 2035.

PURPOSE

The updated GHG emission inventories will act as a foundation for the City's Climate Action Plan by outlining the sources of GHG emissions, and thus, identifying opportunities for reduction. This report provides GHG emission forecasts for 2020 and 2035 using the 2005 baselines established in the municipal and community-wide inventories. The forecasts provide projections against which future progress can be measured. This report is to be used in conjunction with memos that summarize the findings of the updated community-wide and municipal GHG emissions inventories.

Specifically, this report presents:

- A brief summary of the updated 2005 baseline GHG emissions from the community-wide and municipal inventories (refer to **Attachment A** and **Attachment B**);
- The business-as-usual (BAU) forecast of community-wide and municipal emissions to present how GHG emissions will increase by 2020 and 2035 if no behavioral or regulatory changes are made; and
- The adjusted business-as-usual (ABAU) forecast of community-wide and municipal emissions to account for reduction efforts mandated and implemented by the State of California (State), such as new vehicle standards and building standards.

BASELINE INVENTORY

Community-Wide Inventory

The City of Los Altos emitted approximately 184,470 metric tons of carbon dioxide equivalents (MTCO₂e) in the baseline year 2005.¹ **Table I** displays the results of the 2005 community-wide baseline GHG inventory by sector. For a full analysis, see **Appendix A**.

TABLE I – 2005 COMMUNITY-WIDE BASELINE EMISSIONS BY SECTOR

Sector	Metric Tons CO ₂ e/year	Percentage of Total
Residential Energy	59,950	32%
Commercial and Industrial Energy	20,070	11%
Solid Waste	3,950	2%
Transportation	91,670	50%
Water	2,790	2%
Wastewater	1,100	<1%
Off-Road	4,940	3%
TOTAL	184,470	100%

** Due to rounding, the total may not be the sum of component parts.*

Municipal Inventory

Municipal operations for the City of Los Altos emitted approximately 1,870 MTCO₂e in the baseline year 2005. **Table 2** displays the results of the municipal baseline inventory by sector. For a full analysis, see the 2005 City GHG Inventory Report in **Appendix B**. The community-wide and municipal baseline emissions are used to forecast anticipated future emissions, which in turn are used to identify and establish GHG emissions reduction targets.

¹ MTCO₂e stands for metric tons carbon dioxide equivalent and is an internationally recognized unit of measure for reporting the combined, common denominator, climate change effect of the various greenhouse gases. In this report, the unit represents emissions of the three top GHGs: methane (CH₄), nitrous oxide (N₂O), and carbon dioxide (CO₂).

TABLE 2 – 2005 MUNICIPAL BASELINE EMISSIONS BY SECTOR

Sector	Metric Tons CO ₂ e/year	Percentage of Total
Buildings	430	23%
Lighting	130	7%
Water and Wastewater	<10	<1%
Fleet	420	22%
Employee Commute	700	37%
Government-Generated Waste	170	9%
Refrigerants	20	1%
TOTAL*	1,870	100%

* Due to rounding, the total may not be the sum of component parts.

BUSINESS-AS-USUAL FORECAST

A business-as-usual (BAU) forecast is an estimate of how GHG emissions will likely grow over time without influence from state, regional, and local reduction efforts. This BAU emissions forecast assumes 2005 energy consumption, waste disposal, and energy efficiency rates and focuses on two target years: 2020 and 2035. The 2020 target year is estimated for consistency with Assembly Bill 32 targets, while 2035 is studied for consistency with the Senate Bill 375 horizon.

COMMUNITY-WIDE BUSINESS-AS-USUAL INDICATORS

Table 3 lists the various growth indicators and sources used in the forecasting of community-wide emissions for the City of Los Altos. All indicators for 2020 and 2035, except some of those used for transportation, are from the Association of Bay Area Governments (ABAG) 2009 Regional Projections report. Residential energy use is tied to the number of households within city limits for the target years. Similarly, commercial energy use emissions are assumed to grow with the number of jobs. Growth in waste emissions is based on the total service population of Los Altos; this includes projected residential and commercial growth. Using the 2005 Highway Performance Monitoring System (HPMS) and estimates of daily vehicle miles traveled on state and interstate highways (280, 80, 85), PMC calculated vehicle miles traveled (VMT) for 2005 and estimated VMT for 2020 and 2035.

Typically, county-level VMT forecasts from the Metropolitan Transportation Commission (MTC) are used to estimate 2020 and 2035 city-level VMT. In Los Altos, growth is expected to occur at a slower rate than throughout the county. Since, service population is expected to increase at a much lower rate than county VMT, the forecasts for 2020 and 2035 use an average of the VMT estimated for the county and that generated by service population projections from the ABAG 2009 Regional Projections report to arrive at projections that are expected to more closely match projected growth.

TABLE 3 – COMMUNITY-WIDE BUSINESS-AS-USUAL GROWTH INDICATORS AND AFFECTED SECTORS

Growth Indicator	Emissions Sector	2005	2020	2035	Sources	Percentage Change 2005–2035
Jobs	Commercial/Industrial Energy	10,440	11,130	11,950	2010 Census, ABAG	+14%
Service Population (Residents + Jobs)	Solid Waste, Water, Wastewater, Landfill	38,340	40,530	42,350	2010 Census, ABAG	+10%
Households	Residential Energy, Off-Road	10,530	11,030	11,610	2010 Census, ABAG	+10%
Annual VMT	Transportation	178,101,020	204,420,350	212,872,670	HPMS, MTC, ABAG	+20%

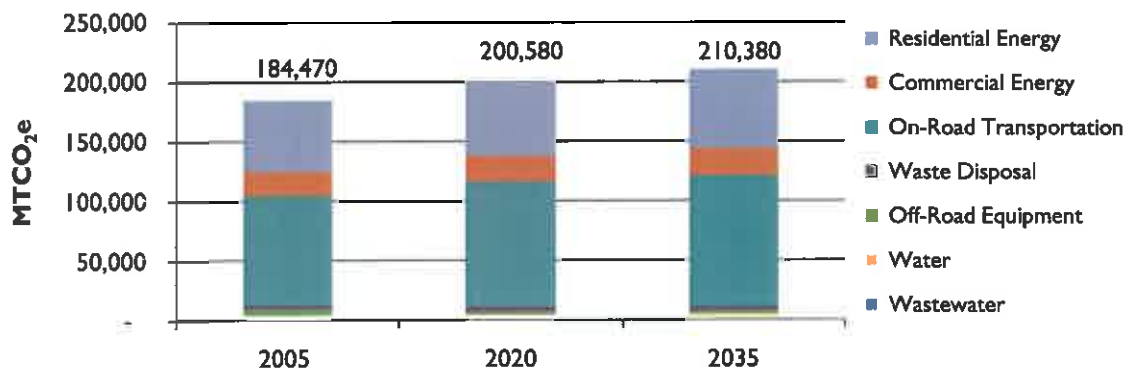
BUSINESS-AS-USUAL FORECAST

Table 4 and Figure 1 summarize the growth forecast of GHG emissions by activity sector without any actions or policies in place to reduce GHG emissions. Under the BAU growth scenario, emissions are estimated to grow by 9% in 2020 (200,580 MTCO₂e) and by 14% from baseline in 2035 (210,380 MTCO₂e).

TABLE 4 – COMMUNITY-WIDE BUSINESS-AS-USUAL EMISSIONS BY SECTOR

Sector	2005 MTCO ₂ e	2020 MTCO ₂ e	2035 MTCO ₂ e
Residential Energy	59,950	62,800	66,100
Commercial Energy	20,070	21,400	22,970
Transportation	91,670	105,220	109,570
Waste Disposal	3,950	4,170	4,360
Off-Road Equipment	4,940	2,880	3,080
Water	2,790	2,950	3,080
Wastewater	1,100	1,160	1,220
Total	187,680	204,820	214,460
Percentage Change from 2005	–	9%	14%

FIGURE I – COMMUNITY-WIDE BUSINESS-AS-USUAL EMISSIONS BY SECTOR



MUNICIPAL BUSINESS-AS-USUAL FORECAST

The growth indicators used for the municipal business-as-usual (BAU) forecast are different from those used for the community. Municipal indicators are based on anticipated future changes to municipal operations and equipment; for example, the size of the fleet, the number of buildings, and increases in services provided to the community. For sectors without any anticipated changes, it was assumed that no changes occur from the baseline emissions. All of the information used in the municipal BAU forecast was provided by City staff. Using the growth indicators shown in Table 5, the municipal BAU forecasts for the City of Los Altos are shown in Table 6 and Figure 2.

TABLE 5 – MUNICIPAL BUSINESS-AS-USUAL GROWTH INDICATORS AND AFFECTED SECTORS

Growth Indicator	Emissions Sector	2005	2020	2035	Sources	Percentage Change 2005-2035
Building Area (Square Feet)	Building Energy	201,260	238,210	307,488	City of Los Altos, 2009 Community Center Master Plan	53%
City Employees (Full-Time Equivalent)	Fleet, Lighting, Employee Commute, Government Generated Waste, Refrigerants, Wastewater	120	130	140	City of Los Altos	+6%
Service Population	Water	38,340	40,530	42,350	2010 Census, ABAG	+10%

TABLE 6 – MUNICIPAL BUSINESS-AS-USUAL EMISSIONS BY SECTOR

Sector	2005 MTCO ₂ e	2020 MTCO ₂ e	2035 MTCO ₂ e
Buildings	430	500	660
Lighting	130	130	130
Water and Wastewater	<10	<10	<10
Fleet	420	460	470
Employee Commute	700	750	790
Government-Generated Waste	170	180	190
Refrigerants	20	20	20
Total	1,870	2,040	2,260
Percentage Change from 2005	-	9%	21%

Figure 2 – Municipal Business-as-Usual Emissions by Sector

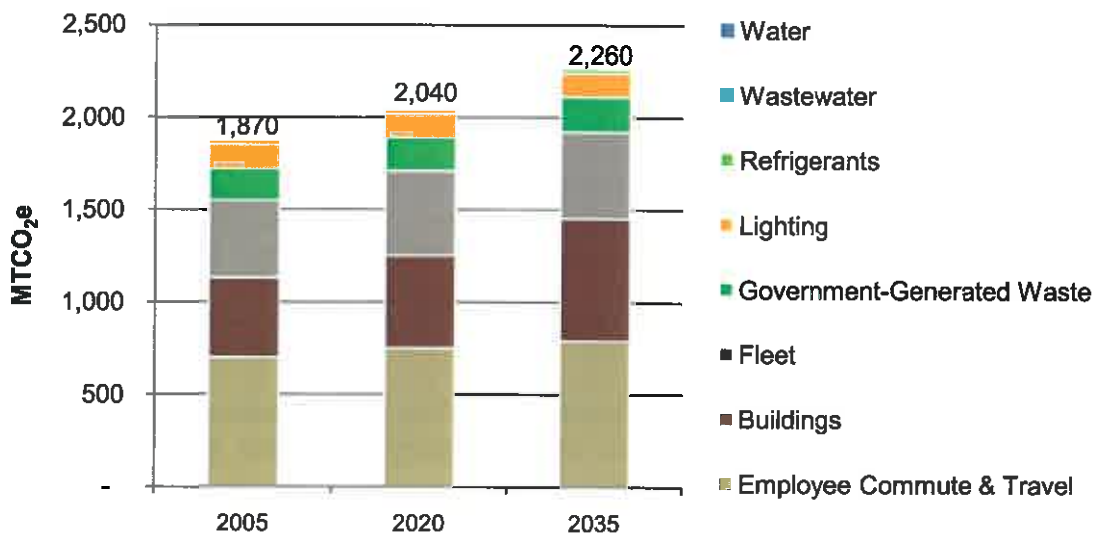


Table 6 and **Figure 2** summarize the growth forecast of GHG emissions by activity sector without any actions or policies in place to reduce GHG emissions. Under the BAU growth scenario, emissions are estimated to grow by 9% in 2020 (2,040 MTCO₂e) and by 21% from baseline in 2035 (2,260 MTCO₂e). Building-related energy is expected to increase approximately 53% between 2005 and 2035 based on the Los Altos Master Plan. State policies likely will slow building sector emissions growth to approximately 13% over that time.

STATE ADJUSTED FORECAST

STATE REDUCTION PROGRAMS

The State has been a proactive force in reducing GHG emissions. Regulations affecting vehicle standards, building standards, and the renewable energy content of electricity will reduce GHG levels in Los Altos. The state actions summarized below are incorporated into the BAU forecast to create a more realistic estimate of Los Altos' future emissions.

Assembly Bill 1493 (Pavley). Signed into law in 2002, AB 1493 requires carmakers to reduce GHG emissions from new passenger cars and light trucks beginning in 2011. Regulations were adopted by the California Air Resources Board (CARB) in 2004 and took effect in 2009 with the release of a waiver from the US Environmental Protection Agency granting California the right to implement the bill. CARB anticipates that the Pavley standards will reduce GHG emissions from California passenger vehicles by about 22% in 2012 and by about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.² The car industry is well on its way to meeting these efficiency targets.

Renewables Portfolio Standard

Established in 2002 in Senate Bill 1078, the Renewables Portfolio Standard (RPS) targets utility providers, such as Pacific Gas and Electric (PG&E), to increase the portion of energy that comes from renewable sources to 20% by 2010 and to 33% by 2020. A June 2009 report from the California Public Utilities Commission indicated it is unlikely that the state and its investor-owned utilities will be able to reach the RPS goal of 33% by 2020; according to state assessments, the forecast assumes that energy providers will achieve a 28% renewable portfolio by 2020.³

California Building Code Title 24

Title 24 of the California Code of Regulations is a statewide standard applied at the local level by local agencies through building permits. It mandates how each new home and business is built in California. It includes requirements for the structural, plumbing, electrical, and mechanical systems of buildings and for fire and life safety, energy conservation, green design, and accessibility in and around buildings. This forecast focuses on Part 6 (the California Energy Code) and Part 11 (the California Green Building Standards Code), which require direct electricity, natural gas, and water savings for every new home or business built in California.

This forecast incorporates the net energy benefit of new Title 24 requirements that did not exist in the baseline year. These estimates are based on California Energy Commission studies that compare each new update of Title 24 to its former version.

Low Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS) calls for the California Air Resources Board (CARB) to achieve a reduction of at least 10% in the carbon intensity of California's transportation fuels by 2020. Transportation fuels that will be affected by the LCFS include California reformulated gasoline (CaRFG), ultra low sulfur diesel (ULSD, also called California diesel), biodiesel/renewable diesel, compressed natural gas (CNG), liquid propane gas (LPG), E85 ethanol, hydrogen, electricity, and methanol. A preliminary injunction was issued in December 2011, which required implementation of the LCFS to be

² California Air Resources Board 2010.

³ California Public Utilities Commission 2009.

put on hold. CARB is currently appealing the decision but until the legal standing of the program has been resolved, the LCFS will not be considered in the adjusted business-as-usual forecast.

California Solar Initiative

The California Solar Initiative is a state program that provides cash rebates for the installation of an electric solar panel system. In order to qualify, the customer must buy electricity from one of California's three investor-owned utilities (Southern California Edison, Pacific Gas and Electric, or San Diego Gas & Electric).

Assembly Bill 341

Approved by the governor on October 5, 2011, AB 341 requires cities, counties, and regional agencies to develop a source reduction component of an integrated waste management plan that would divert 50% of all solid waste from landfills by 2000 through recycling, composting, or source reduction. By 2020, the requirement increases to 75%.

Los Altos implemented solid waste reduction measures before AB 341 became effective and will likely exceed AB 341 requirements. As a consequence, no additional State-required solid waste reduction actions have been included in the ABAU forecast. The benefits of existing City actions to reduce solid waste will be accounted for in the Climate Action Plan.

COMMUNITY-WIDE ADJUSTED BUSINESS-AS-USUAL FORECAST

All of the state programs highlighted above are included in the community-wide adjusted business-as-usual (ABAU) forecast. As shown in **Table 7**, these state reduction efforts are anticipated to reduce business-as-usual (BAU) emissions by 28,430 MTCO_{2e} in 2020 and by 43,390 MTCO_{2e} in 2035. The majority of these reductions are due to AB 1493 (Pavley). In comparison to the BAU scenario, **Table 8** shows that with state reduction measures, 2020 emissions are projected to be 7% below the 2005 baseline levels rather than 9% above. Similarly, 2035 emissions go from 14% above the 2005 baseline levels in the BAU scenario to 9% below baseline levels after the state efforts are taken into account.

TABLE 7 – IMPACT OF STATE POLICIES ON COMMUNITY-WIDE GHG EMISSIONS

State Reductions Summary	2020 MTCO _{2e}	2035 MTCO _{2e}
Pavley I Reductions	-19,370	-30,080
RPS Reductions	-6,400	-9,690
Title 24 Reductions	-430	-1,580
CSI Reductions	-2,230	-2,040
Total State Reductions*	-28,430	-43,390

* Due to rounding, the total may not equal the sum of component parts.

TABLE 8 – COMPARISON OF BUSINESS-AS-USUAL AND ADJUSTED BUSINESS-AS-USUAL FORECAST

State Reductions Summary	2005 MTCO ₂ e	2020 MTCO ₂ e	2035 MTCO ₂ e
BAU Forecast	184,470	200,580	210,380
Total State Reductions		-28,430	-43,390
Adjusted Growth Projection	184,470	172,150	166,990
Percentage Change from 2005		-7%	-9%

** Due to rounding, the total may not equal the sum of component parts.*

MUNICIPAL ADJUSTED BUSINESS-AS-USUAL FORECAST

Only certain state reduction programs affect the municipal business-as-usual (BAU) forecast. These include the Renewables Portfolio Standard, the Pavley standards, and the Title 24 efficiency standards. The California Solar Initiative is not applicable to municipalities and is not quantified. **Table 9** shows the effect of the included state reduction efforts, and **Table 10** shows how this changes BAU emissions. Emissions in 2020 are reduced by approximately 280 MTCO₂e in 2020 and 510 MTCO₂e in 2035. The majority of these reductions are from the AB 1493 (Pavley) standards and the Renewables Portfolio Standard. In comparison to the BAU scenario, 2020 emissions with State reduction measures are 6% below the 2005 baseline levels rather than 9% above. Similarly, 2035 emissions go from 21% above the 2005 baseline levels in the BAU scenario to 6% below baseline levels after state efforts are taken into account.

TABLE 9 – IMPACT OF STATE POLICIES ON MUNICIPAL GHG EMISSIONS

State Reductions Summary	2020 MTCO ₂ e	2035 MTCO ₂ e
Pavley I Reductions	-220	-360
RPS Reductions	-60	-120
Title 24 Reductions	0	-30
Total State Reductions*	-280	-510

** Due to rounding, the total may not equal the sum of component parts.*

TABLE 10 – COMPARISON OF BAU AND ABAU MUNICIPAL FORECAST

State Reductions Summary	2005 MTCO _{2e}	2020 MTCO _{2e}	2035 MTCO _{2e}
BAU Forecast	1,870	2,040	2,260
Total State Reductions		-280	-510
Adjusted Growth Projection	1,870	1,760	1,750
Percentage Change from 2005		-6%	-6%

** Due to rounding, the total may not equal the sum of component parts.*

CONCLUSION

These forecasts provide important information to help the community better understand the anticipated GHG emissions from the activities of residents, employees, businesses, and government located within the City of Los Altos. Using the information in these reports, the City, with guidance from the Environmental Commission, will establish GHG emission reduction targets. The minimum targets, as outlined in the Bay Area Air Quality Management District guidelines, should reduce the City's GHG emissions by 15% below the 2005 baseline levels. Once established, the reduction targets will be used as the basis for developing the Climate Action Plan.

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ATTACHMENT A

CITY OF LOS ALTOS

Community-Wide GHG Inventory Update
September 2012

INTRODUCTION

In 2010, the Los Altos Environmental Commission prepared a community-wide greenhouse gas (GHG) survey that included common emission sources as well as sources not usually included in inventories (i.e., air travel). Since then, the Bay Area Air Quality Management District (BAAQMD) has established guidelines for creating GHG inventories and climate action plans as part of a Qualified Greenhouse Gas Reduction Strategy. With this in mind, the City of Los Altos commissioned this update of the existing community inventory as part of the Climate Action Plan project.

This report summarizes the preliminary results of the 2005 baseline community-wide GHG inventory update.

PURPOSE

The Inventory will act as a foundation for the City's Climate Action Plan by informing the City and the community of the sources of GHG emissions, and thus, opportunities for reduction. This report focuses on community-wide emissions only. The purpose of a GHG emissions inventory is to present the major sources and quantities of GHG emissions caused by activities within the City of Los Altos. The Inventory will provide a baseline against which future progress can be measured and will serve as the foundation for the City's Climate Action Plan.

The Inventory includes the major sources of GHGs caused by activities in Los Altos using best practices consistent with the methodology recommended by the California Air Resources Board (CARB), ICLEI-Local Governments for Sustainability, and the BAAQMD. The Inventory analyzes the following emissions sources for the 2005 calendar year (baseline):⁴

- **Energy** – Electricity, natural gas, and residential propane consumed in the city in 2005.
- **Transportation** – Vehicle miles traveled (VMT) within from the city in 2005.
- **Waste Disposal** – Methane emissions from community waste sent to landfills in 2005 where the emissions will occur in future years.
- **Landfills** – Direct emissions from landfills in the baseline year (2005).
- **Water and Wastewater** – The energy required to extract, filter, move, and treat the water consumed and/or treated in the city in 2005. Direct process emissions from the City's wastewater treatment facilities and fugitive emissions from septic tanks in the city are excluded

⁴ The 2010 Inventory included air travel as an emission source. Although airfare is an important source of GHG emissions, it has been omitted from this Inventory due to a lack of guiding methods for the BAAQMD.

from analysis, as they will be accounted for as appropriate in the municipal inventory update.⁵

- **Off-Road** – Emissions from construction, and lawn and garden equipment/vehicles.

The effect of sequestration in the city has not been quantified or included in the baseline inventory and forecast because this report focuses on emissions that result from community activities and sources that can be mitigated or reduced. Sequestration refers to organic carbon that is stored in material, landfills or soils that does not get emitted. Sequestration is often difficult to quantify and, in many cases, provides few policy options.

RELATIONSHIP TO THE 2010 COMMUNITY-WIDE INVENTORY

In 2010, the Los Altos Environmental Commission prepared a community-wide greenhouse gas (GHG) emission inventory. Changes to the regulatory structure and incentives to address GHG emissions since the creation of the initial inventory have prompted the city to reevaluate the emissions from community-wide and municipal sources. This document reports the new assessment of community-wide GHG emissions in the city.

In response to California Environmental Quality Act (CEQA) Guidelines that went into effect in March 2010, the BAAQMD updated its CEQA Guidelines for the San Francisco Bay Area Basin. The purpose of the guidelines is to assist lead agencies (such as the City of Los Altos) in evaluating the air quality impacts of proposed projects and plans. The guidelines also establish thresholds of significance for impacts related to GHG emissions. Plans that comply with the BAAQMD's suggested guidelines could serve as a Qualified GHG Reduction Strategy, providing streamlined CEQA tiering for development projects that comply with standards in the plan.

To create a Qualified GHG Reduction Strategy (also known as a Climate Action Plan) in compliance with BAAQMD guidelines, the City contracted with PMC to update the inventory to incorporate the new BAAQMD-recommended methodologies and address all emissions sectors identified by the guidelines. PMC used the Environmental Commission-prepared inventory as a starting point for analysis in this Inventory, but re-inventoried emissions as described below. In the process of completing the inventory, PMC completed new emissions calculations to use the most up-to-date tools and resources. The primary distinctions between this Inventory and the previous draft inventory include the following:

- Inclusion of two new emissions sources not previously inventoried: (1) indirect emissions from the electricity used to pump and process water and wastewater used by the community; and (2) fuel combustion emissions produced by off-road equipment used within the community boundary.
- Recalculation of on-road transportation emissions using county-specific transportation emission factors for common fuels from gasoline and diesel (EMFAC).

⁵ According to the Local Government Operations Protocol, "Fugitive emissions that are not physically controlled but result from intentional or unintentional releases, commonly arising from the production, processing, transmission, storage, and use of fuels and other substances, often through joints, seals, packing, gaskets, etc."

- Recalculation of electricity and natural gas emissions using factors from Local Government Operations Protocol (LGOP) v1.1 to remove errors that had been introduced through unnecessary and inaccurate unit conversion.
- Calculation of off-road emissions for agricultural equipment, construction equipment, and lawn and garden equipment, consistent with BAAQMD compliance and using more accurate baseline information for the year 2005, based on 2005 emissions data, households, and building permits.
- Calculation of indirect water and wastewater emissions using local (where available) and state average energy intensities and community-wide water delivery data for Los Altos.
- Exclusion of emissions from aircraft included in the original inventory due to lack of accepted methods for calculations.
- Calculation of solid waste disposal emissions using California-specific factors available in the Landfill Emissions Tool developed by CARB, instead of using national defaults provided by the ICLEI Clean Air and Climate Protection program.
- Integration of updated emissions factors in LGOP v1.1 and EMFAC 2011.

DATA PARAMETERS

The Inventory was developed with the best-available tools, data, and methodology; however, as with any GHG inventory, there are limitations to representing all sources of emissions in a local jurisdiction. The main factors that limit GHG inventories include (1) data availability, (2) privacy laws, and (3) deficient methods. The following sections highlight emissions that cannot be included in a GHG inventory due to these factors. It is estimated that sources not included in the Inventory for reasons of data availability and privacy laws comprise less than 5% of total emissions in the city and are therefore anticipated to have a minimal impact. The emissions excluded for reasons of method limitations may be considerable, but it is not possible to estimate their impact.

I. Data Availability

Lack of available data prevented the calculation of emissions from the following sources for the following reasons:

- Propane use – Propane is largely unregulated in California (except for storage and safety issues, which are regulated). Because it is an unregulated commodity, no data is collected by the State on propane sales or usage. While propane use in the city is likely, the availability of such data prevents accurate calculations of emissions from propane. In addition, propane is not anticipated to be widely used and is likely to contribute minimally to community-wide emissions. A protocol for calculating GHG emissions is currently under development and is anticipated to provide future guidance that will inform the accurate collection of propane use in the city.
- Refrigerants – Similar to propane, the amount of fugitive refrigerant emissions cannot be calculated because sales are not tracked.

2. Privacy Laws

Commercial, industrial, and institutional electricity and natural gas are combined into a nonresidential category due to the California 15/15 rule. The 15/15 rule was adopted by the California Public Utilities Commission in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 rule requires that any aggregated information provided by the utilities must include at least 15 customers and that a single customer's load must be less than 15% of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15% of the total data, categories must be combined before the information is released. The rule further requires that if the 15/15 rule is triggered for a second time after the data has been screened already using the 15/15 rule, the customer must be dropped from the information provided.

3. Unavailability of Protocol for Life-Cycle Emissions

Industry protocol at this time does not recommend inclusion of life-cycle emissions in community-wide GHG inventories. A protocol for estimating life-cycle emissions is currently in development. Life-cycle emissions are emissions associated with the production and disposal of items consumed by a community (i.e., "cradle-to-grave"). For instance, a life-cycle assessment of vehicle emissions would include those from designing, extracting raw materials, producing, delivering, and disposing of each car in the city. In contrast, this analysis only captures how much that car is driven in the city consistent with standard protocol.

4. Other Excluded Emissions

Other GHG emissions sectors have been excluded from this Inventory, as they are negligible in size or relevance.

Review of similar inventories, including the California Greenhouse Gas Inventory prepared by CARB, indicates that those sources not included in the Inventory for the reasons stated above comprise less than 5% of total emissions in the city. The emissions identified in this Inventory are primarily GHGs that the community has directly caused and has the ability to reduce through implementation of conservation actions, a Qualified GHG Reduction Strategy (Climate Action Plan), or other corresponding efforts.

KEY TERMS AND TIMELINES

The following terms are used throughout the Inventory. These concepts are fundamental to understanding the contents of the Inventory.

Baseline year: Emissions are quantified for calendar year 2005, due to the availability of reliable data and consistency with Assembly Bill (AB) 32. A baseline year gives the City a basis of comparison for future reduction efforts and inventories.

Carbon dioxide equivalent (CO₂e): The universal unit for representing the six different GHGs (see definition of greenhouse gas emissions, below) in one single unit by converting each gas into the equivalent potency of carbon dioxide. CO₂e is commonly expressed in metric tons (MTCO₂e), each of which equals 2,205 pounds.

Greenhouse gas emissions: Gases that trap heat in the earth's atmosphere are called greenhouse gases, or GHGs. GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O),

hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). While many of these gases occur naturally in the atmosphere, modern human activity has led to a steep increase in the amount of GHGs released into the atmosphere over the last 100 years. Collectively, these gases intensify the natural greenhouse effect, thus causing global average surface temperatures to rise, which in turn affects global climate patterns. GHGs are often quantified in terms of CO₂ equivalent, or CO₂e, a unit of measurement that equalizes the potency of GHGs.⁶

Sector: Emissions are grouped by the type of activity that generates the emissions, such as transportation, residential energy use, nonresidential energy use, etc.

BASELINE COMMUNITY-WIDE GHG INVENTORY

SUMMARY

The community of Los Altos emitted approximately 184,470 metric tons of CO₂e (MTCO₂e) in the baseline year 2005. As shown in **Figure I** and **Table I**, the transportation sector was the largest contributor to emissions (50%), producing approximately 91,670 MTCO₂e in 2005. Emissions from the residential energy sector were the next largest contributor, with the sector's 59,950 MTCO₂e making up 32% of the total emissions. The waste disposal sector comprised 3% of the total emissions (3,950 MTCO₂e), and emissions from commercial energy comprised 11% of the total (20,070 MTCO₂e). The remaining 6% of emissions were made up from water, wastewater, and off-road equipment sources such as construction equipment. Combined, these remaining sectors contributed 8,830 MTCO₂e. The baseline inventory is intended to guide future local policy decisions that relate to emissions within the City's influence.

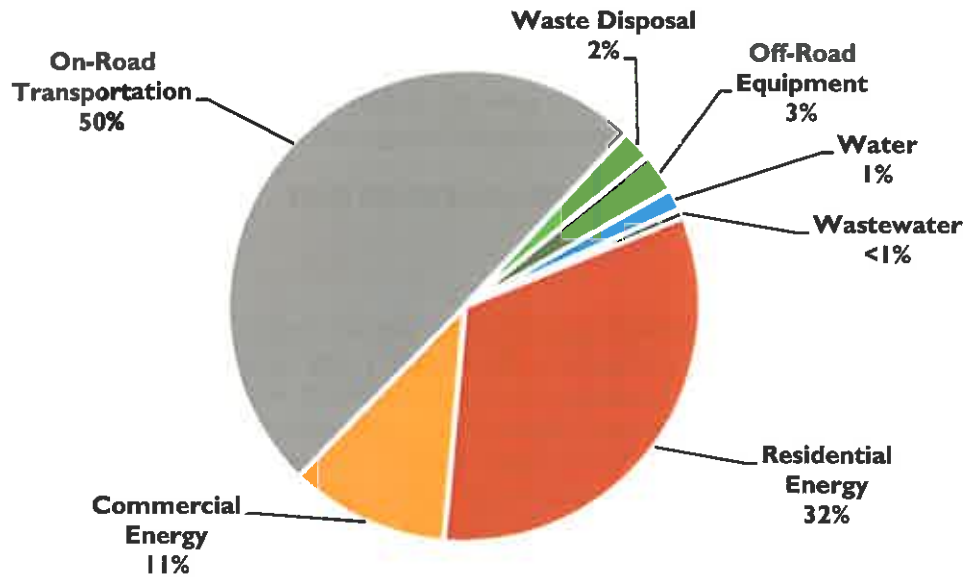
TABLE I – 2005 COMMUNITY-WIDE BASELINE EMISSIONS BY SECTOR

Sector	Metric Tons CO ₂ e/year	Percentage of Total
Residential Energy	59,950	32%
Commercial Energy	20,070	11%
Waste Disposal	3,950	2%
Transportation	91,670	50%
Water	2,790	2%
Wastewater	1,100	<1%
Off-Road	4,930	3%
TOTAL	184,470	100%

* Due to rounding, the total may not be the sum of component parts.

⁶ Refer to the Intergovernmental Panel on Climate Change for more information: <http://www.ipcc.ch/>.

FIGURE I – 2005 COMMUNITY-WIDE BASELINE EMISSIONS BY SCOPE AND SECTOR, INCLUDING STATIONARY SOURCE EMITTERS AND LANDFILLS



Additional details on the activities represented in the Inventory are provided in **Table 2**, which shows the distribution of emissions by subsector. The table summarizes activity data units, data sources, and emissions for each sector and subsector. **Table 3** illustrates the differences between the 2010 Environmental Commission inventory and the PMC update. Although the updated inventory adjusts residential and nonresidential natural gas downward by approximately 3% each, a 5% upward adjustment in transportation and the addition of alternative daily cover (green waste), water, wastewater, and off-road sectors has led to an overall upward adjustment of approximately 7%.

TABLE 2 – COMMUNITY-WIDE DATA SOURCES AND SCOPES

Sector	Subsector	Activity Data	Unit	Coefficient Source	MTCO ₂ e per Year	Percentage of MTCO ₂ e per Year
Residential Energy	Natural Gas	7,386,120	Therms	PG&E, LGOP VI.1	39,290	21%
	Electricity	92,371,350	kWh	PG&E, LGOP VI.1	20,660	11%
Commercial Energy	Natural Gas	1,392,590	Therms	PG&E, LGOP VI.1	7,410	4%
	Electricity	56,594,700	kWh	PG&E, LGOP VI.1	12,660	7%
Solid Waste	Municipal Solid Waste	21,230	Tons of Waste	CalRecycle, CARB	3,910	2%
	Alternative Daily Cover	270	Tons of ADC	CalRecycle, CARB	40	0%
Transportation	Daily Vehicle Miles Traveled	178,101,020	VMT	EMFAC, HPMS, CACP 2009	91,670	50%
Water and Wastewater	Water Supply Energy Use	4,470	MG water	Cal Water, SCVW, CEC, CPUC, City of Los Altos	2,790	2%
	Wastewater Treatment Energy Use	1,770	MG water	Cal Water, SCVW, CEC, CPUC, City of Los Altos	1,100	1%
Off-Road	Lawn and Garden	10,618	Households	CARB	570	<1%
	Construction	69	Building Permits	CARB	4,360	2%
				Total*	184,470	100%

* Due to rounding, the total may not equal the sum of component parts.

TABLE 3 – COMPARISON OF ORIGINAL BASELINE INVENTORY AND UPDATED INVENTORY BY SUBSECTOR

Subsector	Original Inventory (MTCO _{2e}) ¹	Adjusted Inventory (MTCO _{2e})	Percentage Change
Residential Natural Gas	40,660	39,290	-3%
Residential Electricity	20,650	20,660	<1%
Commercial Natural Gas	7,670	7,410	-3%
Commercial Electricity	12,650	12,660	<1%
Waste – Solid Waste	3,850	3,910	2%
Waste – Green Waste	0	40	n/a
On-Road Transportation	86,960	91,670	5%
Water	0	2,790	n/a
Wastewater	0	1,100	n/a
Off-Road Equipment	0	4,940	n/a
Total*	172,430	184,470	7%

¹GHG emissions from air travel (estimated at 37,010 MTCO_{2e}) were omitted to allow for more accurate comparison between the original inventory and the update and for consistency with BAAQMD guidelines.

* Due to rounding, the total may not equal the sum of component parts.

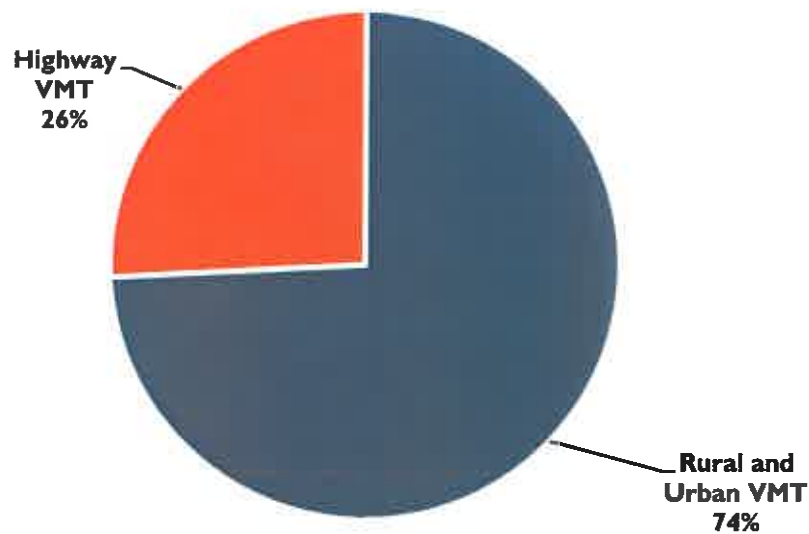
SECTOR DETAIL

Transportation

Transportation emissions accounted for 50% of the 2005 inventory. As with the majority of California municipalities, travel by on-road motorized vehicles constitutes the greatest percentage of GHG emissions in the city. The original 2010 inventory transportation sector model was retained due to the quality of the assessment. However, on-road transportation emissions were recalculated using county-specific emission transportation emission factors for common fuels from EMFAC (gasoline and diesel).

The GHG emissions per trip type are shown in **Figure 3**. Highway vehicle miles traveled (VMT), such as driving on Highway 280, 101, etc., accounted for 26% of on-road transportation-related emissions. VMT accounted for the other 74%. EMFAC 2011 provides carbon dioxide emissions according to the unique vehicle composition of each county in California, including Santa Clara County, which was used for this Inventory. Individual GHGs such as carbon dioxide, methane, and nitrous oxide are converted to CO₂e by multiplying the CO₂ emissions by a conversion factor provided by the US Environmental Protection Agency.

FIGURE 3 – TRANSPORTATION-RELATED GHG EMISSIONS BY VMT TYPE



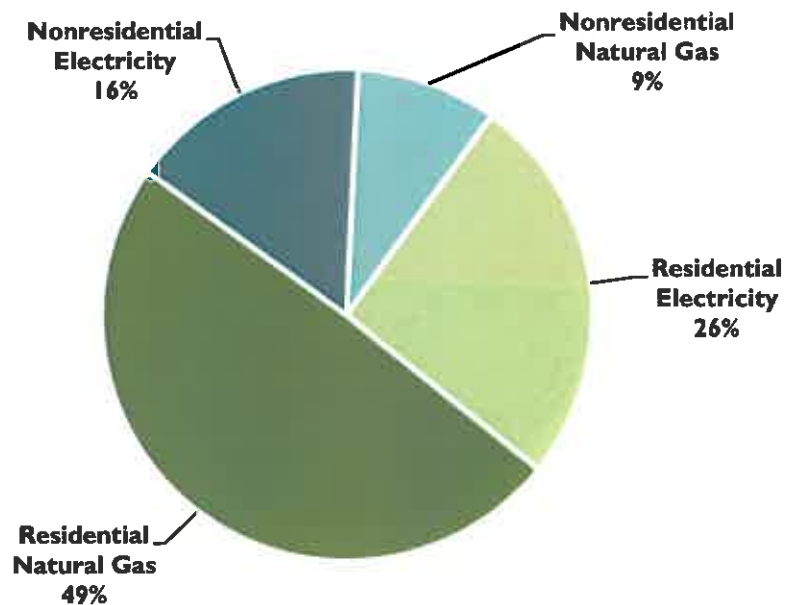
Energy

In 2005, 43% of total community-wide emissions came from the “built environment.” The built environment comprises residential and commercial natural gas and electricity consumption. Commercial buildings include institutional buildings (e.g., schools, community facilities). As shown in **Figure 4**, residential natural gas use makes up 49% of emissions from the built environment, while residential electricity, nonresidential electricity, and nonresidential natural gas make up 26%, 16%, and 9%, respectively.

Pacific Gas and Electric Company (PG&E) provided electricity and natural gas consumption data on May 3, 2012. Commercial and direct access electricity were combined in the nonresidential category due to the California 15/15 rule (see Privacy Laws subsection).

PG&E provided a 2005 carbon dioxide (CO₂) coefficient for electricity and natural gas. Emissions coefficients for methane (CH₄) and nitrogen dioxide (N₂O) emissions were provided by the California Air Resources Board’s Local Government Operations Protocol version 1.1 and were converted into carbon dioxide equivalents and added to the CO₂ coefficient to create a carbon dioxide equivalent (CO₂e) coefficient that integrates all three of the GHG emissions caused by energy consumption.

FIGURE 4 – BUILT-ENVIRONMENT GHG EMISSIONS BY SECTOR



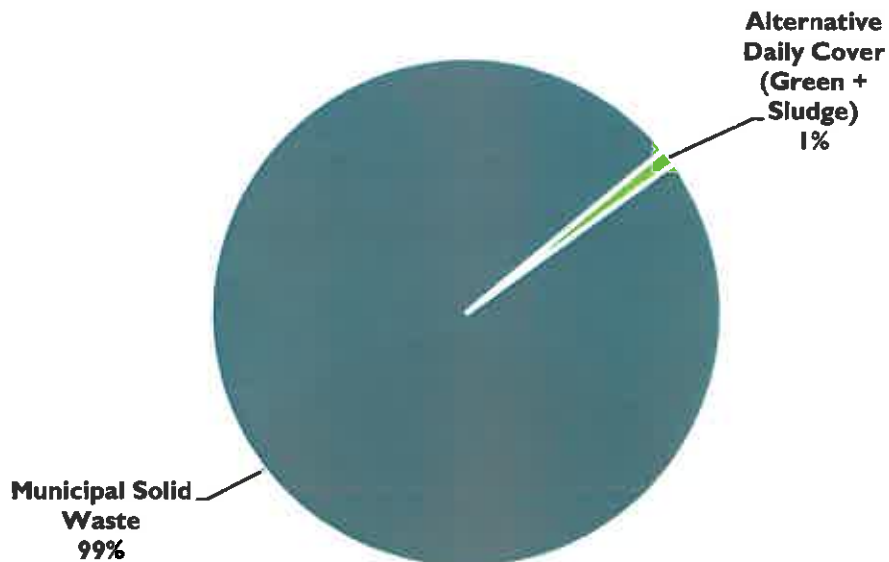
Solid Waste

Solid waste emissions are generally separated into two sources, direct emissions from closed landfills within the city during the baseline year and future emissions from community-generated waste. Since there are no closed landfills in Los Altos, only future emissions from community-generated waste were included in this Inventory.

Community Waste Emissions

Waste disposal contributed 2% of the city's emissions in 2005. This emissions sector includes solid waste, green waste, and sludge disposed by the community in 2005 and sent to managed landfills or dumps. Solid waste disposed of by the community in 2005 will contribute 3,950 MTCO₂e over the next 100 years as the waste decomposes. Methane generation from waste sent to landfills in 2005 was calculated using the California Air Resources Board's Landfill Emissions Calculator v1.3 and an average methane recovery or capture factor of 75%. In 2005, the community sent approximately 21,230 tons of waste to various landfills across the state. The Statewide Waste Characterization Study (CalRecycle 2004) provides standard waste composition for the State of California, which allows this Inventory to account for the different emission rates of various materials. **Figure 5** shows waste emissions by source.

FIGURE 5 – WASTE EMISSIONS BY SOURCE



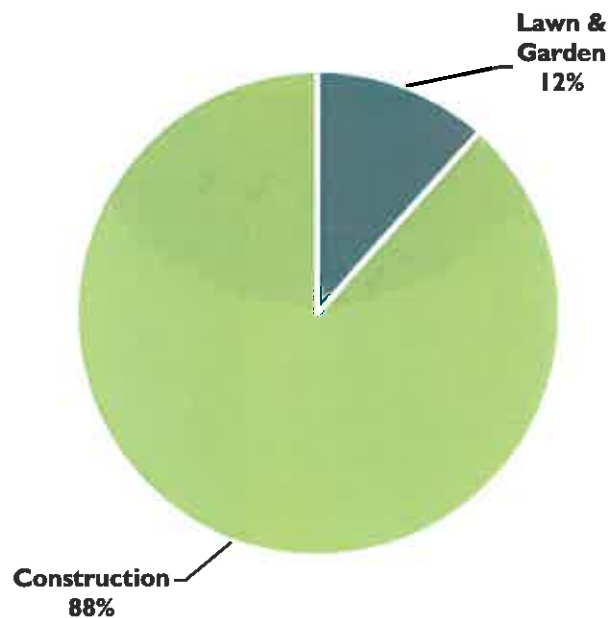
Off-Road

Off-road emissions consist of emissions created by construction equipment and equipment related to lawn and garden activities. Off-road emissions accounted for 3% of emissions in 2005. California Air Resources Board's (CARB) OFFROAD 2007 program provides construction and lawn and garden activity for each county in the state. Construction equipment includes off-road tractors, diggers, backhoes, cranes, and graders. Lawn and garden equipment includes lawn mowers, tillers, leaf blowers, chainsaws, and commercial turf equipment. While several other off-road equipment uses contribute to emissions in the city, method limitations prevent the accurate inclusion of citywide recreational, airport, or other equipment and vehicles. For construction and lawn and garden equipment, the BAAQMD has provided guidance to calculate emissions at a jurisdiction level. As shown in **Figure 6**, GHG emissions from construction and lawn and garden activity make up 88% and 12% of off-road emissions, respectively. Per BAAQMD guidance, city-level activity and emissions for off-road equipment were calculated using the following indicators:

- Total construction equipment emissions were attributed to the city using the number of new housing units built within the city using the US Department of Housing and Urban Development's (HUD's) State of the Cities Data Systems building permit inventorying system.
- Total lawn and garden emissions were attributed to the city using existing households within the city compared to the entire county using the Association of Bay Area Government (ABAG) figures from the 2009 Regional Projections report.

Emissions from off-road equipment and vehicles were determined using CARB's OFFROAD 2007 program. OFFROAD provides the fuel consumption and emissions output for each type of off-road equipment in California per county, equipment type, fuel type, and year.

FIGURE 6 – OFF-ROAD GHG EMISSIONS BY EQUIPMENT CATEGORY

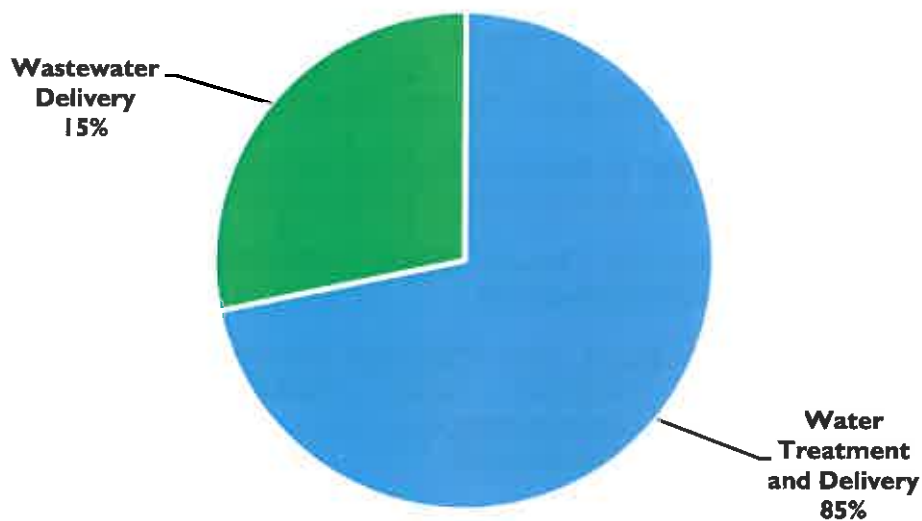


Water and Wastewater

Water and wastewater emissions accounted for approximately 3% of total GHG emissions in 2005 (see Table 2). This Inventory includes emissions from the electricity used to process, treat, and move water and wastewater to and from the city. It should be noted that some of this electricity use did not take place within the city but was used to deliver water to Los Altos. GHG emissions by type of activity are summarized in Figure 7.

While this sector may potentially double-count electricity consumption captured in the energy sector, water and wastewater emissions are calculated separately to comply with BAAQMD guidance. The overlap between electricity and water and wastewater energy is anticipated to have a negligible effect on the Inventory, due to the small contribution of the water and wastewater sector.

FIGURE 7 – WATER AND WASTEWATER GHG EMISSIONS BY WATER ACTIVITY



Water supply information comes from the City of Los Altos 2010 Urban Water Management Plan. Cal Water energy intensities come from the California Energy Commission study: Embedded Energy in Water Studies: Study 1: Statewide and Regional Water Energy Relationship. All water was provided by Cal Water. Wastewater was assumed to be sent to the Santa Clara Valley Water District (SCVW). The wastewater treatment energy intensity came from the SCVW, while wastewater disposal energy intensity came from the California Public Utilities Commission. Table 4 reports the electricity use and emissions for Cal Water.

TABLE 4 – WATER CONSUMPTION

	Supply (MG)	Electricity Use (kWh)	Emissions (MTCO ₂ e)
Cal Water	4,470	12,454,090	2,790

CONCLUSION

The Inventory will support efforts to assess and mitigate impact on climate change from the activities of the people, businesses, and industry in the City of Los Altos. The Inventory will shape development of the City's CAP to meet BAAQMD standards.

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ATTACHMENT B

CITY OF LOS ALTOS

Municipal GHG Inventory Update
September 2012

INTRODUCTION

In 2009, the City of Los Altos, in partnership with ICLEI-Local Governments for Sustainability (ICLEI), prepared a 2005 baseline inventory of greenhouse gas (GHG) emissions from municipal facilities and activities. Since then, the Bay Area Air Quality Management District (BAAQMD) has established guidelines for creating GHG inventories and climate action plans as part of a Qualified Greenhouse Gas Reduction Strategy. With this in mind, the City of Los Altos commissioned this update of the existing inventory as part of the Climate Action Plan project.

This report summarizes the results of the 2005 baseline municipal GHG inventory update.

PURPOSE

The Inventory will act as a foundation for the City's Climate Action Plan by informing the City and the community of the municipal sources of GHG emissions, and thus, opportunities for reduction. This report focuses on municipal emissions only. The Inventory will provide a baseline against which future progress can be measured and will serve as the foundation for the City's Climate Action Plan.

The Inventory includes the major sources of GHGs caused by City activities per best practice and consistent with the methodology recommended by the California Air Resources Board, ICLEI-Local Governments for Sustainability, and the BAAQMD. The Inventory analyzes the following municipal emissions sources for the 2005 calendar year (baseline):

- **Buildings** – Electricity and natural gas consumed by City buildings and facilities.
- **Lighting** – Electricity, paid for by the City, used by street, traffic, and/or outdoor lighting within city limits.
- **Water and Wastewater** – Electricity used by City-owned water and/or wastewater pumps.
- **Fleet** – Gasoline and diesel used by all City-owned vehicles.
- **Employee Commute** – Vehicle miles traveled (VMT) to and from work by City employees.
- **Government-Generated Waste** – Indirect emissions from the waste disposed of by employees and operations of the City.
- **Refrigerants** – Gallons of refrigerants that enter the environment as a result of leaks or spills.

The effect of sequestration by municipal trees in the city has not been quantified or included in the baseline inventory and forecast because this report focuses on emissions that can be mitigated or reduced. Sequestration refers to organic carbon that is stored in material, landfills, or soils that does not

get emitted. Sequestration is often difficult to quantify and, in many cases, provides few policy options.

RELATIONSHIP TO THE 2009 ICLEI INVENTORY

The primary distinctions between this Inventory and the previous draft inventory include the following:

- Recalculation of electricity and natural gas emissions using factors from Local Government Operations Protocol (LGOP) v1.1
- Recalculation of water and wastewater electricity emissions with a revised sum of kilowatt-hours (kWh) and emissions factors from LGOP v1.1
- Recalculation of fleet emissions using diesel and gasoline fuel factors from LGOP v1.1 and a simplified method for calculating nitrous oxide (N₂O) and methane (CH₄)
- Calculation of solid waste disposal emissions using California-specific factors available in the Landfill Emissions Tool developed by California Air Resources Board, instead of using national defaults provided by the ICLEI Clean Air and Climate Protection program
- Recalculation of refrigerant emissions using factors from LGOP v1.1
- Integration of updated emissions factors in LGOP v1.1

RELATIONSHIP TO THE COMMUNITY-WIDE INVENTORY

Municipal emissions account for approximately 1% of community-wide emissions, as shown in **Figure 1**. Municipal GHG emissions are considered a subset of community-wide GHG emissions since the majority of municipal activities occur within the boundaries of the City of Los Altos. This means that all municipal operations are included in the commercial, transportation, waste, or other categories of the community-wide inventory as applicable. For example, electricity use by City buildings is part of the community-wide commercial energy sector. Similar to the way in which businesses and factories perform their own facility-scale GHG inventories, the City municipal operations emissions inventory analyzes municipal emissions in more detail in order to help the City assess and identify its major sources of GHGs. **Figure 1** illustrates the relative scale of municipal and community-wide emissions.

FIGURE I – MUNICIPAL AND COMMUNITY-WIDE GHG EMISSIONS



KEY TERMS AND TIMELINES

The following terms are used throughout the Inventory. These concepts are fundamental to understanding the contents of the Inventory.

Baseline year: Emissions are quantified for calendar year 2005, due to the availability of reliable data and consistency with Assembly Bill (AB) 32. A baseline year gives the City a basis of comparison for future reduction efforts and inventories.

Carbon dioxide equivalent (CO₂e): The universal unit for representing the six different GHGs (see definition of greenhouse gas emissions, below) in one single unit by converting each gas into the equivalent potency of carbon dioxide. CO₂e is commonly expressed in metric tons (MTCO₂e), each of which equals 2,205 pounds.

Greenhouse gas emissions: Gases that trap heat in the earth's atmosphere are called greenhouse gases, or GHGs. GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). While many of these gases occur naturally in the atmosphere, modern human activity has led to a steep increase in the amount of GHGs released into the atmosphere over the last 100 years. Collectively, these gases intensify the natural greenhouse effect, thus causing global average surface temperatures to rise, which in turn affects global climate patterns. GHGs are often quantified in terms of CO₂ equivalent, or CO₂e, a unit of measurement that equalizes the potency of GHGs.⁷

Sector: Emissions are grouped by the type of activity that generates the emissions, such as buildings, vehicle fleet, etc.

⁷ Refer to the Intergovernmental Panel on Climate Change for more information: <http://www.ipcc.ch/>.

MUNICIPAL GHG INVENTORY

SUMMARY

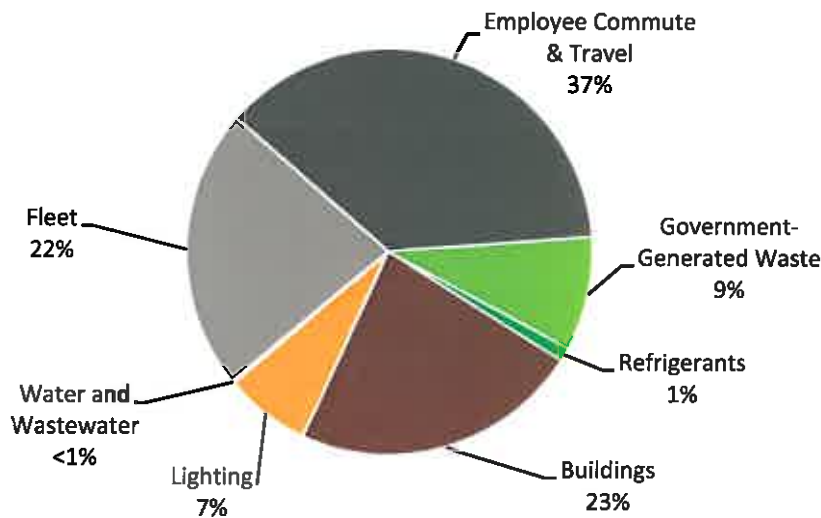
The City of Los Altos emitted approximately 1,870 metric tons of CO₂e (MTCO₂e) in the baseline year 2005. As shown in **Figure 2** and **Table I**, the employee commute and travel sector was the largest contributor to emissions (37%), producing approximately 700 MTCO₂e in 2005. The buildings sector was the next largest contributor, with 430 MTCO₂e making up 23% of the total emissions. The fleet sector comprised 22% of the total emissions (420 MTCO₂e), and emissions from government-generated waste comprised 9% of the total (170 MTCO₂e). The remaining 8% of emissions were made up from lighting, refrigerants, and water and wastewater. Combined, these remaining sectors contributed approximately 150 MTCO₂e.

TABLE I – 2005 MUNICIPAL BASELINE EMISSIONS BY SECTOR

Sector	Metric Tons CO ₂ e/year	Percentage of Total
Buildings	430	23%
Lighting	130	7%
Water and Wastewater	<10	<1%
Fleet	420	22%
Employee Commute	700	37%
Government-Generated Waste	170	9%
Refrigerants	20	1%
TOTAL*	1,870	100%

* Due to rounding, the total may not be the sum of component parts.

FIGURE 2 – 2005 MUNICIPAL BASELINE EMISSIONS BY SECTOR



Additional details on the activities represented in the Inventory are provided in Table 2, which summarizes activity data and emissions by subsector.

TABLE 2 – 2005 MUNICIPAL BASELINE ACTIVITY DATA AND EMISSIONS BY SUBSECTOR

Subsector	Activity Data	Unit	MTCO ₂ e
Buildings – Electricity	1,056,631	kWh	240
Buildings – Natural Gas	36,183	therms	190
Lighting – PG&E-Owned Streetlights	323,546	kWh	70
Lighting – City-Owned streetlights	90,600	kWh	20
Lighting – Traffic Lights	35,631	kWh	10
Lighting – Other Public Lights	136,993	kWh	30
Fleet – Gasoline	35,264	gallons	330
Fleet – Diesel	8,168	gallons	90
Employee Commute	1,280,645	VMT	700
Government-Generated Waste	899	tons	170
Water – Electricity	12,970	kWh	<10
Wastewater – Electricity	1,447	kWh	<10
Refrigerants – R-410A	1	lbs	20
Refrigerants – R-134A	34	lbs	<10
Refrigerants – R-12	1	lbs	<10
Total*			1,870

* Due to rounding, the total may not equal the sum of component parts.

Table 3 illustrates the differences between the 2009 ICLEI inventory and the updated Municipal Inventory. Although most sectors had very small changes, a 5% upward adjustment for fleet emissions and a 42% upward adjustment for government-generated waste led to an overall upward adjustment of 4%, or 70 MTCO_{2e}.

TABLE 3 – COMPARISON OF ORIGINAL INVENTORY AND UPDATED INVENTORY

Sector	Original MTCO _{2e}	Adjusted MTCO _{2e}	Percentage Change
Buildings	430	430	0%
Lighting	130	130	-1%
Water and Wastewater	<10	<10	0%
Fleet	400	420	5%
Employee Commute	700	700	0%
Government-Generated Waste	120	170	42%
Refrigerants	20	20	0%
Total⁽¹⁾	1,800	1,870	4%

* Due to rounding, the total may not equal the sum of component parts.

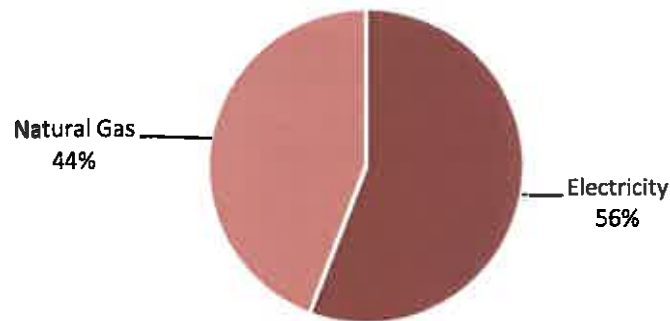
SECTOR DETAIL

Buildings

The buildings sector comprises all electricity and natural gas needed to heat and power government buildings. This analysis does not include emissions from other types of energy such as propane due to lack of reliable sales or consumption data. Building-related energy emissions accounted for 23% of the 2005 inventory. Building emissions per energy type are shown in **Figure 3**. Electricity accounted for 56% of building-related emissions. The other 44% were a result of natural gas consumption.

The California Air Resources Board's Local Government Operations Protocol (CARB LGOP) v1.1 provided a 2007 CO₂ coefficient (used as a proxy for 2005) for electricity and natural gas. Emissions coefficients for methane and nitrous oxide emissions also were provided by the CARB LGOP v1.1 and were converted into carbon dioxide equivalents and added to the CO₂ coefficient to create a CO₂equivalent coefficient.

FIGURE 3 – BUILDING-RELATED GHG EMISSIONS BY ENERGY TYPE

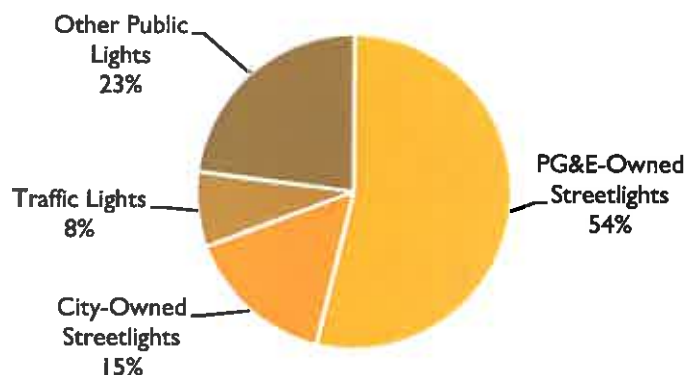


Lighting

Emissions occurring due to public lighting within Los Altos accounted for 7% of total emissions in 2005. These emissions occurred due to the energy use of all City-owned outdoor lighting such as streetlights, traffic lights, and parking lighting. As illustrated in **Figure 4**, in 2005, approximately 69% of lighting-related GHG emissions were caused by street lighting. The remaining 21% came from traffic lights and other public lighting such as outdoor lighting, decorative lighting, and illuminated street signs.

Emissions from lighting-related electricity were calculated using the same coefficient source as the buildings sector.

FIGURE 4 – LIGHTING-RELATED GHG EMISSIONS BY LIGHTING TYPE

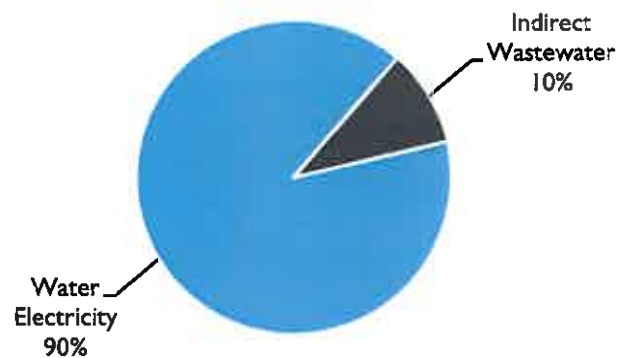


Water and Wastewater

Emissions occurring due to the irrigation of water and the pumping of water and wastewater within the city accounted for less than 1% of total emissions in 2005. As illustrated in **Figure 5**, emissions for water pumping and irrigation accounted for 90% of the sector. Indirect emissions from wastewater, or the emissions that occur as the result of electricity used to transport wastewater, accounted for 10% of the sector.

Water-related emissions from the 2009 ICLEI inventory were recalculated using a revised sum of kWh and emission factors from CARB LGOP v1.1.

FIGURE 5 – WATER AND WASTEWATER EMISSIONS BY SOURCE



Fleet

In 2005, the City's fleet accounted for 22% of overall emissions. As shown in **Figure 6**, emissions from diesel vehicles accounted for 21% of the fleet total and emissions from gasoline vehicles accounted for 79%. **Table 4** reports emissions by fuel type by department. In 2005, the top three GHG-emitting departments were Police, Sewers, and Parks and Recreation, emitting 42%, 20%, and 17% of fleet-related emissions, respectively.

FIGURE 6 – FLEET GHG EMISSIONS BY FUEL TYPE

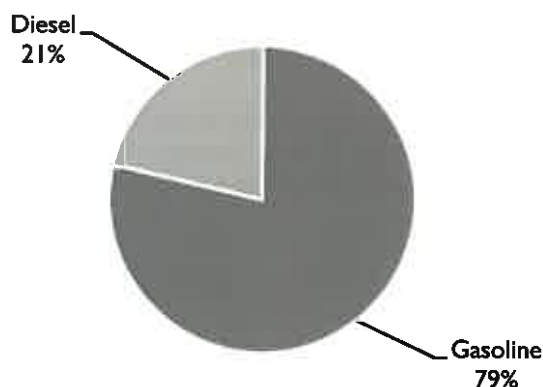


TABLE 4 – FLEET GHG EMISSIONS BY FUEL TYPE BY DEPARTMENT

Department	Gasoline (MTCO ₂ e)	Diesel (MTCO ₂ e)	Total (MTCO ₂ e)	Percentage of Total
Police	175	2	177	42%
Sewers	30	54	84	20%
Parks and Recreation	59	14	72	17%
Streets	16	15	31	7%
Engineering	14	0	14	3%
Facilities	12	2	13	3%
Maintenance	9	2	11	3%
Community Development	10	0	10	2%
Total*	330	90	420	

* Due to rounding, the total may not equal the sum of component parts.

The 2009 ICLEI inventory fleet sector emissions were calculated using diesel and gasoline fuel factors from CARB LGOP v1.1 and a simplified method for calculating N₂O and CH₄.

Employee Commute

Employee commute was the largest source of municipal emissions, accounting for approximately 37% of total GHG emissions in 2005. Employee commute sector methods and state requirements have remained consistent since the 2009 ICLEI inventory. This fact, combined with the high quality of the original data set, led to the conclusion that no update was needed for this sector.

Government-Generated Waste

Solid waste disposed by the City accounted for approximately 9% of total emissions in 2005. These waste emissions will occur over the following 100 years or so as the organic materials decompose into methane when buried in a landfill. Waste tonnages were provided by the City. In 2005, 900 tons of solid waste were generated by the government of Los Altos.

Emissions were recalculated for government-generated waste using California-specific factors available in the Landfill Emissions Tool developed by CARB, instead of the previously used national defaults provided by the ICLEI Clean Air and Climate Protection program.

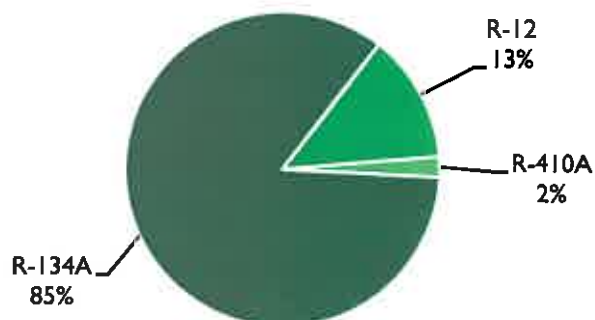
Refrigerants

Refrigerants are used in air conditioning units and other refrigeration equipment. Gases that escape into the atmosphere as a result of refrigerant use or leakage are considered to have a “high global warming potential” because one pound of gas can have the same warming effect as many more pounds of CO₂. Table 5 reports the refrigerant types identified in this Inventory, their common uses, and their CO₂ equivalency (CO₂e). Figure 7 identifies 2005 GHG emissions by refrigerant type. Nearly all (98%) of the City’s refrigerant-related emissions came from motor vehicles. Note that R-22, while inventoried by the City, was left out of the GHG inventory. R-22 is considered an informational item since it is being phased out by the Montreal Protocol.

TABLE 5 – REFRIGERANT BY COMMON USE AND CO₂ EQUIVALENCY

Refrigerant Type	Common Use	CO ₂ e
R-134A	Motor vehicle air conditioning	1,725
R-12	Motor vehicle air conditioning	1,300
R-410A	Stationary air conditioning units and heat pumps	1,725

FIGURE 7 – GHG EMISSIONS BY REFRIGERANT TYPE



CONCLUSION

The Inventory is an important milestone for the City of Los Altos in its role as a leader in assessing and mitigating climate change impacts from municipal activities. The Inventory will shape the development of the City's Climate Action Plan and provides a BAAQMD-consistent basis for the City's analysis of its impact on climate change.

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