REPORT

To the Honorable Mayor and City Council
From the City Manager

November 24, 2008

SUBJECT
Update on City Manager's Office Environmental Initiatives

RECOMMENDATION
Information Only - No Action Required

BACKGROUND
Redwood City's Environmental Initiatives focus in three broad areas: Leading By Example, Community Action, and YO-It's Youth Outdoors! Within each of these focus areas the City continues to develop collaborative relationships with partner organizations and with the community to promote sustainable practices in everyday life, and encourage community building among neighbors and across the city. (Please see Attachment I Environmental Initiatives Evaluation Plan for a review of evaluation outcomes and indicators, and workplan status.)

I. LEADING BY EXAMPLE

Leading By Example refers to the City taking action to conserve energy and reduce carbon emissions within its own operations, and by doing so inspiring residents and businesses within the community to do the same. Leading By Example includes developing a Climate Action Plan in conjunction with the formulation of a new City General Plan. It also includes promoting, coordinating and articulating energy conservation efforts that are taking place across the organization.

Redwood City Climate Action Planning Overview

Typically, climate action planning incorporates five key steps. These steps include:

1. Conducting a baseline greenhouse gas (GHG) emissions inventory,
2. Adopting an emissions reduction target,
3. Creating a climate action plan,
4. Implementing policies and programs and
5. Monitoring results.

In order to maximize community participation and avoid duplication of effort, staff has chosen to incorporate climate action planning into the General Plan process. The completed Climate Action Plan will coincide with the completion of the General Plan. Working within the General Plan process has been an effective strategy, though it has meant that climate action planning has been less visible. A more complete description of the climate action planning process follows.

Baseline greenhouse gas (ghg) emissions inventory

Redwood City is in the process of conducting a GHG emissions inventory for the baseline year of 2005. The inventory is being conducted by ICLEI-Local Governments

for Sustainability and in partnership with the Joint Venture Silicon Valley Climate Protection Task Force. The calculations quantify GHG emissions levels from all municipal operations (e.g., city owned and/or operated buildings, streetlights, transit systems, wastewater treatment facilities) and from all community-related activities (e.g., residential and commercial buildings, motor vehicles, waste streams, industry). The emissions inventory and forecast will provide a benchmark for planning and monitoring progress.

Calculations estimating the City's GHG emissions attributable to municipal operations are in progress. Calculations of emissions from community-related activities are completed. (Please see Attachment II, "Sustainability Indicator Analysis: Redwood City Preliminary Report" which includes an analysis of Redwood City community scale ghg emissions and related transportation, green building and green business operations data.)

Adopt an emissions reduction target for the forecast year

Once the inventories are completed, the City will be asked to adopt an emissions reduction target. Setting a target is designed to foster political will and create a framework to guide planning, implementation and evaluation of measures. State law AB 32 requires a reduction in both city operations and community greenhouse gas emissions to 1990 levels by 2020. Reducing greenhouse gas emissions to 1990 levels means cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 10 percent from today's levels. On a per-capita basis, that means reducing our annual emissions of 14 tons of carbon dioxide for every man, woman and child in California down to about 10 tons per person by 2020.

Development of Climate Action Plan

At the same time that our GHG emissions inventory is being completed, the City is using the Institute for Local Government's California Climate Action Best Practices Framework to survey departments to determine what best practices in climate protection are already being implemented by the City organization. In addition, staff is using the survey to analyze where additional effort is needed.

The foundation upon which staff will develop a community-wide Climate Action Plan will include:

1. Community input gathered in conjunction with the General Plan process,
2. Data from the Redwood City operations and community scale greenhouse gas emissions inventories,
3. Redwood City General Plan Sustainability Indicator Report and
4. An analysis of current best practices in climate protection.

The completed Climate Action Plan will include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments, staff and community. In addition to direct GHG reduction measures, the plan will incorporate public awareness strategies, community education efforts and green workforce development strategies. It will also outline how the City will adapt to climate change and it will dovetail with regional climate protection efforts. The goal is to complete the Climate Action Plan in the fall of 2009.

Climate action planning is critical, but City staff is not waiting for the completion of the plan to aggressively identify and implement strategies to conserve energy and address climate change. Current efforts include working on the development of a green building ordinance, improving mobility of pedestrians and bicyclists, improving the energy efficiency of city facilities and incorporating alternative fuels use in the city's fleet operations, among other actions.

II. COMMUNITY ACTION

Community Action refers to efforts to support and encourage residents and businesses to conserve energy and reduce their GHG emissions at home, at the office, at school and within their neighborhoods. To achieve this, t he City has partnered with area environmental organizations to bring conservation education, tools, and resources to the community. Current efforts have resulted in the following campaigns and programs.

Green @ Home

A program of Acterra, Green @ Home trains volunteers to conduct scheduled House Calls within their neighborhoods. During the "House Call", trained volunteers conduct a basic home energy audit, offer residents five energy saving upgrades, and create a customized conservation plan for the household. Redwood City's Neighborhood Liaison Coordinator has worked closely with Acterra staff to recruit volunteers and encourage neighborhood participation. Green @ Home was officially launched in Redwood City on October 29th. Nine trained Redwood City volunteers are now going out on House Calls with a goal of conducting a minimum of 250 home energy audits by June 30, 2009. City staff will also continue to recruit and train new volunteers.

Redwood City Cool Community Campaign

The Cool Community Campaign, a program of Acterra, is a simple, effective program that helps people reduce their carbon footprint. The campaign invited everyone in our community to join in a group effort by pledging to change at least one energy use practice per month. The program included the creation of a website and discussion groups, and provided action steps, helpful suggestions and feedback. Redwood City piloted the program in the Winter / Spring of 2008. The group's actions during the campaign were equivalent to the planting of 1,000 trees. The program also served to connect the City Manager's Office with 80 community members who are motivated to help the community work together to reduce our carbon emissions and "go green."

Taste and a Talk

A Taste and a Talk is a short bi-weekly educational and networking series on green building topics. The series is sponsored by Recycle Works and has been hosted by Redwood City in the City Council Chambers. The series typically draws 30-50 public participants. To date, a range of topics have been covered including solar and wind energy, energy saving remodeling tips and water conservation.

Cool The Earth Campaign

Cool The Earth is a ready-to-run program that educates K-8 students and their families about global warming and inspires them to take simple actions to reduce their carbon emissions. The City Manager's Office is sharing this unique program with schools and encouraging their participation. Two schools in Redwood City, Orion and Sandpiper,

have confirmed their plans to implement the program beginning in January 2009. Four additional schools are pending. The program is offered free of charge to public schools and after school programs. The City Manager's office is helping to promote the program and support parent organizers in much the same way that staff provide assistance to neighborhood groups.

III. "YO-IT'S YOUTH OUTDOORS!"

Larry Schweiger, President and CEO National Wildlife Federation asks, "How will we address global warming and other environmental threats if we do not engage and prepare the next generation for these monumental challenges?" Redwood City is answering the call through the creation of YO-It's Youth Outdoors! The objective of YO! is to develop healthy young people who are active in the outdoors and stewards of the environment. All along the way, we will be equipping youth with the skills they need to be successful participants in the emerging green economy.

To achieve our objectives the City Manager's Office is convening a collaboration of environmental education and youth organizations who are building a continuum of outdoor education opportunities for children and youth in our community. The continuum currently includes garden and science enrichment partnerships at Taft and John Gill elementary schools and integrated classroom and field studies programs at Kennedy Middle School and Sequoia and Redwood High Schools. As part of this effort, we are managing the Environmental Solutions Forum II (ESF II) on contract with the Silicon Valley Community Foundation. ESF II was launched in fall 2006 to build on the goal of targeting gaps in environmental stewardship education. The project currently focuses on Kennedy Middle and Sequoia High School and coordinates teachers, schools, agencies and local nonprofits to provide an environmental curriculum centered on local ecosystems and their interconnections. As the project continues to mature, staff looks forward to incorporating service learning and workforce development opportunities into the program offerings and expanding the effort to additional schools.

To better connect and expand environmental education across the city, staff are working with the City's Parks, Recreation and Community Services Department to develop YO! as a signature afterschool program at school sites served by the Department. Staff are also working with Redwood City 2020 and the City's Redevelopment Agency to identify the feasibility of creating green job pathways for older youth in the community.

FISCAL IMPACT
None – this is an information only report

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ATTACHMENTS

1. Environmental Initiatives Work Plan and Evaluation Overview
2. Redwood City Sustainability Indicators Analysis

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2008

Environmental Initiatives – Evaluation Plan

Beth Ross

City of Redwood City

1/1/2008

City Manager's Office

Environmental Initiatives

EVALUATION PLAN

Outcomes

1. City-wide carbon emissions are reduced;
2. Sustainable living programs/policies and personal actions are put into practice;
3. Residents develop community building and cooperative problem solving skills

Indicators

1. Redwood City (and replicated to other Bay Area cities) has plans, tools and systems in place to effectively participate in the climate protection and sustainability movement
2. Engaged community members and non-profits work together with local governments to reduce carbon emissions and implement sustainable practices
3. Relevant and culturally appropriate environmental education programs that teach respect for the environment and skills for sustainable living are more available in the community

Project deliverables

- A Redwood City environmental action plan that includes recommended sustainable and energy efficient programs for implementation by the City; strategies for effectively engaging community residents in climate change and sustainable living; a program logic map; and an evaluation plan
- Initiation of neighborhood-based activities to:
  - reduce carbon emissions
  - promote sustainable living practices
- Coordination and initiation of environmental education events and activities for children, youth, and the community
- Resources for replication

Performance Measures

1. Products delivered
2. Reduction in carbon emissions
3. Community member self-reported habit changes that demonstrate a commitment to sustainable living
4. Sustainable policies/ programs identified, adopted and acted on
5. Qualitative data (stories, testimonials, implemented projects) describing community building and cooperative decision-making

Environmental Initiatives
WORKPLAN OVERVIEW

Indicators	Action Steps	Status	Notes
Redwood City (and replicated to other Bay Area cities) has plans, tools and systems in place to effectively participate in the climate protection and sustainability movement	Cool City Team formed – oversees inventory and action plan. Meets monthly		
	City Hall Green Team formed– oversees City Hall Green Business certification. Meets every other month • Green Holiday Faire for employees		
	Sustainability Indicator Report - baseline measurement of sustainability in Redwood City and associated recommendations for consideration		
	Greenhouse Gas Emissions Inventory		
	• Community Scale		See attached analysis
	• City Operations	In progress	
	Adopt emissions reduction target	Dependent on completion of inventory	
	Develop Climate Action Plan • Conduct community outreach in conjunction with General Planning Process	In progress	Staff sustainability focus; Expanded database; 8 community meetings
	• Institute of Local Government (ILG)- review of best practices in climate protection	In progress	
	Implement policies and measures		
	• Green Building Program • Other TBD	In progress	3 education sessions hosted
	Monitor and Verify Results	Dependent on completion of plan	

 *- indicates action completed*

Indicators	Action Steps	Status	Notes
Engaged community members and non-profits work together with local governments to reduce carbon emissions and implement sustainable practices	Established Environmental Initiatives Collaborative		
	• Best practice research – Stanford Summer Intern		Research available upon request
	• 08/09 annual work plan adopted		
	• Development of a continuum of environmental education	In progress	Also see YO!
	• Identification of green workforce development strategies	Future	
	• Shared evaluation and financial sustainability plan	In progress	
	• Resource Development	ongoing	6 grant applications submitted
	Redwood City Cool Community Campaign (piloted spring 2008) – coordinated campaign		80 member group. Energy savings equivalent to 1,000 trees
	Green @ Home – free home energy audits for Redwood City households conducted by trained volunteers. Program of Acterra	ongoing	SSF funding raised 9 trained volunteers Mayors home audited
	Hosted Taste and a Talk green building education series	ongoing	7 sessions
	Green Business Certification Program	ongoing	7 Businesses certified
	Greening Your Neighborhood Workshop		
Relevant environmental education programs that teach respect for the environment and skills for sustainable living are more available in the community	YO-Its Youth Outdoors!		Also see collaborative
	• ESF II – managing partnership for Silicon Valley Community Foundation to develop a continuum of environmental education in Redwood City	ongoing	
	• Developed model and are now fund raising to incorporate environmental education into after school programs	ongoing	
	Cool The Earth – school and after school program designed to educate and engage families in reducing their carbon emissions at home	Recruiting schools to participate	2 schools enrolled, 4 schools pending

Sustainability Indicator Analysis

Redwood City Preliminary Report

Energy and Greenhouse Gas Emissions

Why is this important?

Global climate change is an increasingly acknowledged environmental problem. There is scientific consensus that it is caused by greenhouse gases being released into the atmosphere faster than the earth's natural systems can re-absorb them. Besides a small portion of emissions resulting from waste decomposition, soil disruption, or the release of industrial chemicals, energy use (in buildings, transportation, or elsewhere) is the primary source of greenhouse gas emissions in most U.S. cities, including Redwood City. Both decreased energy consumption and increased renewable energy production are key components to reducing greenhouse gas emissions, and one without the other is unlikely to achieve a sustainable energy economy.

Models predict world temperatures will rise by between 1.4 and 5.8 °C (2.5 and 10.4 °F) during the 21st century, depending on how much atmospheric concentrations of greenhouse gases rise and on the eventual effect of such rises.[1] These global changes would affect residents of Redwood City in a variety of ways, including:

- More frequent heat waves.
- Rising sea levels, which would threaten coastal infrastructure such as the Port of Redwood City, residential, industrial, or other development near sea level, and coastal ecosystems such as Bair Island and Redwood City's many other wetland areas.
- A decrease in the Sierra snowpack, which will reduce fresh water availability through the Hetch Hetchy water system that supplies Redwood City, and could reduce the availability of hydro-electric electricity, a major power source for Redwood City.
- The potential arrival of tropical insect-borne diseases.

Besides Redwood City's obvious stake in contributing to efforts to address this global problem, there is increasing market and regulatory support for action. The implementation of California's AB 32 law, which requires California to reduce its greenhouse gas emissions levels to 1990 levels by 2020, will mandate emissions reductions across sectors, at the regional level and likely at the local level. Meanwhile, rising energy prices provide increasing economic incentive to conserve energy and produce it from renewable sources. California residents and institutions have many years of experience implementing energy conservation efforts. While per capita energy consumption has increased nationally by 50% over the past 30 years, per capita consumption in California has not increased over the same period, due to many factors including efficiency and conservation campaigns by governments, private citizens and some utility companies.

Defining Sustainability

A sustainable level of global greenhouse gas emissions could be re-absorbed by the earth's natural processes, and a sustainable local level of greenhouse gas emissions would contribute proportionally to this goal. A sustainable energy economy would have stable or decreasing levels of consumption combined with indefinitely renewable energy sources.

[1] Intergovernmental Panel on Climate Change, Working Group III Report: Climate Change 2007: Mitigation of Climate Change, p. 133.

Indicator Results

City-wide Greenhouse Gas Emissions and Energy Use

Table 1 shows the Redwood City Community Greenhouse inventory by sector. Highlights are as follows:

- Transportation uses the most energy and emits the most greenhouse gas emissions (51% of total greenhouse gas emissions) of any sector in the city-wide inventory. Residential, commercial and industrial buildings account for another 43% of greenhouse emissions, and waste accounts for 6% of emissions.
- Redwood City's 6.71 tonnes[2] of CO_2 equivalent emitted per capita is similar to the 6.75 tonnes of CO_2 equivalent emitted per capita in the City of San Mateo. Total per capita emissions inventoried in other Bay Area cities vary widely (for instance, 5.23 tonnes of CO_2 Equivalent per capita in El Cerrito and 7.91 tonnes of CO_2 Equivalent per capita in Hercules). However, some differences between cities may have as much to do with unstandardized inventory protocols (particularly around measuring transportation emissions, waste emissions, and "embodied" emissions) and regional forces like miles of through-cutting regional highways as with extremely different consumption patterns.

Table 1: City-wide ("Community") Greenhouse Gas Emissions and Energy Use in 2005

	CO_2 Equivalent (Total Tonnes)	CO_2 Equivalent (Tonnes Per Capita)	CO_2 Equivalent (%)	Total Energy Used (MMBtu[3])
Residential	98,802	1.26	18.9	1,738,288
Commercial	58,866	0.75	11.2	1,075,303
Industrial	67,865	0.87	13.0	1,264,244
Transportation	266,867	3.42	50.9	3,653,965
Waste	31,646	0.41	6.0	N/A
TOTAL	524,046	6.71	100.0	7,731,801

Source: Redwood City Inventory of 2005 Community Greenhouse Gas Emissions, 2008

Building Sector Greenhouse Gas Emissions by Selected City

Comparisons to surrounding cities can give Redwood City a relative sense of its own greenhouse gas emissions performance. The cities listed in this indicator have calculated building greenhouse gas emissions using the ICLEI protocol, which is endorsed by CARB and used by cities across the country. In this protocol, building emissions figures are based on fairly standardized energy bill data and therefore provide a meaningful comparison, with a smaller margin of error, between cities. (Calculations of transportation or waste sector emissions, on the other hand, tend to use less standard data sources and therefore are less meaningful to compare from city to city.) Emissions inventories across all sectors are likely to be more comparable in the future as they are standardized by the state. Highlights of selected cities' buildings emissions are as follows:

[2] "Tonnes" are a metric unit of measurement, equal to 1,000 kilograms, or about 2,200 pounds. Tonnes is the standard unit of measurement for emissions of CO_2 equivalent.
[3] "MMBtu" is one million British Thermal Units.

- Redwood City's residential buildings emit 1.26 tonnes of CO2 equivalent per capita. As with many cities in California and the rest of the United States, the residential sector is the single building sector with the most emissions.
- Redwood City reports slightly fewer residential emissions than other selected cities.
- Redwood City's commercial and industrial building emissions, which combine to 1.62 tonnes of CO2 equivalent per capita, are higher than other selected cities.
- San Mateo's overall profile is the most similar to Redwood City in terms of total emissions from both residential and industrial or commercial buildings, perhaps because of a similar land use make-up and regional location.

Table 2: Per Capita Building Sector Emissions in Selected Bay Area Cities, in Tonnes of CO2 Equivalent

	Residential	Industrial	Commercial	Commercial and Industrial Combined
Redwood City	1.26	0.75	0.87	1.62
San Mateo	1.46	N/A	N/A	1.38
El Cerrito	1.62	N/A	N/A	0.92
Hercules	1.43	N/A	N/A	0.83

Source: Cities of Redwood City, San Mateo, El Cerrito, and Hercules, 2005 Greenhouse Gas Inventories

Watts of Solar Energy Capacity Installed Annually in Redwood City

Redwood City's well-known sunny climate makes it a good location for use of solar energy. Solar energy capacity is defined as the amount of energy able to be produced from solar sources like photovoltaic panels and passive water-heating solar panels. It can be measured in terms of watts installed. Highlights of solar capacity installed in Redwood City include:

- Redwood City has installed a total of 555,877 watts of solar capacity and an average of 61,764 watts of solar capacity per year since 1999.
- Installation of solar energy production capacity has increased in the past nine years, highlighted by 207,347 Watts (37% of the nine year total) of capacity installed in 2006 and 442,843 Watts (80% of the nine year total) of capacity installed from 2004-2007.
- Despite increasing installation, solar energy accounts for an extremely small percentage of overall energy consumed in Redwood City. The 555,877 watts of solar capacity installed since 1999 remains less than one one-millionth of the 1,195 billion watts of energy consumed by residential, commercial, and industrial uses in Redwood City in 2005.

Table 16: Watts of Solar Energy Capacity Installed Annually in Redwood City

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total Since 1999	Average Since 1999
Watts Installed	12,301	1,496	17,425	37,125	44,707	96,334	40,659	207,347	98,483	555,877	61,764

Source: California Energy Commission, 2008

Mix of the City's Energy Supply

Besides off-the-grid systems or private systems such as rooftop solar panels that feed into the electricity grid, Pacific Gas and Electric Company (PG&E) is Redwood City's sole supplier of electricity for purchase. PG&E assumes that all electricity that flows to individual customers (both inside and outside of Redwood City) has roughly the same ratio of renewable to non-renewable sources, so PG&E's energy supply mix dictates Redwood City's energy supply mix. Redwood City does not have direct control over how PG&E produces energy, but can actively and publicly encourage the company to make its energy portfolio less emissions-intensive. It can also participate in any renewable-purchasing programs PG&E may develop. Relevant features of PG&E's energy production mix, shown in Table 3, are described below:

- Natural gas energy accounted for 40% of power produced in 2006. Per watt of power generated, natural gas produces fewer greenhouse gases than coal but more than any other PG&E source.
- Nuclear energy from the Diablo Canyon power plant accounted for 24% of power produced in 2006. Opinions on the sustainability of nuclear power production are mixed; while it produces few greenhouse gas emissions, it also produces highly toxic waste, and the catastrophic failure of a nuclear plant could cause massive environmental damage.
- Hydroelectric energy accounted for 22% of power produced in 2006. This expanding component of the PG&E energy mix produces no greenhouse gas emissions, but it has impacts on river habitat and is vulnerable to reduced Sierra snowpack that results from climate change.
- Renewable energy sources accounted for 12% of power produced in 2006. This has not increased since 2004, but PG&E recently entered into several major new renewable energy purchasing contracts, and it reports that with the addition of these new contracts, 24% of future power deliveries (3,600 megawatts) will be renewable.[4] [5] With the exception of the 0.5 kilowatts (0.0005 megawatts) of solar power installed in Redwood City – most of which is unlikely to feed into the electricity grid and contribute to PG&E's power supply – all PG&E renewable energy is produced outside of Redwood City.
- Coal energy accounts for 1% of power produced in 2006. This small coal share is a positive feature for environmental sustainability, since coal is the most emissions-intensive (both in terms of greenhouse gases and other air pollutants) of any PG&E energy source.

[4] Associated Press, "PG&E to buy power from solar farms on California Coast," cited in *Business Week*, August 14, 2008.

[5] State Senate Bill 1078 requires 20% of a utility's power deliveries to come from renewable sources by 2010.

Table 3: PG&E Energy Production Mix

	Natural Gas	Nuclear	Total California Renewable	Large Hydroelectric	Coal	Other	Generic Power Sold
2004	47%	21%	12%	16%	3%	Less than 1%	1%
2005	42%	24%	12%	20%	1%	1%	N/A
2006	40%	24%	12%	22%	1%	1%	N/A

Source: PG&E, 2008

Summary of Results

Transportation is responsible for the most greenhouse gas emissions in Redwood City, followed closely by buildings and more distantly by waste. Within the building sector, residential are the single sector with the most energy consumption per capita, but industrial and commercial buildings combined use more energy per capita than residential buildings. The city's energy supplier, PG&E, has a relatively low-emitting energy production portfolio, though much of its contracted renewable energy capacity has not yet come on line. The most solar power installed in Redwood City of any year on record were 2006 and 2007, but total installed solar in Redwood City still only accounts for about one one-milionth of energy used in the City.

Transportation

Why is this important?

Transportation has fundamental and widespread environmental, social, and economic impacts. Within most cities in California and the United States, there are more greenhouse gas emissions associated with transportation than with any other sector, and greenhouse gas inventories in several Bay Area cities such as El Cerrito, Hercules, and San Mateo have shown transportation accounting for 40-60% of emissions within city limits.[6] The U.S. Energy Information Administration reports that transportation accounts for around 30% of greenhouse gas emissions in the United States as a whole.[7] Transportation vehicles are associated with a variety of other air and water pollutants, and streets and highways take up large amounts of land with impermeable pavement, affecting stormwater runoff patterns and the availability of land for other purposes.

From 1980 to 2006, total annual roadway vehicle miles traveled (VMT) in the United States roughly doubled, from around 1.5 trillion to around 3.0 trillion, indicating a drastic shift in transportation behavior in the United States.[8] Unless vehicle efficiency is keeping pace with VMT (and it has not been), higher VMT leads to higher levels of CO2 and polluting emissions such as particulate matter and nitrous oxide. In contrast to single-occupancy vehicle travel, public transit and car-pooling decrease vehicle miles traveled and emissions per passenger mile traveled, while walking and bicycling create no emissions and require relatively little space for supporting infrastructure. Inaccessibility to transportation can also be a major social and economic barrier, and money spent on transportation, such as on public transit passes or increasingly high-priced gasoline for private vehicles, can be a major economic burden on households. Increasing the accessibility and affordability of transit, and increasing people's ability to walk or bicycle, can decrease these barriers and burdens.

Defining Sustainability

Sustainable transportation meets society's social and economic needs for mobility in a way that minimizes or eliminates negative environmental impacts.

[6] Cited from the City of Hercules Greenhouse Gas Inventory Administrative Draft, May 1, 2008.
[7] U.S. Department of Energy, Energy Information Administration, "Distribution of Total U.S. Greenhouse Gas Emissions by End-Use Sector" from *Emissions of Greenhouse Gases Report*, November 28, 2007, accessed 6/25/08 at http://www.eia.doe.gov/oiaf/1605/ggrpt.
[8] U.S. Department of Transportation, Bureau of Transportation Statistics, Table 1-33 from National Transportation Statistics 2008, accessed 6/25/08 at http://www.bts.gov/publications/national_transportation_statistics/pdf/entire.pdf.

Indicator Results

VMT

- As shown in Table 4, Redwood City's estimated yearly per capita VMT of 8,455 is slightly lower than a national yearly per capita VMT average of around 10,067 (assuming U.S. Bureau of Transportation Statistics national 2007 VMT estimate and U.S. Census Bureau's 2006 American Community Survey national population estimate).
- Redwood City's relatively lower VMT is typical of an urban area, where origins and destinations are generally closer and there are more alternatives to single-occupancy vehicle travel.

Table 4: VMT in Redwood City

	Miles Per day	Miles Per year
Total estimated VMT	1,810,000	660,526,000
Redwood City Population, 2006 ACS estimate	78,122	78,122
Estimated VMT per capita	23.2	8,455

Source: MTC, 2007

Redwood City Residents and Workers Journey to Work Mode Split

Table 5, "Redwood City Residents Journey to Work Mode Split," contains data about Redwood City *residents* who may work in Redwood City or somewhere else. Table 11, "Redwood City Workers Journey to Work Mode Split," contains data about Redwood City *workers* who either live and work in Redwood City or commute to work in Redwood City from somewhere else. Highlights of indicator data include the following:

- Around 75.9% of Redwood City residents and 80.0% of Redwood City workers drove to work alone in 2000.
- Redwood City *workers* (which includes those workers who live outside of Redwood City) tend to walk and bicycle to work less, and to drive both alone and in a carpool more, than Redwood City *residents*.
- Railroad mode split for Redwood City residents increased from 1.5% in 1990 to 2.4% in 2000, an increase of around 60%. Likely reasons for this increase are discussed below under the indicator "Train Boardings per Weekday in Redwood City."
- Bicycle mode split for Redwood City residents increased from 1.1% in 1990 to 1.8% in 2000, an increase of around 60%.

Table 5: Redwood City Residents Journey to Work Mode Split

	1990 U.S. Census	2000 U.S. Census
Drove alone – car, truck, or van	75.9%	73.9%
Carpooled – car, truck, or van	11.9%	12.7%
Railroad	1.5%	2.4%
Bus	2.1%	2.3%
Bicycle	1.1%	1.8%
Walk	3.4%	2.8%
Worked at Home	2.8%	2.9%
Other	1.3%	1.1%

Source: U.S. Census, 1990 and 2000

Table 6: Redwood City Workers Journey to Work Mode Split

	2000 U.S. Census
Drove alone – car, truck, or van	80.0%
Carpooled – car, truck, or van	13.7%
Railroad	1.9%
Bus	1.5%
Bicycle	0.7%
Walk	1.0%
Other	1.2%

Source: U.S. Census, 2000

Train Boardings per Weekday in Redwood City

The Redwood City CalTrain stop is a major transportation amenity in the City, and is proximate to many of the city's higher density residential areas. The availability of the CalTrain station has facilitated improvements to Redwood City's downtown by both providing access to out of town visitors and providing a transportation link for residents. Trends in ridership at the Redwood City CalTrain station include the following:

- Passenger boardings in Redwood City have increased 153% since 1992, outpacing CalTrain's 60% increase in total passenger boardings since 1992.
- Redwood City's 1,932 average weekday passenger boardings in February 2007 were the highest they have been since passenger counting began in 1992.
- As of June 2008, 80 trains stop per weekday in Redwood City.

Likely reasons for the increase in Caltrain ridership (as well as increased rail mode share, as shown in Table 5) are as follows:

- Increased employment and residential use around the Caltrain station.
- Implementation of employer shuttles between the Redwood City station and major employers in the eastern part of the City.
- Increased feeder bus service.
- Increased congestion along US 101 and I-280.
- Increased frequency of train service.

Table 7: CalTrain Weekday Passenger Boardings

	Oct '92	Feb '95	Mar '96	Feb '97	Feb '98	Feb '99	Feb '00	Feb '01	Feb '02	Feb '03	Feb '04	Feb '05	Feb '06	Feb '07
Redwood City	764	778	874	1,142	1,286	1,331	1,597	1,804	1,597	1,356	1,360	1,423	1,870	1,934
CalTrain Total	21,121	20,695	22,138	26,043	27,967	27,591	31,291	35,609	30,961	27,191	25,550	28,393	32,031	33,841

Source: Caltrain, 2007

Buses and Bus Boardings per Weekday in Redwood City

- As of June 2008, there were 546 total buses passing through Redwood City per day, and an estimated 4,700 total bus boardings per weekday.
- Bus-riding remains an important transit service in the City, with around twice as many bus boardings as train boardings per weekday.

Miles of Bicycle Facilities

The Caltrans Highway Design Manual identifies 3 major types of bicycle facilities – Class I, II, and III bikeways. A Class I bikeway is a completely separated right-of-way for the exclusive use of bicyclists or both bicyclists and pedestrians. A Class II bikeway is a striped lane of a certain minimum width, designated for the exclusive use of bicyclists on a shared way. A Class III bikeway is signed as a bikeway and is shared between bikes and motor vehicle traffic. Usually, the more bike routes of all types there are in a city, the better conditions are for cycling. Tracking miles of facilities over time shows how bicycling conditions are changing, and Table 13 contains a baseline for miles of bicycling facilities in Redwood City in 2008. Salient points are as follows:

- Redwood City has a total of 24.7 miles of bike routes, distributed evenly between Class I, II, and III bike routes.
- Total miles of bike routes account for 8.2% of the approximately 300 total street miles in the City.
- According to the General Plan transportation consultant, around 24 additional miles of facilities would be classifiable as Class III bicycle facilities if proper signage were installed.[9] Though these streets are not technically Class III, they likely offer a similar level of bicycle service.

Table 8: Miles of Bicycle Facilities by Type in Redwood City

Class I	8.9 miles
Class II	9.1 miles
Class III	6.7 miles

Source: Fehr and Peers, 2008

[9] This information is from Sam Tabibnia, Fehr and Peers, contactable at s.tabibnia@fehrandpeers.com, in an email dated 6/19/08.

Summary of Results

In 2000, around ¾ of Redwood City residents drove alone to work, a slight decrease from 1990 levels. This slight decrease was due to more carpooling, bicycling, or bus and train riding, though fewer people were walking. There has been a general upward trend in use of the Redwood City Caltrain station over the past 10 years, and a strong upsurge in the past 3 years. At the same time, buses remain an important transit service in the City, and about twice as many people ride buses in Redwood City as ride trains. Cycling is also an important mode of travel, and around 8% of streets in Redwood City are classified as bicycle facilities.

Green Buildings

Why is this important?

Buildings dictate or influence everyday human behavior, and they have broad impacts on the environment, the economy, and human health and productivity. "Green building" is the practice of decreasing a building's demand for energy, water, and other materials and reducing a building's negative impacts on human health and on the local environment. It is an increasingly mainstream approach to construction and development. In California and most of the country, the amount of greenhouse gas emissions directly related to the construction and operation of buildings is second only to emissions from transportation, and the location of buildings has a strong impact on transportation behavior. According to the U.S. Green Building Council, buildings annually consume more than 30% of the total energy and 60% of the electricity used in the United States. Since the built environment usually changes very slowly over time, building decisions made now will have ramifications far into the future. While new green buildings can have an accumulating, long-term impact, the green retrofit of existing buildings can have an immediate, short-term impact. Existing buildings will make up the majority of the building stock for some time to come, so a comprehensive strategy to reduce the overall environmental impact of buildings must address them.

Redwood City does not currently have a coordinated effort to encourage green building, but is actively developing a green building program that should be in effect by 2009. Future indicator reports can track the number of buildings – both new green buildings and green retrofits of existing buildings – involved in the program each year.

Defining Sustainability

Sustainable buildings are resource efficient, non-toxic, designed to encourage sustainable behavior in building users, and sited in a way that preserves local environmental quality.

Indicator Results

Number of LEED-Certified Buildings

LEED (Leadership in Environmental and Energy-Efficient Design) is a green building rating system developed by the non-profit U.S. Green Building Council (USGBC). LEED is the most widely-used green building rating system in the country, and the number of LEED-certified buildings in the United States has increased exponentially since the first LEED rating system was released in 1998. USGBC has developed specialized LEED rating systems for various kinds of development, including new construction, neighborhoods, existing buildings, commercial interiors, and many others. As of August 2008, Redwood City had:

- One LEED-certified commercial building (the Rudolph and Sletten Corporate Headquarters commercial building).

- One LEED-certified 58-unit residential development (Villa Montgomery affordable housing).
- One approved single-family residence that will be LEED-certified when built.

Summary of Results

Redwood City is in the process of establishing a city-wide green building program, to be in effect by 2009. There is currently one LEED-certified commercial building and one 58-unit LEED-certified residential development in the City. There is also 1 LEED-certified single-family residence planned and approved.

Green Business and Operations

Why is this important?

Green business – operating businesses, governments, and other organizations in an environmentally-friendly manner – can offer many environmental, organizational and community benefits. Green business practices can save money and save resources. They can also reduce water use and reduce greenhouse gas emissions by limiting energy use and waste production. Greener sites, buildings, products and operation practices have also been shown to improve employee morale by creating a healthier work environment and encouraging efficiencies and innovation.

Businesses and governments also have a large upstream impact through the products and services they choose to purchase. In the United States, local and state government combined purchase more than $1 trillion of goods and services each year, including items such as paper, vehicles, infrastructure, landscaping materials, cleaning supplies and janitorial services, and even financial or investment services. When purchased goods are toxic or highly energy- and resource-intensive to produce, they have negative environmental impacts. Implementing environmentally preferable purchasing programs not only contributes to a better environment, it helps to develop markets for environmentally responsible products. Additionally, through setting visible and publicized standards for procurement, government has the opportunity to impact purchasing decisions throughout the community.

Another way governments and business can have an impact on the environment is by influencing employee commute patterns and encouraging alternatives to single-occupancy vehicle commuting through incentives, requirements, or information campaigns. Commuting on foot, by bike, by carpool, or by public transit saves energy, uses less gas, reduces greenhouse gas emissions, reduces stress and improves health, and can saves employees money.

Defining Sustainability

Sustainable business and government operation practices conserve resources, reduce an organization's impact on climate change, provide healthier workplaces and promote environmentally responsible products and practices.

Indicator Results

Number of Businesses Certified by the Bay Area Green Business Program

The Bay Area Green Business Program is a partnership between Bay Area local governments, the U.S. and California E.P.A, and local businesses. It is the best known and most well-subscribed third-party green business certifier in the Bay Area. Certification requires members to adhere to a variety of environmental best practices in their operations. As of August 2008, 7 businesses had been certified by the Bay Area Green Business Program in Redwood City. These businesses are:

- DES Architects
- Harwood Homebuilders
- The Kastrop Group
- Peritus Precision Translations
- Positive Impact Partner
- Federal Shredding
- Applebee's Restaurant

Green municipal procurement standards

- The City does not currently have standards for environmentally preferable procurement.
- Despite no formal standard, the City has made a number of major environmentally preferable purchases in the past 10 years. These include the following:
    - In 2002, the City added 3 electric vehicles to its fleet.
    - The City began replacing older general sedans with Toyota Prius hybrid sedans in 2005. As of 2008, 83% of the City's sedans (15 sedans total) were hybrid, excluding police sedans.
    - In 2006, the City converted from using conventional diesel fuel to using Ultra Low Sulfur Diesel Fuel, which produces fewer criteria air pollutants.

Municipal Employee Participation in Commute Alternative Program

The Redwood City Commute Alternative Program is a program provided by the City and available to municipal employees. The program provides incentives and information to help employees commute to work using a mode other than a single-occupancy vehicle, and also encourage telecommuting when feasible. The program's major financial incentive is a limited number of vouchers available to employees to redeem for transit rides. These are called "commuter checks." Headline data about the program includes the following:

- As of June 2008, approximately 75-100 employees (14-18%) redeem "commuter checks" on a regular basis as part of the Commute Alternative Program.
- Over the last 5 years, there has been a 200% increase in usage of "commuter checks."

Summary of Results

Redwood City has seven businesses certified by the Bay Area Green Business Program. The City is not a certified green operation and does not have standard for environmentally preferable procurement, but has made some significant environmentally preferable purchases in the past 10 years. The City also sponsors a well-used program encouraging employees to commute to work using public transit, carpooling, or walking and biking.