Foster City

Climate Action Plan

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CLIMATE ACTION PLAN

FOR THE

CITY OF FOSTER CITY

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Table of Contents

Executive Summary

Chapter 1: Introduction

1.1	Why Foster City has a Climate Action Plan	1-2
1.2	Climate Science	1-2
1.3	Projected San Francisco Bay Area Climate Impacts	1-5
1.4	State Policy and Regulatory Context	1-9
1.5	Regional Efforts	1-12
1.6	Local Efforts	1-14
1.7	Relationship of the Climate Action Plan to the General Plan	1-19

Chapter 2: Greenhouse Gas Emissions Inventory

2.1	Inventory Sources and Data Collection Process	2-1
2.2	Emission Scopes	2-3
2.3	Baseline Emissions Inventory for 2005	2-6

Chapter 3: Emissions Forecast and Reduction Goals

3.1	Emissions Forecast for 2020, 2025, and 2050	3-1
3.2	Emission Reduction Targets	3-3
3.3	Foster City's Reduction Target	3-3
3.4	Reductions from State-Level Actions	3-5

Chapter 4: Reduction Measures

4.1	Categories of Reduction Measures	4-1
4.2	Comparison of CAP, SAP, existing General Plan and Update	4-1
4.3	Proposed Criteria for Prioritization and Selection of Measures	4-9
4.4	Prioritization and Selection of Measures	4-9
4.5	Reduction Measure Prioritization and Selection Summary	4-10
4.6	Reduction Measure	4-17
4.7	Effectiveness of Proposed Reduction Measures	4-84

Chapter 5: Implementation and Monitoring

5.1	Implementation	5-1
5.2	Monitoring	5-1
5.3	Implementation Measures	5-2
5.4	Implementation Timeframe	5-4
5.5	Potential Funding Sources	5-6

Table of Contents (continued)

Appendix A: Greenhouse Gas Inventory Calculations and Assumptions
A.1 Assumptions A-1

Appendix B: Considerations for Reduction Measures
B.1 Details Considered for Reduction Measures B-1
B.2 General Assumptions Used B-1
B.3 Calculation Assumptions for Each Measure B-1

Appendix C: Glossary C-1

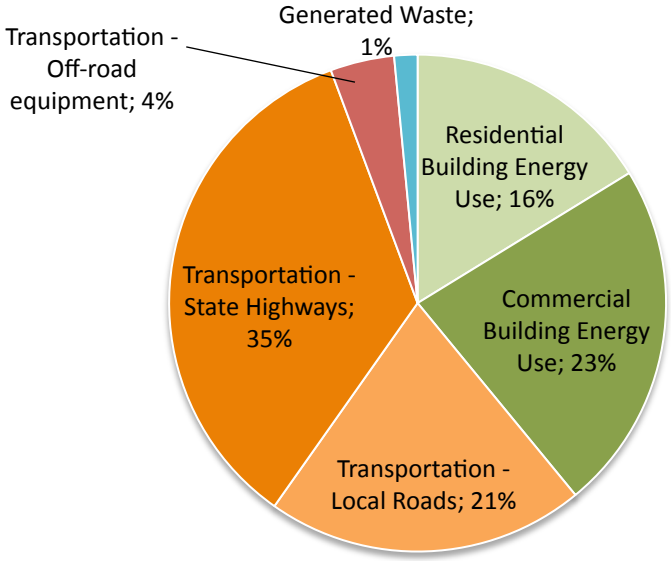
Appendix D: Comparison of Commercial Green Rating Systems D-1

Executive Summary

The City of Foster City has developed the Climate Action Plan to address challenges that climate change will bring to the community. Climate scientists around the world, represented by the Intergovernmental Panel on Climate Change (IPCC), have acknowledged that, through release of greenhouse gases (GHG), human activity is causing climate shifts. Although climate change is an issue of global concern, effects will be felt locally and so the City has begun taking steps to face associated problems. The Climate Action Plan describes climate change effects and prescribes measures to mitigate negative impacts. By addressing potential issues arrising from climate change impacts, the City will better adapt to changing conditions and can protect general community welfare.

Climate change is attributed to increasing atmospheric greenhouse gas concentrations. The six greenhouse gases, as identified by the IPCC, include carbon dioxide (CO_2) methane (CH_4), nitrous oxide (N_2O), and three man-made gasses: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These emissions are all released through our daily activities. Figure ES.1 below shows, by sector, emissions released through activities in Foster City in 2005. A greenhouse gas inventory measures the prevalence of GHG emissions in the atmosphere and their cumulative effects. Chapter 2 of the Climate Action Plan discusses the Foster City GHG inventory in detail.

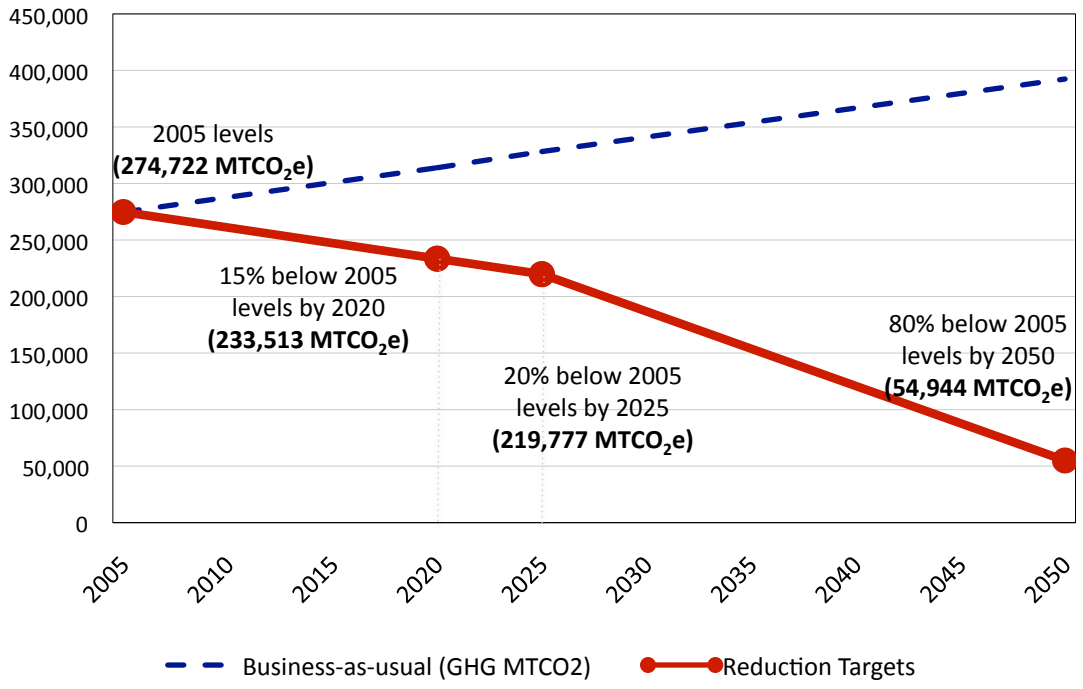
Figure ES.1: Foster City Community Emissions by Sector (2005)



Forecasts for GHG emissions into 2020, 2025, and 2050 reveal a large increase in greenhouse gases if no action is taken, but State laws have set GHG reduction targets as part of a greenhouse gas reduction plan. Local governments have also sought to adopt reasonable targets for greenhouse gas reductions based on goals set forth by the State. The Foster City City Council is considering the establishment of the following GHG reduction targets: achieve 15 percent GHG emissions reduction below 2005 levels by 2020, 20 percent below 2005 levels by 2025, and

80 percent below 2005 levels by 2050. Figure ES.2 illustrates differences between GHG concentrations in a business-as-usual approach, where no action is taken to slow GHG emissions, and reductions achieved in meeting GHG targets. Chapter 3 discusses emission forecasts and reduction goals in greater detail.

Figure ES.2 : Foster City GHG Reduction Targets for 2020, 2025, and 2050



In order to meet greenhouse gas reduction targets, the Climate Action Plan contains a variety of measures to address emissions from different sectors. Many measures have been based on policies proposed over time from sources such as the Sustainability Action Plan, the General Plan, and the Sustainable Foster City Plan. Thus, the Climate Action Plan contains a refined collection of ideas that have been developed from a variety of sources to meet current projected GHG reduction needs.

The measures in the Climate Action Plan are broadly grouped into seven categories:

- Energy (Community): energy efficiency upgrades to residential and commercial buildings through code adoption, funding programs, and urban forestation programs

- Energy (Municipal): energy efficiency upgrades and improvements by the City through revised building standards, solar systems, purchase of environmentally-friendly materials, and leveraging of funds.

- Transportation and Land Use (Community): policies in the General Plan that reduce automobile trips through compact and more efficient land use patterns that promote a

balanced mix of land uses, encourage alternative modes of transportation, and encourage use of hybrid and electric cars.

- Transportation-Related Municipal Operations: policies that promote energy efficiency in the City fleet and promote telecommuting and flexible work schedules to reduce vehicle trips.

- Waste (Community): waste diversion from landfills to reduce the generation of methane and other greenhouse gases.

- Energy and Water: energy reduction in the heating and usage of water.

- Education: programs to increase awareness of conservation, sustainability, and the Climate Action Plan

Chapter 4 presents all measures with background information, a description, cost and financial impacts, implementation process, and calculation assumptions for GHG reductions.

The Climate Action Plan recommends measures that are compatible with the General Plan Land Use and Circulation Element, which means that the GHG reduction measures in this plan will tie into new development projects as well as existing development and municipal and community activities. The Climate Action Plan, as a programmatic tiering document under CEQA, will also serve as a tool for greenhouse gas analysis and mitigation review for new projects. It will help guide future planning, development, and municipal policy decisions. Chapter 5 discusses implementation, monitoring, implementation measures, implementation timeline, and potential funding sources.

This plan contains solutions to mitigate problems associated with climate change. By embracing the idea to "Think Global, Act Local," Foster City joins many cities within the Bay Area and around the world that have addressed climate change issues in order to serve both their local communities and the global population.

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Chapter 1: Introduction

The City of Foster City is pleased to present the following Climate Action Plan ("Plan"). This Plan is designed to be a blueprint of our community's response to the challenges posed by climate change. Climate scientists around the world, represented by the Intergovernmental Panel on Climate Change (IPCC), have an unequivocal position: Human activity is changing the earth's climate through the release of greenhouse gas (GHG) emissions resulting from the combustion of fossil fuels[1]. Adopting an effective mitigation policy and taking action now will reduce the damage we will cause and cost less over time.

Our City is not expected to solve the climate crisis alone, but local action is increasingly important as the State has limited authority to require reduced emissions within municipalities. California relies on its counties and cities to strive for emissions reductions where the state has no immediate influence, through local land use policies, transportation measures, energy and water conservation programs, and other initiatives. Efforts to reduce GHG emissions at the local level require not only local regulations and local leadership, but also citizen and business participation, public awareness, and community-based involvement in a wide range of reduction measures and strategeies. The City is in a position to provide regional leadership in the effort to reduce GHG emissions, and other cities of a similar size may look to Foster City for best practices and innovative ways in which they too can reduce emissions and improve their energy efficiency.

A coordinated regional effort will allow us to reach our reduction targets. Together with our partners in County, State, and Federal government, Foster City is committed to taking steps to reduce our emissions and create new programs and services that will support our community and our families in doing the same. This Plan offers ways to make our homes and buildings more energy efficient and increase the usage of renewable energy. It recommends measures that work hand-in-hand with the General Plan Land Use and Circulation Element to encourage development patterns that maintain a mix of uses, and provide for diversified circulation needs, including efficient and safe access for all users of the streets, roads, and highways. It offers ways to reduce the waste heading to our landfills and lower residential and commercial water usage, in line with existing efforts already implemented by the City. Finally, this Plan also outlines measures that the municipal government could take to reduce greenhouse gas emissions and lead by example.

[1] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-human-and.html

1.1 Why Foster City has a Climate Action Plan

The City of Foster City has developed this Climate Action Plan in order to achieve a number of objectives, including:

- **To demonstrate environmental leadership** – We as a community can rise to the challenge of reducing the impact of climate change by taking reasonable steps to reduce our GHG emissions.
- **To save money and promote economic development** - Residents, businesses, and government will reduce their utility costs through increased energy and water efficiency. The City's focus on energy efficiency would encourage and possibly create job opportunities within the community (such as industries providing alternative energy solutions and sustainability services) that contribute to protecting our environmental resources.
- **To comply with the letter and spirit of State environmental initiatives –** California is taking the lead in tackling climate change while driving the new energy markets and fostering new environmental services. As such we have a responsibility to help the State meet its goals to reduce greenhouse gas emissions.
- **To promote sustainable development** – By developing this Plan according to Bay Area Air Quality Management District guidelines, a new class of sustainable development projects, such as mixed use and transit oriented developments, can be fast-tracked through the California environmental review process, which may spur economic development and assist in the establishment of new businesses.

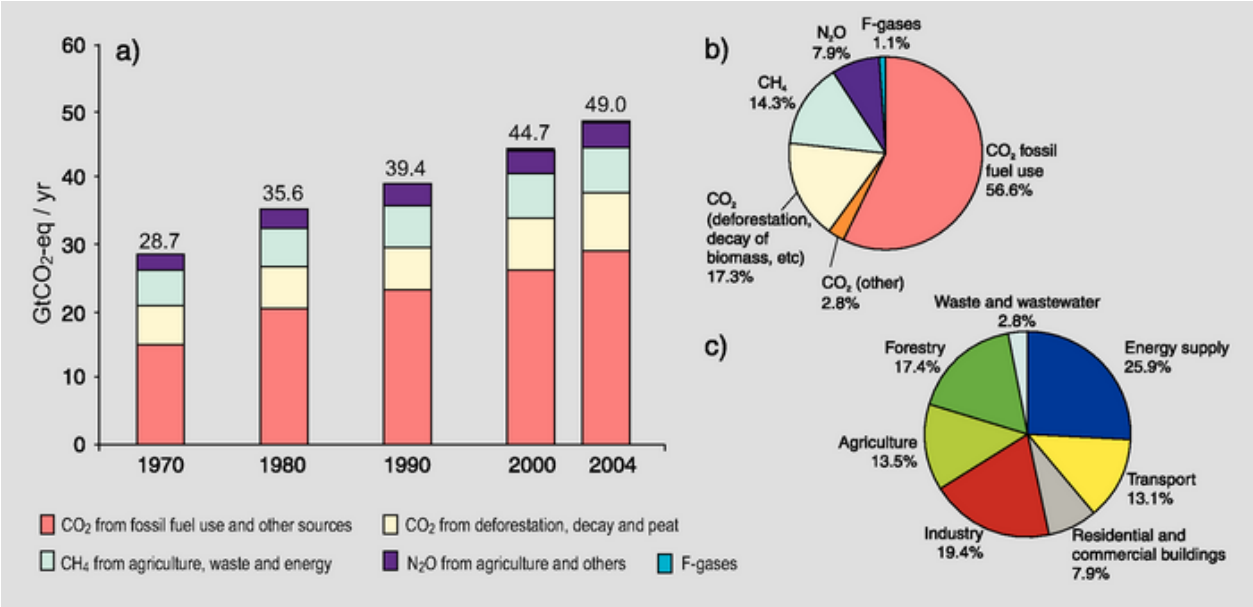
1.2 Climate Science

Climate change presents one of the most profound challenges of our time. A broad international consensus exists among atmospheric scientists that the Earth's climate system is being destabilized in response to elevated levels of greenhouse gas emissions in the atmosphere. Since the pre-industrial period, this is primarily attributed to the combustion of fossil fuels for energy use, however land-use changes also provide another significant, although smaller contribution[2].

Greenhouse gas emissions include carbon dioxide (CO_2) methane (CH_4), nitrous oxide (N_2O), and three man-made gasses: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The following graphic from the IPCC shows the growth and distribution of anthropogenic (human-caused) greenhouse gas emissions in the atmosphere.

[2] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-human-and.html

Figure 1.1: Growth and Distribution of Global Anthropogenic GHG emissions



Source: International Panel on Climate Change, Fourth Assessment Report

The largest contributor to climate change is carbon dioxide emissions, followed by methane and nitrous oxide. Carbon dioxide is emitted through the combustion of fossil fuels such as coal and petroleum as well as through the decomposition of clear-cut forests (deforestation).

A recent comprehensive study of climate impacts on the United States, written by a task force of U.S. government science agencies, led by the National Oceanic and Atmospheric Administration (NOAA),[3] makes the following key conclusions:

1. **Global warming is unequivocal and primarily human-induced (anthropogenic)**. Average global temperature has increased over the past 50 years. This observed increase is due primarily to human-induced (anthropogenic) emissions of heat-trapping gases.

2. **Climate changes are underway in the United States and are projected to grow.** Climate-related changes have already been observed in the United States and within its coastal waters. These changes include more frequent and severe drought conditions, rising temperatures and sea level, rapidly retreating glaciers, thawing permafrost, lengthened growing seasons, lengthened ice-free seasons in the ocean and on lakes and rivers, earlier snowmelt, and alterations in river flows.

3. **Widespread climate-related impacts are occurring now and are expected to increase.** Climate changes are already affecting water, energy, transportation, agriculture, ecosystems, and health. These impacts are different from region to region and will grow under projected climate changes.

[3]U.S. Global Change Research Program 2009. "Global Climate Change Impacts in the United States." Page 12. http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts

4. **Climate change will stress water resources.** Access to clean water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue, especially in the western U.S.. Floods and water quality problems are likely to be amplified by climate change in most regions. Declines in mountain snowpack are important in the western U.S. and Alaska, where snowpack provides vital natural water storage and supply.

5. **Crop and livestock production will be increasingly challenged.** Agriculture is considered one of the sectors most adaptable to changes in climate. However, increased heat, pests, water stress, diseases, and weather extremes will pose adaptation challenges for crop and livestock production.

6. **Coastal areas are at increasing risk from sea-level rise and storm surge.** Sea-level rise and storm surges place many U.S. coastal areas at increasing risk of erosion and flooding, especially along the Atlantic and Gulf Coasts, Pacific Islands, and parts of Alaska. Energy and transportation infrastructure and other property in coastal areas are very likely to be adversely affected.

7. **Threats to human health will increase.** Health impacts resulting from climate change are related to heat stress, waterborne diseases, poor air quality, extreme weather events, and diseases transmitted by insects and rodents.

8. **Climate change will interact with many social and environmental stresses.** Climate change will combine with pollution; population growth; overuse of resources; urbanization; and other social, economic, and environmental stresses to create larger impacts than from any of these factors alone.

9. **Thresholds will be crossed, leading to large changes in climate and ecosystems.** There are a variety of thresholds in the climate system and ecosystems. These thresholds determine, for example, the presence of sea ice and permafrost and the survival of species, from fish to insect pests. Changes to these thresholds all have implications for society.

10. **Future climate change and its impacts depend on choices made today.** The amount and rate of future climate change depend primarily on current and future human-caused emissions of heat-trapping gases and airborne particles, and our responses to reducing emissions, thereby limiting future warming and adapting to the changes that are unavoidable.

According to the current scientific consensus, a 2°C increase in average global temperature over the next century is a “safe” level of global warming. To limit the average global temperature increase to 2°C, GHG concentrations need to be stabilized at a level well below 450 parts per million (ppm). Currently, global atmospheric concentration of GHGs stands at around 400 ppm.

Additional Resources about Climate Change

- International Panel of Climate Change Fourth Assessment Report: http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml
- U.S. Global Change Research Program: http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts
- Pew Center on Climate Change: http://www.pewclimate.org/
- National Ocean and Aeronautical Administration (NOAA): http://www.climate.gov/#dataServices
- U.S. Environmental Protection Agency: http://www.epa.gov/climatechange/indicators.html
- Our Changing Climate: A report on global warming and California produced by the California Climate Change Center in collaboration with the Union of Concerned Scientists: http://www.climatechoices.org/ca/
- State of California's Resource for Global Climate Change Information: http://www.climatechange.ca.gov

1.3 Projected San Francisco Bay Area Climate Impacts

Historical records show that sea level in San Francisco Bay has risen about seven inches (18 cm) over the past 100 years. Scientists agree that the rate of sea level rise is accelerating, but projections of future sea levels vary considerably. Present California coastline projections reported by the California Natural Resources Agency and the California Energy Commission predict 10 to 18 inches of sea level rise by 2050 (using 2000 as the baseline) and between 40 and 55 inches by 2100, depending upon the emission scenario used[4]. In 2009, the Bay Conservation and Development Commission (BCDC) released *Living With a Rising Bay*, an assessment that included the following[5]:

- Increased flooding risk for 270,000 Bay Area residents with a 55 inch rise
- Estimated $36 billion in at-risk property by 2050, and $62 billion by 2100
- Estimated 95 percent of tidal wetlands vulnerable to sea level rise, which may increase flooding and erosion

[4] The Impacts of Sea Level Rise on the San Francisco Bay: http://www.energy.ca.gov/2012publications/CEC-500-2012-014/CEC-500-2012-014.pdf

[5] San Francisco Bay Conservation and Development Commission. 2009. (April) Draft Staff Report. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline. Available at: http://www.bcdc.ca.gov/proposed_bay_plan/bp_1-08_cc_draft.pdf

In July 2012, the California Natural Resources Agency and the California Energy Commission released a revised report, *Climate Change Reports Highlight Impacts and Challenges for California,*[6] which confirmed the 2009 report and stated if population and development were kept at today's levels, a 100-year flood in 2100, after a 55-inch sea-level rise, would put at risk 480,000 people and $100 billion of property (in 2000 dollars) along San Francisco Bay and the open coast. New decision-support tools that incorporate sea-level rise into investment decisions for upgrading coastal infrastructure are vital to California's economy.[7]

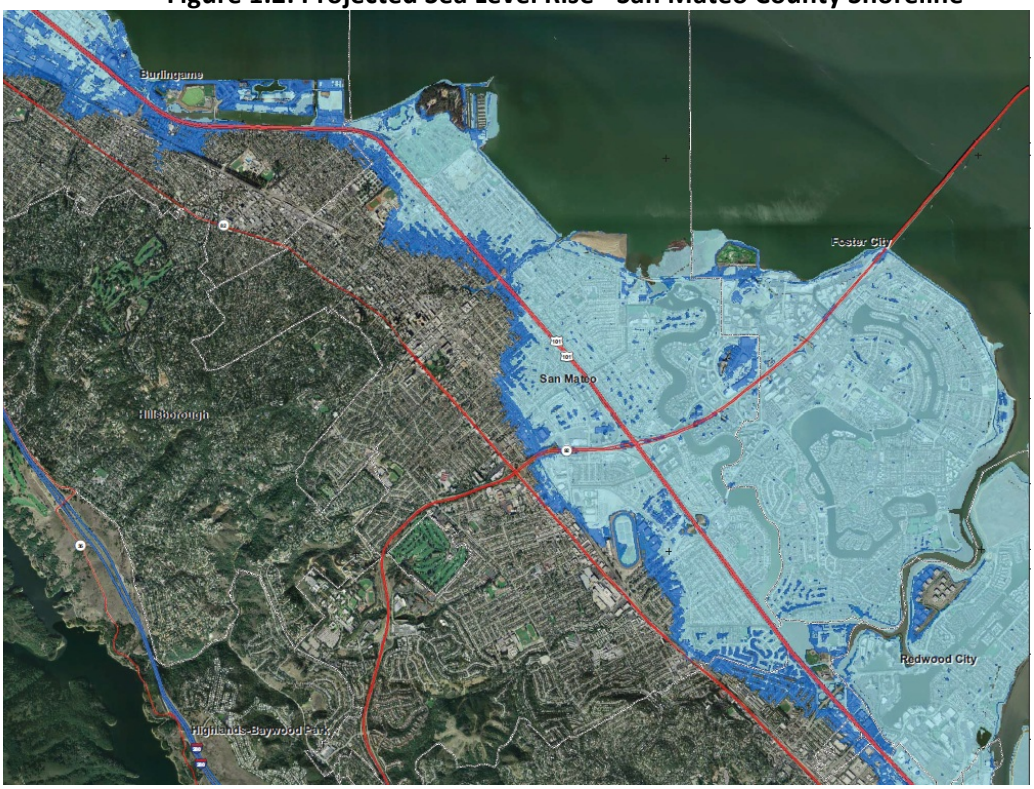
The Pacific Institute, with support from the California Energy Commission (CEC), California Department of Transportation, and the Ocean Protection Council, has produced inundation maps for the shores of San Francisco Bay that indicate which areas are vulnerable to 16-inch and 55-inch rises in sea level.[8] The Bay shoreline, from Brisbane to East Palo Alto, is a typical San Francisco Bay low-lying shoreline which provides vital ecological, industrial, and residential functions yet it is already vulnerable to inundation from both tidal and fluvial sources. Both the San Francisco Airport and the Port of Redwood City are at risk, as are segments of critical transportation infrastructure including segments of Highway 101, approaches to the Dumbarton and San Mateo Bridges, and Caltrain railroad. As shown in Figure 1.2, because all of Foster City is located within this area, it is susceptible to this sea level rise.

According to a 2009 study[9] by the CEC, the Pacific Institute, and others, and confirmed by the 2012 report[10], 110,000 people living in areas of San Mateo County are vulnerable to a 100-year flood event with a 4.5-foot rise in sea level. The County infrastructure and facilities at risk from the same event include:

- $24 billion worth of buildings and contents, mostly along the Bay (replacement value);
- 530 miles of roadways;
- 10 miles of railroads;
- San Francisco Airport (SFO), including the 31 MW United Cogen power plant;
- Wastewater treatment plants operated by the Cities of South San Francisco/San Bruno, City of Millbrae, City of San Mateo, South Bayside System Authority, Mid-Coastside Sewer Authority, and SFO (total treatment capacity of approximately 44 MGD);
- 78 EPA-regulated hazardous materials sites;
- 34 square miles of coastal wetlands.

[6] http://www.climatechange.ca.gov/adaptation/third_assessment/
[7] http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf
[8] Maps available at http://www.pacinst.org/reports/sea_level_rise/hazmaps.html
[9] Heberger, Matthew, Heather Cooley, Pablo Herrera, Peter H. Gleick, and Eli Moore (2009). The Impacts of Sea Level Rise on the California Coast. PIER Research Report, CEC-500-2009-024-D, Sacramento, CA: California Energy Commission.
[10] The impacts of Sea Level Rise on the San Francisco Bay: http://www.energy.ca.gov/2012publications/CEC-500-2012-014/CEC-500-2012-014.pdf

Figure 1.2: Projected Sea Level Rise - San Mateo County Shoreline[11]



The range of current sea level rise estimates presents difficulat challenges to cities that must decide how to expend limited resources to protect critical land uses and infrastructure. As the shoreline migrates landward, habitats and flood hazard areas will also shift. Past development of residential, commercial, and public access infrastructure may limit the flexibility of set-backs or adjustments to the Bay shoreline.

1.3.1 Extreme Heat & Storm Events

California in general should expect overall hotter and drier conditions with a reduction in winter rain (and concurrent snow in the mountains), as well as increased average temperatures. There is a high likelihood that extreme weather events, including heat waves, wildfires, droughts, and floods will be among the earliest climate impacts experienced.[12] In San Mateo County, higher average sea levels means that storms will impact the Pacific coast and Bay shore more severely with higher storm surges, more extensive inland flooding, and increased erosion. If more frequent or severe natural disasters occur, more emergency and public health services will be needed to deal with the consequences.

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[11] Quadrangle shown at http://www.pacinst.org/reports/sea_level_rise/hazmaps/San_Mateo.pdf and sourced from http://www.pacinst.org/reports/sea_level_rise/gmap.html

[12] California Natural Resources Agency, 2009, *California Climate Adaptation Strategy*, http://www.climatechange.ca.gov/adaptation/

Heat related illness and mortality are expected to increase. Though extreme heat events in bayfront and coastal areas like San Mateo County are not expected to be as severe or as long-lasting as those further inland, the resident population is not as well prepared or equipped to deal with higher temperatures. Air conditioning is far less common, for example. Outdoor workers, elderly populations, and infants are particularly vulnerable to extreme temperatures.

California will continue to get hotter: Statewide average temperatures increased by about 1.7 degrees Fahrenheit from 1895 to 2011, and temperatures are expected to rise by 2.7 degrees above 2000 averages by 2050.[13] Higher temperatures and drier summer conditions produce higher levels of ozone, which can exacerbate respiratory illnesses, particularly among vulnerable populations such as children and the elderly. Higher temperatures and drier conditions can also increase the potential for wildfires, which could lead to declines in air quality causing negative impacts to respiratory and cardiovascular health.

Local agriculture is also likely to be impacted by extreme weather events, higher temperatures, and less water availability for agricultural production, resulting in lower production and a potential decline in food security. By the latter half of this century, dry water years are expected to increase by 8 percent in the Sacramento Valley and by 32 percent in the San Joaquin Valley, compared to the latter half of the 20th century; [12] an impact that will have implications to and be felt by communities in the San Francisco Bay Area, including Foster City.

1.3.2 Public Health

Most Californians are not aware of recent statistics suggesting that California is home to the worst air quality in the nation, with over 90 percent of Californians breathing unhealthy air. According to the California Air Resources Board, unhealthy levels of ozone (smog) and particulate matter annually contribute to:

- 19,000 premature deaths
- 9,400 hospital admissions for respiratory and cardiovascular disease
- 280,000 asthma and other lower respiratory symptoms
- 22,000 cases of acute bronchitis
- millions of school and work days lost due to respiratory conditions[14]

In addition, climate change, including increased summer temperatures, can have adverse effects on the health of Foster City's residents and workers, especially the vulnerable populations including children, seniors, and those with existing chronic illnesses.

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[13] Climate Change Reports Highlight Impacts and Challenges for California: http://www.energy.ca.gov/releases/2012_releases/2012-07-31_climate_change_impacts_and_challenges.pdf

[14] American Lung Association. Land Use, Climate Change & Public Health Issue Brief: Improving Public Health and combating climate change through sustainable land use and transportation planning. Spring 2010.

San Mateo County Health System, in accordance with the Centers for Disease Control, is charged with informing cities about the risk to public health from climate change, creating tools that support decision-making and capacity building to mitigate adverse health outcomes from climate change, and serving as a credible leader in planning for the public health impacts of climate change.

1.4 State Policy and Regulatory Context

The State of California has been a leader in developing and implementing policies and regulations to directly address the risk of severe climate change. Below we summarize the key statewide legislation aimed to reduce GHG emissions. There are many supporting pieces of legislation and other related initiatives that are sector specific. These are more fully described in Chapter 3.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, the California legislature passed Assembly Bill (AB) 32, which set the goal of reducing GHG emissions back to 1990 levels by 2020. AB 32 finds and declares that "global warming poses a serious threat to economic well-being, public health, natural resources and the environment of California." The legislation granted authority to the Air Resources Board to establish multiple mechanisms (regulatory, reporting, voluntary and market) to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

Executive Order S-3-05

Executive Order S-3-05, enacted by former Governor Arnold Schwarzenegger in 2005, establishes GHG emission reduction targets at 80 percent below 1990 levels by the year 2050, and reinforces the AB 32 reduction of GHG emissions to 1990 levels by the year 2020. It also created a framework for the State-level coordination and reporting on meeting GHG reduction targets and plans.

Assembly Bill 1493, the Pavley Bill

In 2002, the California legislature enacted Assembly Bill (AB) 1493 (aka "the Pavley Bill"), which directs the Air Resources Board to adopt standards that will achieve "the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles," taking into account environmental, social, technological, and economic factors. In September 2009, the Air Resources Board adopted amendments to the "Pavley" regulations to reduce GHG emissions in new passenger vehicles from 2009 through 2016.

Senate Bill 375

In September 2008, Senate Bill (SB) 375 was signed into law to provide emissions reduction goals related to vehicle-miles traveled on a regional planning level. The bill seeks to align regional transportation planning efforts with regional GHG reduction targets as well as land use and housing allocations. SB 375 requires metropolitan planning organizations (MPOs) to adopt a sustainable communities strategy or alternative planning strategy. The Air Resources Board, in consultation with the MPOs, has set a per capita GHG reduction target for emissions of passenger cars and light trucks in the San Francisco Bay Area of seven percent below 2005 levels by 2020, and 15 percent below 2005 levels by 2035. This is a different target compared to the AB 32 reduction target and will be achieved through a combination of State-wide and local actions.

California 33 Percent Renewable Portfolio Standard (RPS)

California's Renewable Portfolio Standard (RPS) was originally established by legislation enacted in 2002. Subsequent amendments to the law have resulted in a requirement for California's electric utilities to have 33 percent of their retail sales sourced from eligible renewable resources in 2020 and all subsequent years. Renewable resources include wind, solar, geothermal, wave, and small hydroelectric power.

Senate Bill 97, CEQA Guidelines for Addressing GHG Emissions

California Environmental Quality Act (CEQA) requires public agencies to review the environmental impacts of proposed projects, including General Plans, Specific Plans and certain kinds of development projects. In February 2010, the California Office of Administrative Law approved the recommended amendments to the State CEQA Guidelines for addressing GHG emissions. The amendments were developed to provide guidance to public agencies regarding the analysis, mitigation, and effects of GHG emissions in draft CEQA documents.

Bay Area Air Quality Management District CEQA Guidelines

The Bay Area Air Quality Management District (BAAQMD) encourages local governments to adopt a GHG Reduction Strategy that is consistent with AB 32 goals. The "qualified" GHG Reduction Strategy may streamline environmental review of community development projects. According to the BAAQMD, if a project is consistent with a Qualified GHG Reduction Strategy, then it can be presumed that the project will not have significant GHG impacts. This approach is consistent with the following State CEQA Guidelines, Section 15183.5.a:

"Lead agencies may analyze and mitigate the significant impacts of greenhouse gas emissions at a programmatic level, such as…a plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an [Environmental Impact Report] containing a programmatic analysis of greenhouse gas emissions."

More details can be found in Section 1.7 of this chapter on how this Climate Action Plan is a qualified GHG Reduction Strategy.

Title 24 and the CALGreen Building Code

Title 24 is the California Building Standards code, and is updated every three years. The last update was in 2013. CALGreen is one of the 12 parts of Title 24. CALGreen is a set of mandatory green building standards for new construction that went into effect throughout California on January 1, 2011. The 2013 California Green Building Standards Code went into effect on January 1, 2014. These building standards apply to all new public and privately-constructed commercial and residential buildings. CALGreen is referred to officially as the California Green Building Standards Code and includes a matrix of mandatory requirements tailored to residential and non-residential building classifications, as well as two sets of voluntary measures (CALGreen Tier 1 and Tier 2) that provide a host of more stringent sustainable building practices and features. Among the key mandatory provisions are requirements that new buildings:

- reduce indoor potable water use by at least 20% below current standards;
- recycle or salvage at least 50% of construction waste;
- utilize low VOC-emitting finish materials and flooring systems;
- install separate water meters tracking non-residential buildings' indoor and outdoor water use;
- utilize moisture-sensing irrigation systems for larger landscape areas;
- receive mandatory inspections by local officials of building energy systems, such as HVAC and mechanical equipment, to verify performance in accordance with specifications in non-residential buildings exceeding 10,000 square feet; and
- earmark parking for fuel-efficient and carpool vehicles.

SB 1078

SB 1078 established the California Renewables Portfolio Standard Program (RPS) in 2002, which requires that a retail seller of electricity, including electrical corporations, community choice aggregators, and electric service providers, purchase a specified minimum percentage of electricity generated by eligible renewable energy sources. RPS was accelerated in 2006 under SB 107 by requiring that 20 percent of electricity retail sales be served by renewable energy sources by 2010.

Executive Order S-13-08

Executive Order S-13-08 convened an independent panel to complete the first California Sea Level Rise Assessment Report by the end of 2010, to inform any State infrastructure. The Order also initiated an independent sea level rise science and policy committee. State-level land use planning guidance in relation to sea level rise and other climate change impacts was also to be provided.

AB 1103 and AB 531

AB 1103, signed into law in 2007, required the benchmarking of the energy consumption of certain types of nonresidential buildings in California, using the Environmental Protection Agency's Portfolio Manager system. It also required the disclosure of the building's energy usage to potential buyers, lessees, and lenders of the building. After January 1, 2010, AB 531 became law and assigned the implementation of AB 1103 to the California Energy Commission (CEC). The CEC set out a phased implementation of AB 1103 into 2014 by requiring larger buildings to comply earlier, and smaller buildings to begin compliance at a later stage.

1.5 Regional Efforts

The following regional efforts promoting GHG reductions are already under way:

City/County Association of Governments of San Mateo County (C/CAG). C/CAG is a council of governments consisting of the County of San Mateo and its 20 cities. The organization deals with topics such as transportation, air quality, stormwater runoff, hazardous waste, solid waste and recycling, land use near airports, abandoned vehicle abatement, and issues that affect quality of life in general. C/CAG supports a number of sustainability initiatives including the following:

> ***San Mateo County Energy Watch.*** This program is a local government partnership between Pacific Gas and Electric Company (PG&E) and C/CAG to promote energy efficiency in municipal and non-profit buildings. SMC Energy Watch has provided staff assistance to support Foster City and other San Mateo County jurisidctions in the development of their Climate Action Plans. SMC Energy Watch also promotes and manages several rebate incentives and funding opportunities, of which Foster City has taken advantage.
>
> ***Congestion Management Agency.*** C/CAG serves as the Congestion Management Agency for San Mateo County to identify strategies to respond to future transportation needs, develop procedures to alleviate and control congestion, and promote countywide solutions.
>
> ***Sustainable Communities Strategy/Regional Transportation Plan.*** C/CAG is collaborating with local governments in San Mateo County as well as regional agencies to develop a Sustainable Communities Strategy (SCS) in compliance with the requirements of SB 375. The SCS will facilitate more focused development in priority development areas near public transit stations. The aim of the San Mateo County SCS is to better integrate land use with public transportation in order to reduce GHG emissions.

Energy Upgrade California in San Mateo County. This San Mateo County program aims to help residential consumers make improvements to their homes so they will use less energy, conserve water and other natural resources, and become healthier and more comfortable. The program connects homeowners with participating contractors who can help plan and complete energy efficiency projects and take advantage of rebates. Energy Upgrade California is a partnership among California counties, cities, non-profit organizations and the State's investor-owned utilities (e.g. PG&E).

Joint Venture: Silicon Valley Network. Established in 1993, Joint Venture: Silicon Valley Network provides analysis and action on issues affecting the local economy and quality of life. The organization brings together established and emerging leaders -- from business, government, academia, labor, and the broader community -- to spotlight issues and work toward innovative solutions. Joint Venture is dedicated to promoting climate-friendly activities that help the local economy and improve quality of life in Silicon Valley.

PG&E's Sustainable Communities Team. A PG&E Community Energy Manager has been assigned to San Mateo County to work jointly with each municipality to develop a comprehensive energy management strategy that a city can implement across institutional, residential, business, and industrial sectors. In addition, PG&E has provided city and county energy usage data, GHG inventory assistance, and information on innovative pilot grant funding for projects that help to reduce GHG emissions in each community.

Silicon Valley Leadership Group (SVLG) Bay Area Climate Change Compact. SVLG is an organization consisting of principal officers and senior managers of member companies who work cooperatively with local, regional, State and Federal government officials to address major public policy issues affecting the economic health and quality of life in Silicon Valley. In 2009, SVLG organized the Bay Area Climate Change Compact, which establishes a framework for regional cooperation and setting aggressive goals for the reduction of greenhouse gas emissions.

Sustainable San Mateo County (SSMC). SSMC was established in 1992 by a group of San Mateo County citizens who sought to create a broader awareness of the sustainability concept. SSMC supports multiple programs to promote energy efficiency, alternative transportation and education on sustainability concepts which focus on the intersections of the environment, the economy and social equity. SSMC's Energy Ambassador program supports the Energy Upgrade California program by providing homeowners free personal energy reviews and education on home energy efficiency. *Indicators for a Sustainable San Mateo County* is a report published annually by SSMC to provide fact-based information on local trends impacting our economy, environment, and society. Propelled by the philosophy "what gets measured, gets managed," the Report presents indicators that raise awareness of sustainability in the county and improve our ability to make sound decisions for the benefit of future generations. The indicators in the Report are used by governments, businesses, civic groups, and nonprofit organizations to set goals, measure progress towards achieving them, and prioritize the allocation of scarce resources. In addition to the indicators, the Report highlights success stories, showcases positive changes that local governments and businesses are making, and presents resources for individuals to take further action.

Sustainable Silicon Valley (SSV). In 2004, SSV organized a regional voluntary initiative, setting a visionary target of reducing CO_2 emissions by 20 percent below the region's 1990 levels by the year 2010. SSV partners participating in the voluntary CO_2 emissions reduction program determined their own baseline year and a CO_2 percentage reduction goal to reach by 2010. Each pledging partner also chooses how to meet this target. There are many options available – from improvements in equipment efficiency to energy conservation, the use of renewable energy sources, and purchase of green power and/or promotion of alternative commute options.

1.6 Local efforts

While cities may be vulnerable to climate impacts, they also can play a critical role in reducing the emissions that exacerbate climate impacts. Cities are places where high-level knowledge-based activities congregate, along with the expertise needed to tackle climate change. This is especially true in the San Francisco Bay Area. With their concentrations of people and activities at high densities, cities can use resources such as energy, materials, and land more efficiently.

AB 32 identifies local governments as essential partners in achieving California's goal to reduce GHG emissions. Local governments have primary authority to plan, zone, and permit how and where land is developed to accommodate population growth and the changing needs of their jurisdiction. Cities have varying degrees of responsibility for the collection and processing of waste and have responsibility for other environmental infrastructures, such as energy and water. Cities own and manage buildings and vehicle fleets and are able to form partnerships with private interests to mobilize and coordinate community action. Furthermore, cities are uniquely positioned to promote economic development that emphasizes sustainable development and local "green-collar" jobs, which are jobs in the environmental sectors of the economy.

Foster City has taken several steps towards environmental sustainability over the years, through the following policies and actions which have already been implemented. Most of the actions in the following list are from the Environmental Sustainability Action Plan[15], which was developed in 2009 by Foster City's Environmental Sustainability Task Force (ESTF). This contains a set of goals, recommendations and a general framework that create a path to a more sustainable Foster City. The list has been updated to reflect further actions taken by the City since 2009.

Policies and Strategies

- Adoption of Resolution 2006-71, supporting efforts of all governments to develop policies and programs to reduce global warming.
- Adoption of Resolutions 2007-57 and 2009-17, supporting and then adopting the development of the San Mateo County Energy Strategy to reduce the impact of global warming and the corresponding climate change.
- Appointment of an Ad Hoc Environmental Sustainability Task Force which developed a Recommended Sustainability Action Plan.
- Appointment of a Transportation Committee to develop transportation recommendations.
- Adoption of the Sustainable Foster City Plan, which is a sustainable economic development strategic plan that incorporates environmental sustainability as a core component of sustainable economic growth.

[15] http://www.fostercity.org/city_hall/committees/upload/Final+W8.pdf

Carbon Emissions

Emissions from City Operations:

- Conducted an inventory of greenhouse gas (GHG) emissions from City operations. This inventory was used to create a prioritized action plan to reduce emissions, as detailed in this document. This action plan includes the setting of an emissions reduction goal for City operations. The City currently has a number of programs that reduce carbon emissions both from City operations and the community as a whole. Chapter 4 documents the estimated reductions from existing and new efforts.

- Converted to a system by which water meters could be read remotely, reducing the need to routinely access on-site meters around the city by automobile.

- Benchmarked major City facilities, to track and compare ongoing energy use.

Promotion and Support of Mass Transportation:

- Worked as a member of the Traffic Congestion Relief Alliance with employers to ensure that trip-reducing alternatives are available, introduced to employees, and publicized on a regular basis.

- Provided funding, along with a matching grant from C/CAG, for the Connections Shuttle from 2003 to mid-2012, a free in-town shuttle service that provided connections to recreational activities, shopping centers, and to other regional mass transit alternatives for Foster City residents and employees of local businesses. Due to budget reductions, the City Council decided not to fund the shuttle service after June 2012, however, a grant application for funding for a mid-day shuttle has been approved for fiscal years 2014/15 and 2015/16.

- Promoted the San Mateo County Transit (SamTrans) bus services, and the SamTrans Redi-Wheels paratransit services.

- Promoted the Alameda-Contra Costa (AC) Transit transbay bus service to and from Foster City.

- Promoted employer-operated shuttles to and from the San Mateo Caltrain Station and the Millbrae Intermodal Station from three areas of town: Lincoln Centre, North Foster City, and Mariners Island.

- Operated an on-demand Senior Express Shuttle to transport residents age 55 and older to events and activities in the region.

- Promoted the Peninsula Jewish Community Center (PJCC) Get Up and Go service, a low-cost shared ride transportation program for seniors who do not drive.

Bicycle Alternatives:

- Required that bicycle racks be installed at all new commercial/office developments in town. Bicycle racks are also on all shuttles.

- Maintained a bicycle/pedestrian path along the bayfront—a leg of the Bay Trail that connects with trails maintained in neighboring cities and allows for an easy commute by bicycle between Foster City and a number of Peninsula cities.

Foster City Employee Trip Reduction:

- Implemented an alternative schedule for most employees, reducing employee commuter trips from a traditional schedule.

- Implemented the option of employees telecommuting from home, keeping cars off the roadways while still maintaining a productive workforce.

- Participated in an annual Great Race for Clean Air, sponsored by the Spare the Air Team at the Bay Area Air Quality Management District.

City Fleet Fuel Efficiency:

- Increased the percentage of hybrids in the City fleet and reviewed other fuel efficient alternatives as vehicles are replaced.

- Replaced traditional vehicles with electric options for parks maintenance operations when appropriate.

- Maintained the City's vehicle fleet in peak condition in order to maximize performance and minimize carbon emissions.

Other Carbon-Reducing Policies:

- Reduced speed limits on most City streets to allow for residents' and businesses' use of Neighborhood Electric Vehicles (NEV) for intra-City transportation.

- Adopted regulations prohibiting the installation or replacement of wood burning appliances unless certain conditions are met to protect air quality.

Energy Conservation and Renewable Energy

- Eliminated permit fees for installation of solar panels.

- Installed Light Emitting Diode (LED) streetlights on all public streets. LED streetlights reduce energy use by up to 50 percent and require less maintenance and less frequent replacement.

- Converted all traffic and pedestrian signals to LEDs; these lights use about 20 percent of the electricity of the older halogen lights.

- Implemented energy conservation practices in building maintenance supplies, parts and systems in City facilities.

- Contracted with Thermal Mechanical to perform a wide range of energy efficiency upgrades in City facilities identified through the San Mateo County Energy Water program facilities audit.
- Installed computer-controlled heating, ventilation and air conditioning systems in some buildings to make them more energy efficient, and shutting off the systems during times when work areas may not be inhabited.
- Participated in the San Francisco Community Power Demand Response Program, reducing city-wide electricity use on peak demand days.
- Installed solar-powered speed safety signs near Bowditch Middle School.
- Converted City lighting systems to use energy efficient electronic ballasts.
- Joined Energy Upgrade California program to encourage energy efficiency retrofits by Foster City property owners.
- Joined CaliforniaFIRST to enable commercial customers to access Property-Assessed Clean Energy (PACE) financing.
- Contracted for solar photovoltaic installations on City buildings and installation of PV system at the Library/Community Center is in progress.

Water Conservation

- Implemented a conservation-based tiered water rate structure, including advanced rebate and education programs to drive water conservation. The City has seen a 17% reduction in water consumption between 2009 and 2013 as a result.
- Worked as a member of the Bay Area Water Supply and Conservation Agency (BAWSCA), offers incentives for residents and businesses to conserve water, such as rebates for low-flow toilets and high-efficiency clothes washers.
- Worked in collaboration with local schools to provide "home audit" kits to fifth graders who report back water savings as part of a school project and taught water conservation to students on water utility facility field trips.
- Offered free informational resources, such as Water-Wise Gardening in the Bay Area guide for water customers.
- Installed low-flow toilets, state of the art irrigation systems and controllers, and drought tolerant plantings in order to reduce water usage in City facilities and parks.
- Replaced turf grass in selected parks with artificial turf which does not require irrigation.
- Installed water fixtures in City buildings that work on a sensor system to conserve water.

Recycling

- Worked as member of South Bay Waste Management Authority (SBWMA) to administer programs to meet and sustain a minimum 50 percent diversion rate mandated by the state.
- Promoted residential and commercial recycling efforts, thereby increasing the solid waste diversion rate over the last several years.
- Implemented residential curbside collection of batteries and cell phones in addition to providing a collection point at City Hall.
- Sponsored annual electronics recycling event.
- Recycled all used lamps and ballasts from City lighting systems.
- Recycled used printer cartridges.
- Purchased "in-unit" recycling containers that the garbage collection contractor distributes to residents of multi-family dwellings.
- Hosted free compost give-away events during the year to utilize green waste collection.
- Participated through the Fire Department in a food waste collection program.
- Passed an ordinance requiring a minimum of 50 percent of the debris generated from certain construction and demolition projects be diverted from landfills to recycling facilities.

Habitat Preservation and Protection

- Maintained storm water system in compliance with National Pollution Discharge Elimination System (NPDES) requirements, reducing pollution of Bay waters.
- Implemented the Foster City Lagoon Management Plan, which directs the use of environmentally friendly products and processes, rather than chemical treatment, to manage lagoon water quality whenever possible.
- Worked with the Audubon Society to create new seasonal wetlands for bird habitat as part of lagoon dredging project.

Other

- Worked as an active member of the Joint Venture Silicon Valley Network Climate Protection Taskforce, Sustainable Silicon Valley and International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability, USA in order to pursue regional climate protection alternatives.
- Ensured that janitorial supplies used in City facilities are environmentally friendly including: low pH diluted cleaning concentrates and renewable resource paper products.

- Developed, through ESTF, goals and recommendations for the Sustainability Action Plan. ESTF met twice a month from July of 2008 through February of 2009. During these meetings, ESTF members learned about and discussed sustainability concepts, current City, county, regional, State and Federal efforts, and considered additional actions for Foster City. ESTF members were informed by dialogue with subject-matter experts and each other, conducted additional research and developed goals and recommendations in subcommittees. The Sustainability Action Plan was used as an important reference document for the Climate Action Plan.

1.7 Relationship of the Climate Action Plan to the General Plan

Foster City is preparing an update to the Land Use and Circulation Element of the City's General Plan concurrent with the preparation of this Climate Action Plan.

The Land Use and Circulation Element provides a vision and strategy to guide sustainability in the City over the timeframe of the General Plan. The Climate Action Plan is a tool that is linked to the General Plan through the Land Use and Circulation Element, but focuses specifically on greenhouse gas emissions reductions. The Climate Action Plan is a shorter-term plan that will be updated on a more frequent basis. Future updates to the Climate Action Plan may warrant subsequent General Plan amendments to ensure that relevant measures are incorporated as appropriate into the City's primary planning document.

The Climate Action Plan identifies and quantifies the impact of the City's sustainability vision, policies, and programs on GHG emissions. The sustainability components of the General Plan and the Climate Action Plan function together as part of the City's comprehensive toolkit to achieve a vibrant and sustainable community.

1.7.1 Application of the General Plan EIR and the Climate Action Plan to Future CEQA Reviews and Specific Projects

The CEQA Guidelines specifically identify the process for using the analysis in an EIR to streamline the environmental analysis of subsequent projects. CEQA Guidelines Section 15168 (c) and (d) describe how a Program EIR may be used with later activities and how the Program EIR may be used to simplify the analysis for subsequent environmental analyses. CEQA Guidelines Section 15168(d)(3), specifically allows subsequent environmental documents to solely discuss new effects which had not been considered before in the Program EIR. As described under CEQA Guidelines Section 15183(a), CEQA mandates that projects that are consistent with the development density established by a general plan for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. CEQA Guidelines Section 15183(b) identifies that, in approving a project that meets the requirements of the section (that is, the project is consistent with development densities established in a community plan, general plan, or zoning for which an EIR was certified), the lead agency shall limit its examination of environmental effects to those which the agency determines, in an initial study or other analysis:

(1) Are peculiar to the project or the parcel on which the project would be located.

(2) Were not analyzed as significant effects in a prior EIR on the zoning action, general plan, or community plan, with which the project is consistent.

(3) Are potentially significant off-site impacts and cumulative impacts which were not discussed in the prior EIR prepared for the general plan, community plan or zoning action.

(4) Are previously identified significant effects which, as a result of substantial new information which was not known at the time the EIR was certified, are determined to have a more severe adverse impact than discussed in the prior EIR.

CEQA Guidelines Section 15183(c) states:

"(c) If an impact is not peculiar to the parcel or to the project, has been addressed as a significant effect in the prior EIR, or can be substantially mitigated by the imposition of uniformly applied development policies or standards, as contemplated by subdivision (e) below, then an additional EIR need not be prepared for the project solely on the basis of that impact."

CEQA Guidelines Section 15183.5 provides further support for this approach to tiering and streamlining the analysis of greenhouse gases, indicating that project-specific environmental documents may rely, through tiering or incorporation by reference, on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in Sections 15152 (tiering), 15167 (staged EIRs), 15168 (program EIRs), 15175–15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning). The Program EIR prepared by the City for the General Plan Land Use and Circulation Element Update, which also addresses this Climate Action Plan, is intended to provide the analysis necessary for the City to use the document as a tiering and streamlining document as provided by CEQA Guidelines Sections 15168 and 15183.

1.7.1.1 Streamlining of GHG Analysis

CEQA Guidelines Section 15183.5 provides support for streamlined analysis of greenhouse gases impacts associated with later project-specific environmental documents. The General Plan EIR and Climate Action Plan provide a programmatic analysis of greenhouse gas emissions and mitigation. The City intends to use the General Plan EIR as a tiering and streamlining document as allowed under Section 15183.5 of the CEQA Guidelines.

Section 15183.5(a) specifies that later project-specific environmental documents may tier from and/or incorporate by reference the programmatic review provided by the General Plan EIR. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in Section 15152 (tiering), 15167 (staged EIRs), 15168 (Program EIRs), 15175–15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).

Section 15183.5(b) allows for the City to determine, analyze, and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions; the Climate

Action Plan analyzes and mitigates greenhouse gas emissions and is consistent with the requirements of Section 15183(b)(1). As set forth in Section 15183.5(b) and pursuant to Sections 15064(h)(3) and 15130(d), the City may use the Climate Action Plan to determine that a subsequent project's incremental contribution to greenhouse gas and climate change impacts is not cumulatively considerable if the project complies with the Climate Action Plan.

For developments wishing to benefit from CEQA streamlining provisions, the City may require voluntary measures in this Climate Action Plan as mandatory conditions of approval or as mitigations in a mitigated negative declaration for an environmental impact report, as appropriate, on a project-by-project basis. This approach allows the City to ensure that new development can benefit from CEQA streamlining provisions while also ensuring that the City is on target to achieve the reduction targets outlined in this Plan.

Any project that is not consistent with the Climate Action Plan would be required to analyze greenhouse gas emissions in a project-level environmental document and would not be able to tier from this EIR.

1.8 Foster City's Climate Action Plan Process

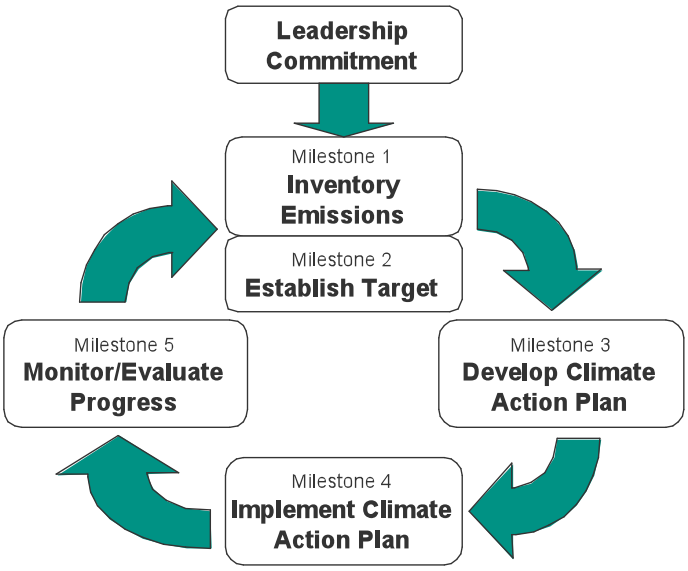
This Climate Action Plan was developed in partnership with the City and County Association of Governments of San Mateo County (C/CAG). C/CAG sponsored a Regionally Integrated Climate Action Planning Suite (RICAPS), which is a set of templates and calculation tools developed in conjunction with DNV KEMA Energy and Sustainability and Hara[16], to assist San Mateo County jurisdictions in the development of their own Climate Action Plans. This effort, together with multi-city working group meetings, assists local governments to develop Climate Action Plans that are consistent with California Environmental Quality Act (CEQA) guidelines and the BAAQMD's CEQA Air Quality Guidelines, updated May 2011. By combining resources, the Climate Action Plan template project promotes high quality Climate Action Plans that can be used to meet regulatory requirements and support planning efforts to reduce GHG emissions. The template project and Foster City's climate strategy is based on the Local Governments for Sustainability (ICLEI) 5-Milestone process as seen in the framework below.

1.8.1 Framework for Climate Action

The ICLEI 5-Milestone process, shown in Figure 1.3, is a management process based on increasing knowledge through each step to achieve the targeted GHG emissions reductions.

[16] DNV KEMA Energy and Sustainability is a global energy consultancy firm that offers management and technology consulting and services to the energy value chain. Hara is an energy management company that assists organizations to collect, analyze, interpret and act on energy and resource data.

Figure 1.3: Iterative Management Processes for Climate Action



Source: ICLEI

- **Leadership Commitment:** Define the overall vision and goals for the community.
- **Milestone 1 (Inventory Emissions):** Conduct a baseline emissions inventory and forecast.
- **Milestone 2 (Establish Target):** Adopt an emissions reduction target for the forecast year.
- **Milestone 3 (Develop Climate Action Plan):** Identify feasible and suitable strategies and supporting actions to reduce emissions and achieve co-benefits aligned with the overall vision and goals.
- **Milestone 4 (Implement Climate Action Plan):** Enact the plan.
- **Milestone 5 (Monitor/Evaluate Progress):** Establish feedback loops to assess and improve performance, including an assessment and adjustment of the necessary human, financial and data resources.

In November 2009, all San Mateo County member jurisdictions completed their 2005 community and municipal GHG inventories as part of a joint effort with ICLEI, Joint Venture Silicon Valley Network, the County of San Mateo and funded by C/CAG. This C/CAG Climate Action Plan template project follows this framework by assisting member jurisdictions with Milestones 2 and 3. The City of Foster City is responsible for implementing the actions identified in this Climate Action Plan to complete Milestone 4.

To support Milestone 5, C/CAG is developing forecasting and calculation tools to allow its member jurisdictions to track total community GHG emissions. The tool will assist cities to monitor the effectiveness of emissions reduction efforts. Specifically, C/CAG is working with Hara, Inc., a software provider, to develop a customized online solution that may be used by each City in the County to track GHG emissions and emission reductions achieved from various strategies. More information about the Hara tool is provided in the Users Guide for this Template document.

1.8.2 Public Outreach and Community Engagement

During Summer 2012, Foster City held a Public Scoping Session with the Planning Commission to accept comments from the public on the scope of the EIR that will be prepared for the Land Use and Circulation Element Update for which this Climate Action Plan is a part, and is planning future public input sessions to review this Climate Action Plan.

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Chapter 2: Greenhouse Gas Emissions Inventory

The emissions inventory provides an important foundation for the Climate Action Plan. It provides a baseline year, 2005, against which progress is measured as the City makes progress toward its goal of reducing greenhouse emissions 15 percent by 2020 and 20 percent by 2025. This inventory identifies the sources and quantifies the volumes of Greenhouse Gas (GHG) emissions resulting from activities taking place throughout the community of Foster City in 2005.

In 2010, the City of Foster City completed a GHG Emissions Inventory for 2005, with support and training from ICLEI. To assist San Mateo County jurisdictions in meeting BAAQMD's California Environmental Quality Act (CEQA) guidelines for Qualified GHG Reduction Strategies, the City/County Association of Governments of San Mateo County (C/CAG) utilized grants from the Bay Area Air Quality Management District (BAAQMD) and Pacific Gas and Electric Company (PG&E) from 2010 onwards to develop new tools. The new tools, termed the Regionally Integrated Climate Action Planning Suite, or RICAPS, were utilized to make modifications to and strengthen the 2005 Greenhouse Gas Emissions Inventory, as well as calculate emissions for 2010 as part of forecasting emissions to 2020, 2025, and beyond.

2.1 Inventory Sources and Data Collection Process

An inventory of GHG emissions requires the collection of data from a variety of sectors and sources. The emissions inventory completed for the City of Foster City follows the standards outlined in the BAAQMD's GHG Plan Level Quantification Guidance[1], and the International Local Government GHG Emission Analysis Protocol (IEAP)[2]. Table 2.1 summarizes the sectors, emissions sources, and energy types included in Foster City's GHG inventory. Foster City does not have industrial and agricultural land uses, therefore those sectors have been omitted from the inventory. The GHG emissions inventory tallied both municipal and community-wide emissions of GHGs. Municipal sector emissions are attributable to local government (City) operations and local government use of resources, and are calculated and reported because municipalities generally have more control over these emissions than emissions from the other community-wide sectors. The community-wide GHG emissions inventory includes all sources of GHG emissions that are emitted within the City limits. However, in the context of the community-wide inventory, the municipal emissions are included in the commercial sector.

[1] This report utilized BAAQMD's GHG Plan Level Quantification Guidance, last updated May 2012. http://www.baaqmd.gov/

[2] The IEAP consists of the general principles and philosophy that any local government, regardless of location, should adhere to when inventorying GHGs from its government operations and community as a whole.

Table 2.1: Sectors and Emissions in the GHG Inventory

Sector	Emissions sources	Energy types
Energy (Residential)	Energy in residential buildings	Electricity Natural gas
Energy (Commercial)	Energy in commercial, government and institutional buildings	Electricity Natural gas
Transportation and Land Use	All road vehicles Public transportation Off-road vehicles/equipment	Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel
Waste	Landfills Waste stream	Landfill gas (methane)
Water use and Water Treatment	Water use in residential, commercial, government and institutional buildings, requiring energy use Energy use for treatment processes Direct methane emissions from treatment process	Electricity

This inventory also utilized the most recent version of the Local Government Operations Protocol (LGOP, version 1.1)[3]. As the community-wide greenhouse gas emission protocol was still under development at the time this Climate Action Plan was written, the community-wide GHG inventory utilized industry-accepted methodologies for quantifying emissions that occur from combustion sources within City limits and from electricity consumption. Lifecycle emissions associated with goods and products procured by communities and residents are not included in this Greenhouse Gas Inventory.

Carbon dioxide equivalents are a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

The GWP of a given gas describes its effect on climate change relative to a similar amount of carbon dioxide. According to the USEPA, the following six gasses are considered GHGs, and their respective GWP is shown in Table 2.2 below.

[3] Local Government Operations Protocol is a protocol used for the quantification and reporting of greenhouse gas emissions inventories. It was developed in partnership by California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and The Climate Registry. Version 1.1, May 2010.

Table 2.2: Greenhouse Gases

Gas	Chemical Formula	Human Activity	Global Warming Potential over 100 years	Lifetime in Atmosphere
Carbon Dioxide	CO_2	Combustion	1	50-200 years
Methane	CH_4	Combustion, Anaerobic Decomposition of Organics (Landfills, Wastewater), Fuel Handling	21	12 years
Nitrous Oxide	N_2O	Combustion, Wastewater Treatment	310	120 years
Hydrofluorocarbons	Various	Leaked Refrigerants, Fire Suppressants	43-11,700	1-270 years
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC Equipment Manufacturing	6,500-9,200	800-50,000 years
Sulfur Hexafluoride	SF_6	Transmission and Distribution of Power	23,900	3,200 years

Global Warming Potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. Carbon Dioxide is used as the standardized base for comparison, and has a GWP of 1. Methane has a GWP of 21 over 100 years, meaning it will trap 21 times more heat than Carbon Dioxide over a period of 100 years. In general, the three types of fluorinated gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) are the most potent and long-lasting type of greenhouse gases. They have no natural sources and are solely emitted by human activities.

Emission factors are used to convert energy usage or other activity data into associated emissions quantities. They are typically expressed in terms of emissions per unit of activity data (e.g. lbs CO_2/kWh). Please see **Appendix A** for a listing of emissions factors used in this report.

2.2 Emission Scopes

Emissions sources can be categorized according to where they fall relative to the geopolitical boundary of the community (i.e. the City boundaries). Using this method, emissions sources are categorized as direct or indirect emissions – Scope 1, Scope 2, or Scope 3 – in accordance with the World Resources Institute and the World Business Council for Sustainable Development's Greenhouse Gas Protocol Corporate Standard. This standard is important as it helps local government better understand the sources of emissions and the extent to which it can directly control those emissions.

The Scopes framework identifies three emissions scopes for community emissions:

Scope 1: All direct emissions from sources located within the City's boundaries. Typical Scope 1 emissions include natural gas combustion emissions, emissions from fuel combustion by vehicles and off-road equipment, and methane emissions from biodegrading waste in landfills within community boundaries.

Scope 2: Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling. Scope 2 emissions occur as a result of activities that take place within the City's boundaries, but that occur at sources located outside of the City's boundaries.

Scope 3: All other indirect or embodied emissions not covered in Scope 2, that occur as a result of activity within the City's boundaries. Common Scope 3 emissions are future emissions from organic waste disposed of in the base year, emissions from air travel or ports, and "upstream" emissions (emissions generated in the production of materials used in the community).

Scope 1 and Scope 2 sources are the most essential components of a community greenhouse gas analysis. These sources are typically the most significant in scale, and are most easily impacted by local policy making. The International Local Government GHG Emission Analysis Protocol (IEAP) also includes, in its Global Reporting Standard, the reporting of Scope 3 emissions associated with the decomposition of solid waste and sewage waste-water produced within the geopolitical boundaries of the local government.

One of the most important reasons for using the scopes framework for reporting greenhouse gas (GHG) emissions at the local level is to prevent "double counting" for major categories such as electricity use and waste disposal. Double counting occurs if a set of emissions could be considered twice within an inventory. For example, if a local government produced its own power, it would be considered a Scope 1 emission at the point of generation and a Scope 2 emission at the point of consumption, and it would be inappropriate to add these emissions together. This may also occur if a local government has an active landfill within its boundaries to which community waste is sent. This report sums, or "rolls up" emissions from many scopes into one number, but also clearly identify the types of emissions included in the rollup numbers.

Table 2.3 below organizes activities in the Community Wide GHG Inventory into their respective Scopes.

Table 2.3: 2005 Community Emissions by Activity Type in Foster City

	Activity Amount	Units	Net Emissions: CO2e (tones)
Scope 1 Emissions			
Commercial Natural Gas	3,129,995	therms	16,646.3
Direct Access Natural Gas	1,723,863	therms	9,168.1
Vehicles on Local Roads	117,000,000	Vehicle miles traveled	56,890.0
Off road equipment	26,320	units	11,435.0
Residential Natural Gas	5,297,949	therms	28,176.2
Vehicles on State Highways	195,000,000	Vehicle miles traveled	94,975.9
Sum for Scope 1 (direct emissions from sources located within Foster City)			**217,291.5**
Scope 2 Emissions			
Commercial Electricity	117,036	megawatt hours	26,182.3
Direct Access Electricity	24,455	megawatt hours	10,676.8
Residential Electricity	73,389,689	kilowatt hours	16,418.1
Sum for Scope 2 (Indirect emissions due to consumption of purchased or acquired electricity, steam, heating, and cooling)			**53,277.2**
Scope 3 Emissions			
Alternative Daily Cover	86	short tons (US tons)	9
Landfilled Solid Waste	22,698.00	short tons (US tons)	4,144.0
Sum for Scope 3 (All other indirect emissions not covered in Scope 2, which occur due to activity within Foster City)			**4,153.0**
Total			**274,721.7**

Note: Data taken from January 1, 2005 to December 31, 2005.
Sources: PG&E, Department of Transportation and Caltrans, Bay Area Air Quality Management District, Association of Bay Area Governments, California Integrated Waste Management Board Disposal Reporting System, Allied Waste of San Mateo County, and the City.

This Climate Action Plan does not include emission calculations for the delivery of water from the source (Hetch-Hetchy Valley) to Foster City, as these emissions are considered insignificant due to the role that gravity plays in the delivery of water to the Bay Area. Currently it is not common practice for jurisdictions to calculate water emissions.

2.3 Baseline Emissions Inventory for 2005

In the base year of 2005, the City of Foster City emitted approximately 274,722 metric tons of carbon dioxide equivalent[4] (CO_2e) from the residential, commercial, transportation, waste, and municipal sectors. (Foster City has no industrial or agricultural sectors, however light industrial is included in commercial uses for this analysis.) Municipal sector emissions are calculated and reported because municipalities generally have more control over these emissions than emissions from the other community-wide sectors. The City of Foster City has identified specific policies and programs to reduce these municipal emissions. However, in the context of the community-wide inventory, the municipal emissions are included in the commercial sector. Burning fossil fuels in vehicles and for energy use in buildings and facilities is the largest contributor to Foster City's GHG emissions. Table 2.4 provides a summary of total Citywide (i.e. community and municipal) GHG emissions.

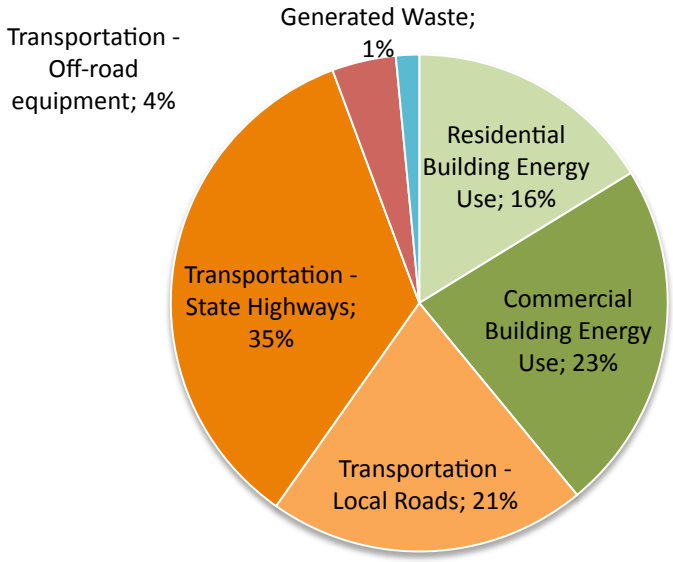
Table 2.4: 2005 Community Emissions by Sector in Foster City

Sector	Greenhouse Gas Emissions (metric tons CO_2e)	Percentage of Greenhouse Gas Emissions
Residential Building Energy Use	44,594	16 %
Commercial Building Energy Use	62,674	23 %
Transportation – Local Roads	56,890	21 %
Transportation – State Highways	94,976	35 %
Transportation – Off-road equipment	11,435	4 %
Generated Waste	4,153	1 %
TOTAL	**274,722**	100 %

The residential and commercial sectors represent emissions that result from electricity and natural gas used in both private and public sector buildings and facilities. The transportation sector includes emissions from private, commercial, and fleet vehicles driven within the City's geographical boundaries, as well as the emissions from transit vehicles and the City-owned fleet. Off-road equipment includes lawnmowers, garden equipment, and construction, industrial, and light commercial equipment. Figure 2.1 shows the proportion of Foster City's total GHG emissions from all major sources for 2005.

[4] Carbon dioxide equivalent is a unit of measure that normalizes the varying climate warming potencies of all six GHG emissions, which are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). For example, one metric ton of methane is equivalent to 21 metric tons of CO_2e. One metric ton of nitrous oxide is 310 metric tons of CO_2e.

Figure 2.1: Community Emissions by Sector[5] (2005)



As shown above, the largest categories of emissions are related to transportation (highway travel, local travel, and off-road equipment) and building energy use (both residential and commercial).

2.3.1 Electricity and Natural Gas Emissions

Data on electricity and natural gas usage in Foster City was provided by PG&E. This included electricity and natural gas usage for both residential and commercial sectors. Direct access electricity and gas was also included, where the end use customer bought electricity or natural gas on the wholesale market from a competitive Energy Service Provider, rather than from PG&E. Although purchased from an alternative Energy Service Provider, the electricity is delivered through PG&E's transmission and distribution systems. Direct access gas may be delivered through PG&E's systems, or directly to customers. Estimations of electricity and natural gas purchased through Direct Access contracts were derived from County level Direct Access consumption figures, provided by the California Energy Commission. Table 2.5 below shows the usage of electricity and natural gas in the residential and commercial sectors.

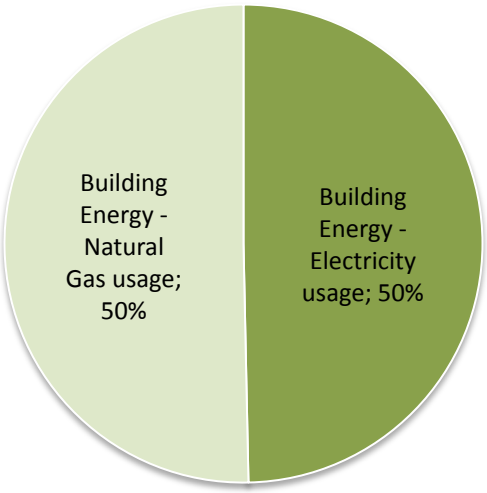
[5] While Foster City's water treatment and conveyance emissions are not displayed separately in the chart above, they have been accounted for in the commercial/industrial and residential building energy sectors.

Table 2.4: Foster City Residential and Commercial usage of electricity and natural gas, 2005

Sector	Activity Amount	Emissions (metric tons CO_2e)
Residential Electricity	73,390 Megawatt hours	16,418.1
Commercial Electricity	117,036 Megawatt hours	26,182.3
Direct Access Electricity	24,455 Megawatt hours	10,676.8
Total Electricity Usage	**214,881 Megawatt hours**	**53,277.2**
Residential Natural Gas	5,297,949 Therms	28,176.2
Commercial Natural Gas	3,129,995 Therms	16,646.3
Direct Access Natural Gas	1,723,863 Therms	9,168.1
Total Natural Gas Usage	**10,151,807 Therms**	**53,990.6**

The total emissions in metric tons CO_2e resulting from building electricity usage is about the same as the total emissions resulting from natural gas usage. Hence, electricity and natural gas usage each contribute approximately 50 percent of the total building energy emissions for Foster City, as illustrated in Figure 2.2 below.

Figure 2.2: Building Energy Emissions by Fuel Type



It is important to note that emissions associated with the generation of electricity, which make up a significant portion of the greenhouse gasses associated with building energy, can vary widely from year to year. The GHG emissions associated with electricity use are based on an emissions factor specific to PG&E's territory, calculated annually by PG&E, and then made available to Cities[6]. PG&E's specific emissions factor is calculated by dividing PG&E's total emissions from their power plants (in pounds of CO_2) by the total amount of electricity (in megawatt-hours or MWh) delivered to end users. This factor varies year over year because

[6] The 2005 baseline inventory uses an emissions factor for 2005 listed in the local PG&E Power/Utility Protocol spreadsheet of the PG&E California Climate Action Registry Report. In future inventory years, the emission factor may be found in the Additional Optional Information tab of PG&E's Electric Power Sector report spreadsheet, which is part of PG&E's Report to The Climate Registry. A three-year average emissions factor could be used in the future to address the large variance that may occur from year to year.

PG&E's electricity sources change[7]. For PG&E, the variance is typically dependent on the availability of hydroelectric resources. During low precipitation years, there is less water available to generate emissions-free hydropower. Because of this, PG&E must compensate by supplying more electricity generated from natural gas or coal.

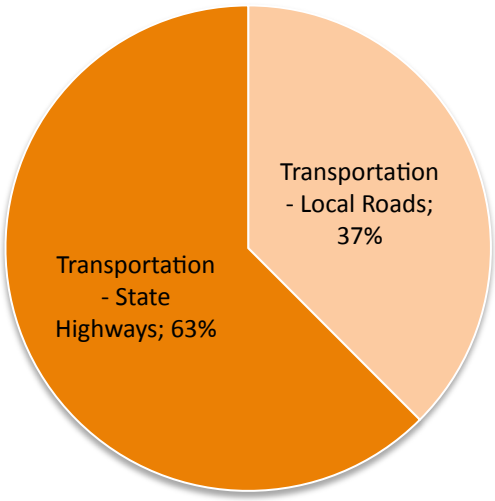
Emissions from natural gas usage are calculated using emissions factors from the same PG&E Power/Utility Protocol document mentioned above.

2.3.2 Transportation Emissions

Data for Vehicle Miles Traveled (VMT) for Local Roads and State Highways was obtained from the Department of Transportation and Caltrans Geographic Information Systems files respectively. The VMT for State Highways was split equally between jurisdictions for areas where the highway was on the border of two jurisdictions. Based on assumptions provided by the BAAQMD, VMT was broken down into gas and diesel portions based on a VMT mix assumption, then converted into gallons of fuel using fuel efficiency factors. Greenhouse gases were then calculated from the resulting fuel consumption using emission factors provided by the BAAQMD.

Arguably, Foster City has little to no control over the emissions caused by vehicles on State highways (in this case, emissions from Highway 92 are included in the inventory). While this is true, it is still necessary to document the emissions from State highways, particularly because Foster City is able to take credit for State-level actions that target vehicle emissions from both local roads and State highways, and this is reflected in the greenhouse gas reduction target and related calculations. The Climate Action Plan also focuses on measures that would reduce the greenhouse gas emissions caused by vehicles on local roads. Please see Chapter 3 for more details.

Figure 2.3: Transportation Emissions – Highways v. Local Travel



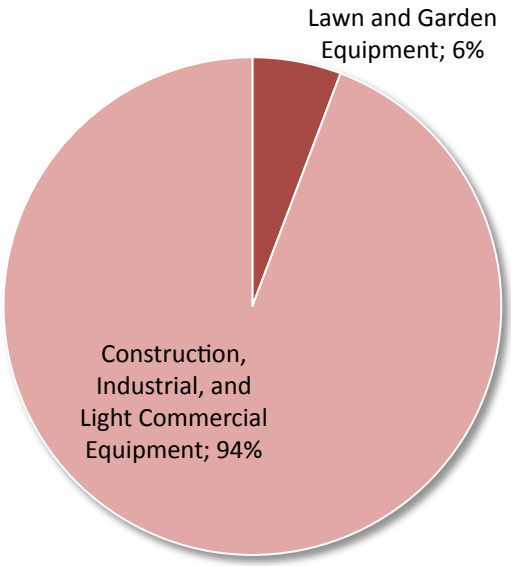
[7] For instance, the utility specific emissions factor for PG&E in 2006 was 455.81 lbs/MWh, whereas in 2008 it was 641.35 lbs/MWh.

2.3.3 Off-road Emissions

Off-road emissions refer to emissions from mobile, off-road sources. These sources are not on roads, or related to roads or transportation. Rather, they include lawn and garden equipment, and construction, industrial, and light commercial equipment. Foster City's off-road emissions were calculated based on its share of county-wide emissions, which were derived using methods in the San Mateo County Community-scale GHG Inventory template produced by ICLEI and C/CAG.

Foster City's share of county-wide lawn and garden equipment emissions was estimated based on Foster City's share of households in the County. Foster City's share of construction, industrial, and light commercial equipment emissions was based on Foster City's share of employment in the County. See **Appendix A** for details. Figure 2.4 below shows the breakdown between these two sources of emissions.

Figure 2.4: Off-road Emissions – Household Equipment v. Commercial Equipment



2.3.4 Solid Waste

Foster City recorded two different types of solid waste for 2005: Landfill solid waste and Alternative Daily Cover. Landfill waste made up nearly all of the emissions recorded for 2005 at 99.8 percent, and Alternative Daily Cover at 0.2 percent. Most of the waste was transported to Ox Mountain Sanitary Landfill[8], with the rest transported and disposed at various other landfills in California. Alternative Daily Cover is material other than soil used as a temporary overlay on an exposed landfill face. Approved materials include processed green materials, sludge, ash and kiln residue, compost, construction and demolition debris, and special foams and fabrics.

[8] The Ox Mountain Sanitary Landfill began using methane capturing technologies to generate power in 2009, generating 11.5 megawatts of electricity, approximately twice that of most local landfills.

Emissions from waste are due to organic materials decomposing in the anaerobic environment of a landfill. This produces methane, which is 21 times more potent than carbon dioxide. Organic materials (e.g., paper, plant debris, food waste, and so forth) generate methane within the anaerobic environment of a landfill, while non-organic materials do not (e.g., metal, glass, and so on). Table 2.6 shows the approximate breakdown of the materials Foster City sent to landfills in 2005. Materials that do not release GHGs as they decompose are included in the "All Other Waste" category.

Emissions from the waste sector are an estimate of methane (CH_4) generation that will result from the anaerobic decomposition of all waste sent to landfill in the base year (2005). Although these emissions are attributed to the inventory year in which the waste is generated, the emissions themselves will occur over the approximately 100-year timeframe that the waste will decompose. This frontloading of emissions is the approach taken by the United States Environmental Protection Agency's (EPA) Waste Reduction Model (WARM). Attributing all future emissions to the year in which the waste was generated incorporates all emissions from actions taken during the inventory year into that year's greenhouse gas inventory. This facilitates comparisons of the impacts of actions taken between inventory years and between jurisdictions. It also simplifies analysis of the effectiveness of actions taken to reduce waste generation or divert waste from landfills.

The assumed waste composition is taken from the California Integrated Waste Management Board (CIWMB) in a 2004 report on waste characterization[9]. CIWMB was the former California State agency dealing with recycling and waste reduction, but was abolished in 2010 and its duties transferred to the California Department of Resources Recycling and Recovery (CalRecycle).

Table 2.5: Assumed Waste Composition and Emissions

Waste Type used in calculations	CIWMB's Waste Categories	Waste Share	Emissions (metric tons CO_2e)
Paper Products	All paper types	21.0 %	872.1
Food Waste	Food	14.6 %	606.3
Plant Debris	Leaves and Grass, Prunings and Trimmings, Branches and Stumps, Agricultural Crop Residues, and Manure	6.9 %	286.6
Wood/Textiles	Textiles, Remainder/Composite Organics, Lumber, and Bulky Items	21.8 %	905.4
All Other Waste	The other category includes all inorganic material types reported: Glass, Metal, Electronics, Plastics, Non-organic C&D, and Special/Hazardous Waste	35.7 %	1482.6
Total		**100 %**	**4,153**

[9] Waste characterization: CIWMB 2004 Statewide Waste Characterization Study. This State average waste characterization accounts for residential, commercial and self-haul waste. http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

2.3.5 Municipal Operations

Municipal Operations make up 1 percent of the total emissions in Foster City. Transportation-related emissions, including those generated from employee commutes and vehicle and transit fleets, account for the largest source at 48 percent of municipal operations. Buildings and facilities account for 26 percent of municipal emissions, with the Civic Center generating the most at 62 percent.

Emissions sources such as airport facilities, port facilities, power generation facilities, solid waste facilities, and other fugitive emissions other than leaked refrigerants were not included. This is because Foster City does not have any airport or port facilities, nor does it have power generation or solid waste facilities. With the exception of building and fire extinguisher refrigerants, gases from pressurized equipment due to leaks were not detected or recorded. Data from power generated and solid waste handled outside of City limits is included in the County or City data in which those facilities are located.

Table 2.7 and Figure 2.5 below show a summary of the emissions from Government Operations in 2005.

Table 2.6: 2005 Foster City Government Operations Emissions by Organization

Sector	Government Operations Greenhouse Gas Emissions (metric tons CO_2e)	Percent of total Governments Operation Emissions
Buildings and Other Facilities	777.8	26%
Employee Commute	772.9	25%
Government-generated Solid Waste	145.5	5%
Refrigerants	19.7	1%
Streetlights and Traffic Signals	406.3	13%
Vehicle and Transit Fleet	695.4	23%
Wastewater Facilities	29.1	1%
Water Delivery Facilities	186.5	6%
TOTAL	**3,033.1**	**100%**

Figure 2.3: Municipal Operations – Greenhouse Gas Emissions

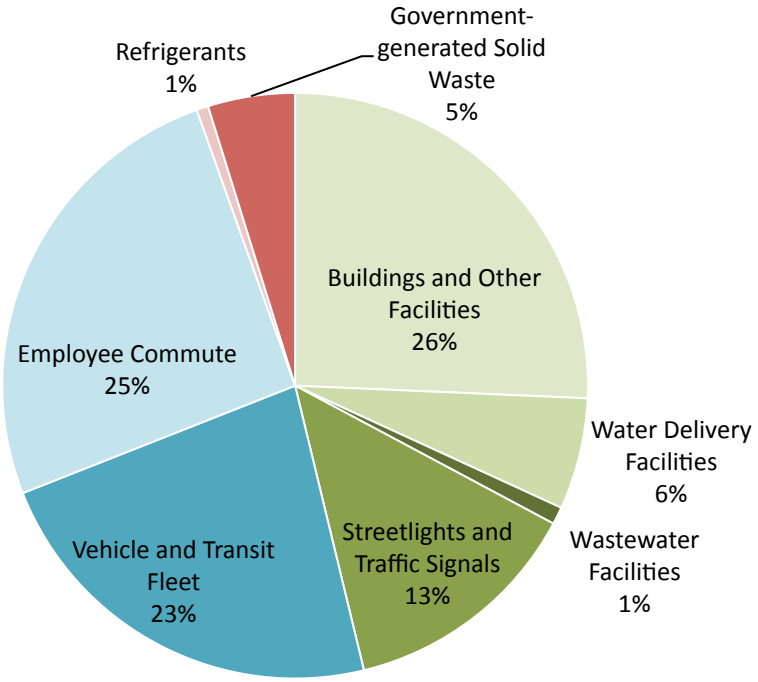


Table 2.8 below provides more details on the various sectors listed above.

Table 2.7: Detailed descriptions of 2005 Government Operations Sectors and Emissions

Sector	Organizational and categorical descriptions	Type of Activity	Data Source
Buildings and Other Facilities	**Major Facilities** included the Civic Center, Library and Community Center, Maintenance Facility, Recreation Building, Teen Center, and Parks / Restrooms / Ball Fields. **Minor facilities** included wireless transmitters for the purpose of cellular and data communications throughout Foster City.	Emissions generated from electricity and natural gas consumption.	City staff and PG&E
Water Delivery Facilities	Water Delivery Pumps, Sprinklers/Irrigation Control, Landscaping Irrigation, and other pumps and motors.	Emissions generated from electricity and natural gas consumption.	City staff & PG&E
Wastewater Facilities	Emergency Generators at 15 lift stations (ie. pumping stations) throughout Foster City.	Emissions generated from diesel fuel consumption.	City staff
Refrigerants	Refrigerant leaks and replaced fire extinguishers at municipal facilities.	Emissions generated from R22 and Halon 1211 refrigerants.	City staff
Vehicle and Transit Fleet	Fuel consumed and vehicle miles traveled for vehicles used for City business and managed by the Police, Parks and Recreation, Public Works, Fire, Community Development, City Manager, Finance, and Human Resources Departments, and the Senior Vehicle Fleet run by the City.	Emissions generated from Gasoline and Diesel consumption, with adjustments for different vehicle sizes. No Compressed Natural Gas (CNG) or biodiesel vehicles were used in 2005.	City staff
Government-generated Solid Waste	Waste generated from City operations, Corporation Yard, Library, City Hall, Sea Cloud Park, and Recreation Center.	Emissions from landfill and landfill cover generated by government-run facilities in 2005.	Allied Waste of San Mateo County
Employee Commute	Fuel consumed and vehicle miles traveled by City employees to work.	Emissions generated from Gasoline and Diesel consumption, based on a detailed survey for City employees. Employees who responded to the City's survey did not use CNG or biodiesel vehicles.	City staff

Chapter 3: Emissions Forecast and Reduction Goals

3.1 Emissions Forecast for 2020, 2025 and 2050

Based on the 2005 community and municipal operations emissions inventories, the City of Foster City projected a forecast of future emissions for the years 2020, 2025 and 2050. The emission forecast represents a "business-as-usual" prediction of how GHG emissions would grow in the absence of GHG policies and measures to reduce GHG emissions. Conducting an emissions forecast is essential for developing the climate action plan because one must compare future reductions with future emissions levels, not current levels.

The projected business-as-usual GHG emissions are based on the emissions from the existing growth pattern and General Plan prior to the adoption of this Climate Action Plan. More specifically, business-as-usual emissions would occur if the City of Foster City were to continue its 2005 patterns of travel, energy and water consumption, and waste generation and disposal. Therefore, the business-as-usual emissions are projected in the absence of any mitigation measures, policies or actions that would reduce emissions over time, including landmark State legislation described in section 1.3. Programs, policies, and measures implemented after 2005 are considered beyond business-as-usual. The projections from the baseline year of 2005 use growth factors specific to each of the different economic sectors. Table 3.1 below summarizes the results of the forecast to 2020, 2025, and 2050. The forecast to 2020 and 2050 assist in determining the annual reduction in emissions required by the year 2020 and 2050 to fulfill AB 32 and Executive Order S-3-05 respectively, whereas the forecast to 2025 assists in determining the annual reduction in emissions required by year 2025 for the Climate Action Plan to be used as a CEQA mitigation document for future projects. The 2025 forecast represents the total greenhouse gas emissions in 2025 due to the total potential buildout of Foster City, as planned for in the 2025 General Plan.

Table 3.1: Foster City "Business as Usual" Emissions Forecast for 2020 and 2025

Emissions Sources	2005 ($MTCO_2$)	Annual Growth Rate	2020 (Projected $MTCO_2e$)	2025 (Projected $MTCO_2e$)	2050 (Projected $MTCO_2e$)
Residential	44,594	0.39%	47,279	48,209	52,648
Commercial/Industrial	62,674	0.88%	71,438	74,624	88,967
Transportation	163,301	1.044%	190,830	201,001	245,888
Waste	4,153	0.39%	4,403	4,490	4,903
TOTAL	**274,722**	**0.89%**	**313,950** (14.3% increase from 2005)	**328,234** (19.5% increase from 2005)	**392,407** (42.8% increase from 2005)

The emissions forecast was projected for each sector, as specific factors would affect each sector differently (e.g. new building energy codes or new fuel economy standards for vehicles). This approach provides a better approximation of future emissions. The following explains how the emissions forecast was estimated for each sector:

- For the residential energy sector, the compounded annual population growth rate was calculated at 0.39 percent from 2005 through 2020, 2025, and 2050 using population projections from the Association of Bay Area Governments (ABAG)[1].

- For the commercial energy sector, the City of Foster City relied on the analysis contained within "California Energy Demand 2008-2018: Staff Revised Forecast,"[2] a report by the California Energy Commission (CEC), which shows that commercial floor space and the number of jobs have closely tracked the growth in energy use in the commercial sector. Using regional job projections for the San Francisco Bay Area from ABAG's *Projections 2009,*[3] the compounded annual growth in energy use in the commercial sector from 2005 to 2020 was calculated to be 0.88 percent. This growth rate was projected out to 2025 and 2050 to estimate commercial energy growth for these benchmark years as well.

- Title 24 Energy Efficiency Standards, established to reduce California's energy consumption for both residential and commercial energy sectors, were not considered in the business-as-usual forecast calculations, as is typical practice in Climate Action Plans. These standards are upgraded to increasingly stringent standards every three to five years, and therefore would be difficult to reflect accurately as a global emissions reduction in the Climate Action Plan. Rather, its impact is reflected in the calculations for specific measures.

- For transportation, the City of Foster City relied on the Metropolitan Transportation Commission report, "Travel Forecasts Data Summary: Transportation 2035 Plan for the San Francisco Bay Area" from December 2008, in which MTC projects that average weekday vehicle miles of travel (VMT) will increase at an annual rate of 1.044 percent per year through 2020.[4] The recently passed Federal Corporate Average Fuel Economy standards and the State of California's pending tailpipe emission standards could significantly reduce the demand for transportation fuel in Foster City. An analysis of potential fuel savings from these measures has <u>not</u> been included in this business-as-usual forecast. Regardless of future changes in the composition of vehicles on the road as a result of State or Federal rulemaking, emissions from the transportation sector will continue to be largely determined by growth in VMT.

- For waste-related emissions growth, the primary determinate for growth in emissions for the waste sector is population. Therefore, the compounded annual population growth rate for 2005 to 2020, 2025, and 2050 of 0.39 percent (the same as the residential sector projection) was used to estimate future emissions in the waste sector.

Development patterns and the rate and pace of growth in the residential and jobs sectors are dictated largely by market conditions, and as such, can fluctuate over time. It is acknowledged that the City has recently approved some development projects that may not have been

[1] Association of Bay Area Governments Projections 2009
[2] http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF
[3] http://www.abag.ca.gov/planning/currentfcst/regional.html
[4] Report available at: http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf. Compounded annual growth rate for 2006-2020 is calculated from Table F.4 on Page 129 and Table F.5 on Page 131 of the report.

accounted for in the 2009 ABAG population and employment projects. These projects include the Gilead Sciences Corporate Campus Master Plan expansion, the Chess-Hatch Commercial/Industrial/Office redevelopment project, and the Pilgrim Triton Master Plan. Approval of these projects occurred after 2005, and could potentially lead to employment growth rates in excess of the ABAG projections. However, each of these projects are required to incorporate a range of GHG emissions reductions measures, which will further assist the City in meeting the emissions reduction targets described below. The GHG reduction plans, including required Transportation Demand Management Plans required for these projects are in accordance with, and consistent with, the measures and policies contained in this Climate Action Plan.

3.2 Emission Reduction Targets

The *California AB 32 Scoping Plan* seeks to bring California to a low carbon future, reaching 1990 emissions levels by 2020. As part of that reduction, the plan encourages municipal governments to reduce their emissions to 1990 levels by 2020, which is an approximate 15 percent reduction from today's levels by 2020 ("today's levels" are defined as 2008 levels or earlier). However, since 1990 data on a jurisdictional level may not be available, the Air Resources Board suggests that local governments set their targets based on today's levels, using the most current and best available greenhouse gas emission data[5]. The plan also directs local governments to assist the State in meeting California's emissions goals. Many cities have consequently adopted community-wide emissions reduction targets at least 15 percent below 2005 levels by 2020. Some cities in the Bay Area have sought even stricter emissions targets. For example, since 2002, the City of San Francisco has sought to reduce its emissions to 20 percent below 1990 levels by 2012[6]. Per the Local Government Toolkit developed by the California Air Resources Board, The Climate Registry, and ICLEI, cities in California are encouraged to adopt a 15 percent reduction target by 2020 for municipal operations and the community as a whole, based on the most current GHG inventory conducted.

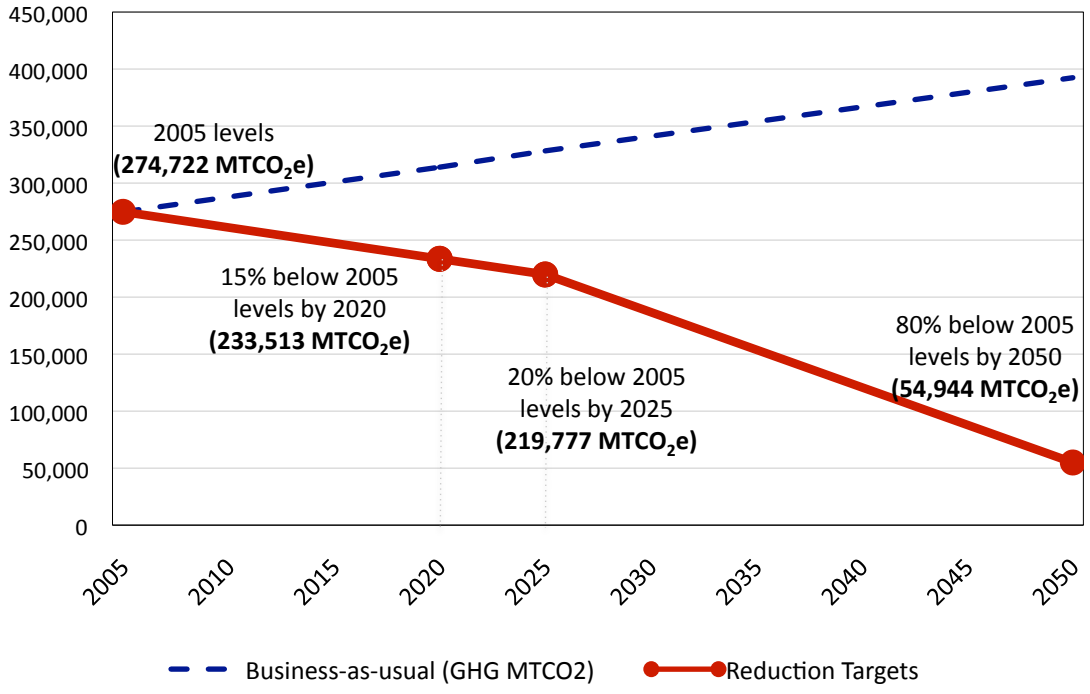
The AB 32 target of reducing GHG emissions to 1990 levels by 2020 represents the initial step toward achieving the longer term goal of Executive Order S-3-05 established for California, which calls for reducing GHG emissions to 80 percent below 1990 levels by 2050.

3.3 Foster City's Reduction Targets for 2020, 2025, and 2050

Figure 3.1 below illustrates how the business-as-usual emissions are estimated to increase, thus widening the emissions reductions needed by 2020, 2025, and 2050 respectively. The emissions reductions needed to reach the three targets of 15 percent below 2005 by 2020, 20 percent below 2005 by 2025, and 80 percent below 2005 by 2050 are also shown.

[5] California Air Resources Board. http://www.arb.ca.gov/cc/localgovernment/localgovernment.htm
[6] City of San Francisco 2004. *Climate Action Plan*. http://www.sfenvironment.org/downloads/library/climateactionplan.pdf

Figure 3.1: Foster City GHG Reduction Targets for 2020, 2025 and 2050



This Climate Action Plan document is based on the 2020 reduction target to comply with AB 32. If Foster City successfully implements all the measures in this Climate Action Plan and achieves the 15 percent reduction goal by 2020, it will be able to continuously reduce its GHG emissions and attain a 20 percent reduction by 2025.

The 15 percent emission reduction target by 2020 means a reduction of 80,437 metric tons of CO_2e from the BAU projections by 2020 as shown in Table 3.2 below. The amount of reductions required would be accomplished through measures at the State and regional level, and also measures implemented at the local level by Foster City. Chapter 4 discusses in detail the actions that Foster City has taken, or is planning to take to reduce emissions within the community.

Table 3.2: Comparison of GHG Emissions Projection and Reduction Target

2005 Emissions ($MTCO_2e$)	2020 Target Emissions at 15% below 2005 ($MTCO_2e$)	2020 BAU Emissions ($MTCO_2e$)	Emissions Reductions Required to reach target emissions in 2020 ($MTCO_2e$)
274,722	233,513	313,950	**80,437**
2005 Emissions (MTCO2e)	**2025 Target Emissions at 20% below 2005 (MTCO2e)**	**2025 BAU Emissions (MTCO2e)**	**Emissions Reductions Required to reach target emissions in 2025 (MTCO2e)**
274,722	219,777	328,234	**108,457**

3.4 Reductions from State-Level Actions

Regulations aimed at reducing GHG emissions at the State and regional levels will contribute significantly to emissions reductions in Foster City. A summary of the expected emission reductions from State programs is provided in Table 3.3 below. It includes:

- AB 1493 (the Pavley Bill), aimed at reducing GHG emissions from motor vehicles, is expected to reduce GHG emissions Statewide by 19.7 percent by 2020;
- Low Carbon Fuel Standard (LCFS), adopted in 2007 to establish a GHG standard for transportation fuels to reduce alternatives to oil and reduce GHG emissions, is expected to reduce on-road transportation emissions by 7.2 percent by 2020 (separate from the Pavley Bill); and
- The California Renewable Portfolio Standard (RPS), which mandates that 33 percent of electricity sold by the State's investor-owned utilities must be generated from renewable resources by 2020. The impact of the RPS rule is projected to result in an additional 21 percent of GHG reductions. The RPS rule is expected to remain the same through 2025.

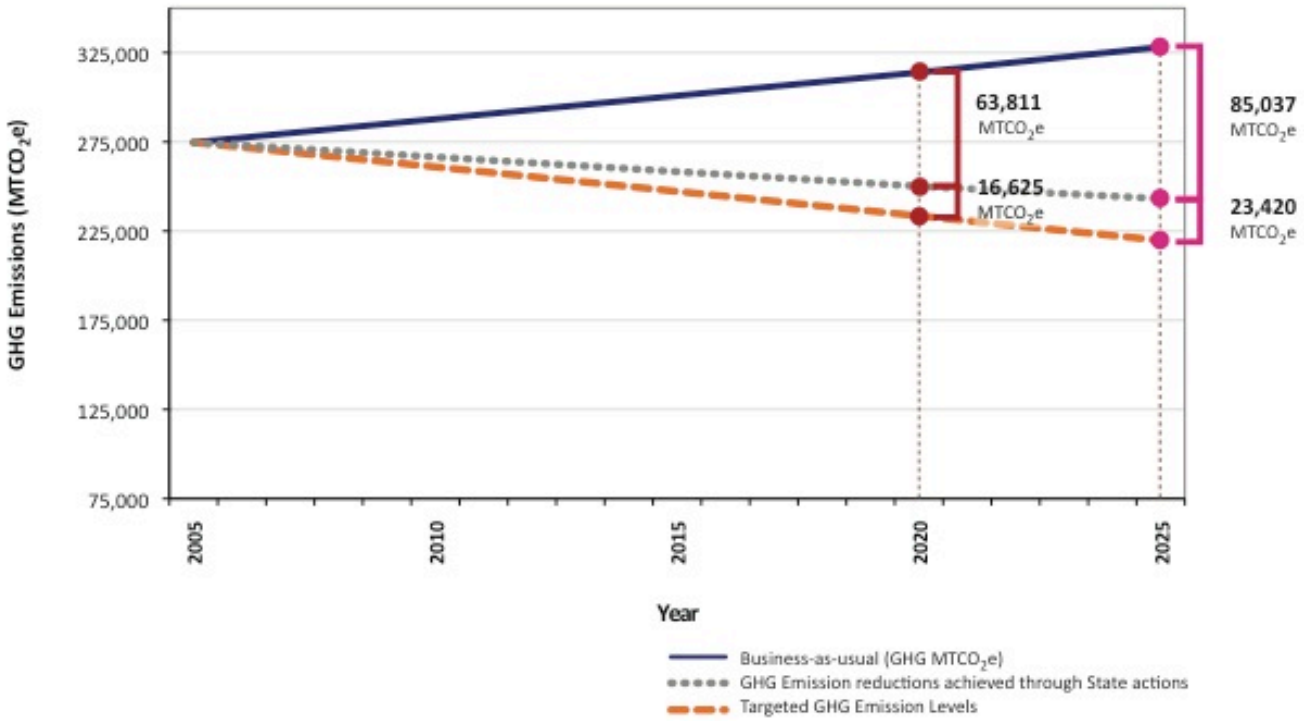
These State programs are described in more detail in Chapter 1. The impact of State-level actions on reducing local emissions is significant, and is shown in relation to the City of Foster City's emissions baseline, business-as-usual forecast, and reduction target in Figure 3.2.

Table 3.3: Emission Reduction Projections from State-level Programs from 2020 and 2025

State Initiatives	Sector	Percentage Reduction from 2020 GHG Forecast	Annual Reduction in Foster City's Emissions in 2020	Percentage Reduction from 2025 GHG Forecast	Annual Reduction in Foster City's Emissions in 2025
AB 1493 (Pavley)	Transportation	19.7%	37,593	26.3%	52,796
LCFS	Transportation	7.2%	13,740	9.6%	19,296
33% RPS	Electricity (Energy)	21.0%	12,478	21.0%	12,944
Total Statewide Initiative Emissions Reductions		**47.9% of 2020 GHG Forecasted emissions**	**63,811 $MTCO_2e$** (approx. 79% of total emissions reductions required)	**56.9% of 2025 GHG Forecasted Emissions**	**85,036 $MTCO_2$** (approx. 78% of total emissions reductions required)

Figure 3.2 also shows the emissions reductions expected from State-Level actions, and the reductions needed to reach the City of Foster City's emission target. With 63,811 $MTCO_2e$ reductions achieved from State-level actions by 2020, an additional 16,625 $MTCO_2e$ of reductions would need to be achieved by local measures in order to reach the 2020 GHG reduction target. With 85,036 $MTCO_2e$ of reductions achieved from State-level actions by 2025, an additional 23,420 $MTCO_2e$ of reductions would need to be achieved by local measures in order to reach the 2025 GHG reduction target.

Figure 3.2: Foster City GHG Reduction Targets for 2020



Chapter 4 of the Climate Action Plan contains measures for the year 2020. If all selected measures are fully implemented towards the 15 percent reduction goal for 2020, the 20 percent reduction goal for 2025 will also be achieved.

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Chapter 4: Reduction Measures

4.1 Categories of Reduction Measures

The following reduction measures are organized into the following categories to match the sectors identified in the greenhouse gas inventory in Chapter 2:

- Energy (Community), or EC
- Energy (Municipal), or EM
- Transportation and Land Use (Community), or TL
- Transportation-related Municipal Operations, or TM
- Waste (Community), or WC
- (Energy and) Water, or EW
- Education, or ED

The **Energy** sector comprises all electricity and natural gas usage in the City of Foster City, including municipal and community-wide energy consumption. The total energy usage in the 2005 GHG inventory represents 39 percent of the City's emissions, and is certainly a large component where measures can be put in place to reduce emissions.

Transportation and Land Use makes up 60 percent of the City's emissions, with transportation on State highways accounting for approximately 35 percent and transportation on local roads accounting for approximately 21 percent of total emissions. While the City has very limited control over the activity on State Highways, it is important to note that the State-level actions related only to transportation will contribute up to 64 percent of the total emission reductions required by 2020.

The City's generated **waste** accounts for approximately 1 percent of its total emissions.

The City's **municipal operations** account for approximately 1 percent of its total emissions across all categories of energy, transportation, waste and water.

4.2 Comparison of Climate Action Plan, Sustainability Action Plan, and General Plan Land Use and Circulation Element Update

Many measures described in this Climate Action Plan document are not new to Foster City; rather, they are based on measures previously recommended in the Sustainability Action Plan (SAP) written by Foster City's Environmental Sustainability Task Force. Several measures are similar to goals and policies proposed in the current Land Use and Circulation Element Update, the Housing Element (2009), Safety Element (1995), Conservation Element (2009), and Parks and Open Space Element (2009). The similar goals and policies have been noted in Table 4.1. Tasks from the Sustainable Foster City Plan (SFCP) have also been included in summary form.

Relevant changes to circumstances that have occurred since the writing of the SAP were also reflected in the Climate Action Plan measures. Some measures from the SAP were combined in this document for ease of implementation.

This chart also shows a comparison of what some other San Mateo jurisdictions have been doing with their Climate Action Plans, Sustainability Elements, or General Plan Updates. The documents reviewed for comparison include Portola Valley's 2009 Sustainability Element, San Bruno's relevant General Plan measures, and the Climate Action Plans from Redwood City (2010), Pacifica (2012 Draft), San Carlos (2009), and Burlingame (2009).

Measures that are highlighted in green have already been implemented or are currently being implemented on an on-going basis by Foster City or other responsible parties (such as PG&E).

Table 4.1: Comparison between Climate Action Plan, Sustainability Action Plan, and General Plan Land Use and Circulation Element Update

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
EC 1: Adopt a Residential Green Building Ordinance.	• (LUC* Element) LUC-aa (proposed): Green Building Guidelines and Incentives • (SAP) E 3: Green Building Ordinance • (Housing Element) H-B-3-a: Energy Conservation Assistance • (Housing Element) H-B-3-b: Increased Energy Conservation • (Conservation Element) C-4: Energy Conservation • (Conservation Element) C-o: Title 24. • (SFCP) Expand green building practices • (SFCP) Implement programs to maximize energy efficiency building and appliance standards	Portola Valley, San Bruno, Redwood City, Pacifica, San Carlos, Burlingame
EC 2: Encourage Personal Energy Audits and Energy Efficient Home Upgrades.	• Proposed with this Climate Action Plan. • (Housing Element) H-B-3: Encourage Energy Conservation in Housing	San Carlos Redwood City Portola Valley Berkeley Pacifica
EC 3: Encourage and Facilitate Residential Energy Efficiency Upgrades.	• (SAP) E 2: Business Energy Efficiency Upgrades • (Housing Element) H-B-3: Encourage Energy Conservation in Housing • (SFCP) Encourage reliable, cost-effective energy solutions for homes	San Bruno, Pacifica
EC 4: Adopt a Commercial Green Building Ordinance.	• (LUC Element) LUC-aa (proposed): Green Building Guidelines and Incentives • (SAP) E 3: Green Building Ordinance • (Conservation Element)	Portola Valley, San Bruno, Redwood City, Pacifica, San Carlos, Burlingame

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
	• C-4: Energy Conservation (Conservation Element) C-o: Title 24. • (SFCP) Expand green building practices • (SFCP) Implement programs to maximize energy efficiency building and appliance standards	
EC 5: Encourage and Facilitate Business Energy Efficiency Upgrades.	• (SAP) E 2: Business Energy Efficiency Upgrades • (SFCP) Encourage reliable, cost-effective energy solutions for businesses	San Carlos
EC 6: Provide Financing for Commercial Energy Efficiency and Renewable Energy.	• (SAP) E 6: Energy Efficiency and Renewable Energy Financing • (SFCP) Encourage reliable, cost-effective energy solutions for businesses • (SFCP) Develop relationships and promote safe and reliable infrastructure in the area of energy	CaliforniaFIRST (see Measure EC 7 for more details) is available in all twenty incorporated jurisdictions of San Mateo County.
EC 7: Encourage Residential Solar Panel Installation.	• (SAP) E 7: Renewable Energy Requirements • (SFCP): Investigate and implement a Clean Energy Initiative	San Bruno (pre-wiring only), Pacifica, San Carlos (consideration only)
EC 8: Create a Requirement for Urban Forestation.	• (LUC Element) LUC-74 (proposed): Tree Planting • (SAP) AQT 3: Urban Forestation	San Bruno, Redwood City, San Carlos
EC 9: Work with Developers and Employers to Develop Robust Sustainability Plans to Minimize GHG Emissions	• Proposed with this Climate Action Plan.	
EM 1: Implement Energy Efficient Street Lighting.	• Already implemented by City with grant funding.	San Bruno, Pacifica
EM 2: Implement an Environmentally Preferred Purchasing Policy.	• (Conservation Element) C-u: City Procurement. • (SFCP) Implement programs to maximize energy efficiency building and appliance standards	Portola Valley, San Bruno, Burlingame
EM 3: Adopt Green Building Standards for Municipal Buildings.	• (SAP) E 3: Green Building Ordinance	San Bruno, Burlingame (conduct feasibility study)
EM 4: Consider a Municipal Renewable Energy System Installation Program.	• (SAP) E 7: Renewable Energy Requirements • (SFCP) Investigate and implement a Clean Energy Initiative	Redwood City, San Carlos (considered)

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
EM 5: Audit Municipal Facilities for Energy Efficiency Opportunities and Implement Energy Efficient Retrofits.	• (SAP) E 4: Business Energy Audit • (SFCP) Review and investigate City facility energy efficiencies to reduce energy costs • (SFCP) Implement programs to maximize energy efficiency building and appliance standards	San Bruno (equipment and appliances only), Redwood City, Pacifica, Burlingame
TL 1: Implement Smart Growth Development.	• (LUC Element) LUC-21: Mixed Use Residential/Commercial Projects • (LUC Element) LUC-25: Mixed Use Developments • (LUC Element) LUC-49: Density and Intensity of Uses • (LUC Element) LUC-59: Traffic Reduction Programs • (LUC Element) LUC-60 (proposed): Employer-based Trip Reduction • (LUC Element) LUC-61 (proposed): Create Opportunities for Transit; Access to Regional Transit. • (LUC Element) LUC-K: Encourage Redevelopment of Under-utilized Properties with Increased Density/Intensity of Uses. • (Housing Element) H-D-4: Mixed Use Development • (Housing Element) H-D-4-a: Mixed Use Housing	Portola Valley, Redwood City, Pacifica, Burlingame
TL 2: Implement Complete Streets and Pedestrian and Bicycle-friendly design.	• (LUC Element) LUC-E: Provide for Diversified Circulation Needs • (LUC Element) LUC-55 (proposed): Complete Streets • (LUC Element) LUC-63 (proposed): Pedestrian and Bicycle Friendly Design • (LUC Element) LUC-65: Reduce Auto Parking Requirements based on Provision of Bicycle Parking • Resolution #2012-63 adopted on September 10, 2012 adopting a Complete Streets Policy • (Parks and Open Space Element) PC-C: Maintain and Improve the City's Pedway and Bikeway System • (Parks and Open Space Element) PC-7: Bike path system. • (Parks and Open Space Element) PC-8:	Redwood City, Pacifica, Burlingame

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
	Recreational Use of Pedestrian Walkways. • (Parks and Open Space Element) PC-h: Existing Pedway Enhancement. • (SFCP) Improve pedestrian amenities, bike lanes, ramps, to promote non-vehicular traffic • (SFCP) Develop relationships and promote safe and reliable infrastructure in the area of transportation • (SFCP) Develop parks and recreation amenities such as bike lanes and pedway improvements • Ad Hoc Transportation Committee Report recommendations for improved bicycle facilities	
TL 3: Incentivize and Explore Car and Bike Sharing.	• Proposed with this Climate Action Plan. • (SFCP) Develop relationships and promote safe and reliable infrastructure in the area of transportation • (SFCP) Seek funding for local/regional transportation needs beyond commuter shuttle programs	Pacifica
TL 4: Encourage a Preferred Parking/Electric Plug-in Policy for Alternative Fuel Vehicles.	• (SAP) AQT 1: Preferred Parking/Electric Plug-In • (LUC Element) LUC-67 (proposed): Preferred Parking/Electric Plug-In • (SFCP) Develop relationships and promote safe and reliable infrastructure in the area of transportation	Portola Valley (at Town Center, and in homes), Redwood City, Pacifica, Burlingame
TL5: Support Safe Routes to School	• Proposed with this Climate Action Plan. • Identified in Ad Hoc Transportation Committee Report recommendations	Redwood City
TM 1: Implement a Fuel-efficient Fleet Policy.	• Proposed with this Climate Action Plan.	Redwood City, Pacifica, Burlingame
TM 2: Implement a Low-emissions Fleet Policy.	• Proposed with this Climate Action Plan. • Identified in Ad Hoc Transportation Committee Report recommendations	Pacifica
TM 3: Allow Flexible Working Schedules for Municipal Employees.	• Proposed with this Climate Action Plan. • (Conservation Element) C-l: Transportation Systems Management (TSM) Ordinance. • (Conservation Element) C-m: Reduction in Automobile trips. • Implemented through City's 9/80 Telecommuting Policy.	New approach for Foster City.

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
TM 4: Establish a Public Employee Commuting Program.	• Proposed with this Climate Action Plan. • (Conservation Element) C-l: Transportation Systems Management (TSM) Ordinance. • (Conservation Element) C-m: Reduction in Automobile trips.	Portola Valley (general, not specific to Town operations)
WC 1: Achieve a Higher Diversion Rate of 75 Percent.	• Proposed with this Climate Action Plan. • (Conservation Element) C-5: Solid Waste • (Conservation Element) C-s: Citywide Recycling Program. • (Conservation Element) C-t: Source Reduction and Recycling Element. • (SFCP) Collaborate with SBWMA and Recology to increase waste diversion, composting and recycling. • (SFCP) Develop relationships and promote safe and reliable infrastructure in the area of waste	Redwood City, Pacifica, Burlingame (75 percent by 2015). All Alameda County cities 75 percent by 2010, Palo Alto 73 percent by 2011, San Jose 75 percent by 2013.
WC2: Adopt an Ordinance to Prohibit Disposable Polystyrene Food Ware.	• Proposed with this Climate Action Plan. • Already implemented. • (SAP) SW2: Ban on plastic bags and Styrofoam • (SFCP) Implement Residential and Business greening programs that celebrate sustainability efforts	San Mateo County, Burlingame, Millbrae, Pacifica, San Bruno, South San Francisco, Half Moon Bay.
WC 3: Continue Participation in a Grading or Award Program for Commercial Food Waste Collection.	• (SAP) SW 1: Commercial Food Waste Collection • (SFCP) Implement Residential and Business greening programs that celebrate sustainability efforts • (SFCP) Implement a business award to recognize and promote sustainable businesses • Already implemented.	Burlingame (diversion of waste for businesses)
WC 4: Implement a Ban on Single Use Plastic Carryout Bags and Charge for Paper and Reusable Bags.	• Implemented • (SAP) SW 2: Ban on Plastic Bags and Styrofoam • (SFCP) Implement Residential and Business greening programs that celebrate sustainability efforts	Almost all San Mateo County jurisdictions and some Santa Clara jurisdictions are participating in the effort to analyze this ordinance.
WC 5: Adopt a Construction and Demolition Ordinance.	• (SAP) SW 3: Construction and Demolition Ordinance	Almost every jurisdiction in San Mateo County.

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
WC 6: Adopt a Yard Waste Ordinance.	• (SAP) SW 4: Yard Waste Ordinance.	Pacifica
WC 7: Facilitate Recycling of Styrofoam and Hard-to-Recycle Plastics.	• (SAP) SW 5: Recycling of Styrofoam and Hard-to-Recycle Plastics	New approach for Foster City.
WC 8: Adopt RecycleBank or a Pay-As-You-Throw Program.	• (SAP) SW 6: RecycleBank or Pay-as-You-Throw • (Conservation Element) C-s: Citywide Recycling Program.	Redwood City (considered)
EW 1: Lower Residential and Commercial Water Usage in Foster City.	• (SAP) W 1: Water-Wise Landscaping • (SAP) W 3: Tiered Water Rates • (SAP) W 6: Water Saving Appliances • (SAP) W 7: Conservation Program for Multi-Family Dwellings • (Conservation Element) C-A: Protect and Conserve Natural Resources • (Conservation Element) C-1: Water Resources • (Conservation Element) C-d: Water Conservation Plan. • (SFCP) Enhance water conservation for multi-family without separate metering • (SFCP) Review existing water use efficiency programs, investigate cleaner energy to move and treat water	Almost every jurisdiction in San Mateo County.
EW 2: Adopt a Water-wise Landscaping Ordinance and Outdoor Water Saving Incentives.	• (SAP) W 1: Water-wise Landscaping • (EMID) Chapter 8.80 Outdoor Water Use Efficiency • (Conservation Element) C-1: Water Resources • (Conservation Element) C-a: Water Saving Landscaping and Irrigation. • (SFCP) Enhance water conservation for multi-family without separate metering (already completed)	Portola Valley, San Bruno, Redwood City, Pacifica, San Carlos, Burlingame
EW 3: Adopt an Ordinance and Incentives for Indoor Water Savings.	• (SAP) W 6: Water Saving Appliances • (EMID) Chapter 8.70 Indoor Water Use Efficiency (already completed) • (Conservation Element) C-b: Property Owner Water Saving Techniques.	Pacifica, Redwood City
EW 4: Establish Conservation-based Water Rates.	• (SAP) W 3: Tiered Water Rates	Several jurisdictions in San Mateo County.

Measures recommended in the Climate Action Plan	Measures originally recommended in the Foster City Sustainability Action Plan (SAP), General Plan (GP), Municipal Code (MC), Sustainable Foster City Plan (SFCP), and Estero Municipal Improvement District Code (EMID)	Considered or Implemented by other Cities (not exhaustive)
EW 5: Increase Promotion for Water-saving Programs.	• Proposed with this Climate Action Plan.	New approach for Foster City.
EW 6: Advocate for More Informative Water Bills.	• (SAP) W 4: More Informative Water Bills	New approach for Foster City.
EW 7: Work with BAWSCA and EMID to Establish a Water Conservation Help Line.	• (SAP) W 5: Water Conservation Help Line	New approach for Foster City.
ED 1: Facilitate an Education Garden.	• (SAP) W 2: Education Garden	All jurisdictions have identified measures to promote and educate the public about climate change and the adopted measures to reduce GHG emissions.
ED 2: Hold Earth Day Fairs.	• (SAP) EDU 1: Earth Day or Sustainability Fair • (Conservation Element) C-u: Recycling Information.	
ED 3: Conduct Educational Workshops on Sustainability.	• (SAP) EDU 2: Educational Workshops • (Housing Element) H-A-3-a: Community Outreach • (Conservation Element) C-r: Energy Information and Outreach.	
ED 4: Create a Dedicated Website Focused on the Climate Action Plan Measures.	• (SAP) EDU 5: Foster City Green Website • (Housing Element) H-A-3-a: Community Outreach • (Conservation Element) C-r: Energy Information and Outreach. • (Conservation Element) C-u: Recycling Information.	

*LUC refers to Land Use and Circulation.

4.3 Proposed Criteria for Prioritization and Selection of Measures

Jurisdictions in San Mateo County have been using the RICAPS calculation tool to help prioritize measures to be included in their greenhouse gas reduction strategies, which include a method of scoring each measure using weighted factors. In this document, the RICAPS criteria have been simplified into three main categories, with an indication of how each measure fares in each category – excellent, good, or fair. The measures that have the most favorable cost-to-benefit assessments are those with a higher GHG emissions reduction, and less cost and time required to implement.

Each measure is given an overall score that reflects the costs and benefits of implementation, which is designated as the cost-benefit indicator. This indicator averages the scores from each of the three assessment criteria – Annual Greenhouse Gas Reduction, Costs, and Implementation Time. Each assessment criteria is given a rating of excellent, good, or fair. The scoring system quantifies the rating of excellent as a "3," good as a "2," and fair as a "1." When these numbers are averaged, they give the weighted score reflecting the overall quality of the measure.

The cost-benefit indicators can be used as guides to prioritize and select measures. A comparison of the measures, along with their cost-benefit indicators, can be found in the table "Foster City Climate Action Plan: Prioritization and Selection of GHG Emission Reduction Measures."

The levels for excellent, good, and fair were determined by taking into account the entire spectrum of costs and reductions associated with all the proposed measures.

Table 4.2: Assessment Criteria Categories and Levels

Annual Greenhouse Gas Reduction (Metric Tons CO_2e)		**Costs (Government Capital Outlay and Total Operating Costs combined)** (dollars)		**Implementation time required** (years)	
> 500	Excellent	≤ $5,000	Excellent	≤ 1	Excellent
100 –500	Good	> $5,000 - $20,000	Good	2 – 4	Good
< 100	Fair	> $20,000	Fair	≥ 5	Fair

4.4 Prioritization and Selection of Measures

Stakeholders and decision makers of Foster City will be asked to prioritize and select the measures that the City should adopt as part of the Climate Action Plan. The measures presented in Table 4.2 demonstrate a total of 22,042 Metric Tons CO_2e possible in annual reductions if all the measures listed were selected for implementation.

As described under Section 3.4, the City needs to achieve **16,625** $MTCO_2e$ of annual GHG reductions to meet the 15 percent reduction target by the year 2020, and **23,420** $MTCO_2e$ of annual GHG reductions to meet the 20 percent reduction target by the year 2025. Working towards these goals, Foster City has already implemented some existing measures and

programs, and the sum of the annual reductions achieved by those measures is **7615** $MTCO_2e$. Therefore, the City needs to prioritize and select at least **9010** $MTCO_2e$ of additional measures to be implemented going forward, in order to achieve its reduction target in the year 2020.

Assuming an approximately linear progression of the GHG reductions by each of the existing measures and programs, the existing measures and programs will result in **10,153** $MTCO_2e$ by 2025, and the City will need to achieve at least **13267** $MTCO_2e$ of GHG reductions by 2025 to achieve the 2025 reduction target.

4.5 Reduction Measure Prioritization and Selection Summary

Table 4.3 shows a list of all the measures that Foster City could consider in order to reach its reduction targets of **16,625** and **23,420** Metric Tons CO2e of GHG emissions for the years 2020 and 2025, respectively. Any achieved GHG reductions based on existing measures are indicated in parentheses under the Annual GHG Reduction column. These numbers are included in the total; they are not additional reductions. **Detailed measure descriptions and assumptions are provided in Appendix B.**

Please refer to Table 4.3 on the following pages.

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

EC1

Selected Measure: **Implement a Residential Green Building Ordinance**
Emissions Category: Energy (Community)
Status: Proposed in SAP and GPU; Already Implemented
Measure Description: Implement the 2013 Title 24 energy requirement standards and encourage implementation of Tier 1 and Tier 2 standards for new development projects and significant remodels.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
962 MT CO2e	$0	0 years		This measure should be considered together with EC2 and EC3 for maximum reductions in residential GHG emissions.
Excellent	Excellent	Excellent		
3	3	3	3.0	

EC2

Selected Measure: **Encourage Personal Energy Audits and Energy Efficient Home Upgrades**
Emissions Category: Energy (Community)
Status: New Measure
Measure Description: Encourage residents to reduce their carbon footprint by promoting programs like "Personal Climate Action Plans." Promote home renovations and upgrades that increase energy efficiency. The greenhouse gas reductions achieve through this measure will be primarily tied to residential upgrades and renovations.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
1132 MT CO2e	$20,000	2 years		
Excellent	Good	Good		
3	2	2	2.3	

EC3

Selected Measure: **Encourage and Facilitate Residential Energy Efficiency Upgrades**
Emissions Category: Energy (Community)
Status: Proposed in SAP; Already Implemented
Measure Description: Participate in the Energy Upgrade California program, and other similar rebates and incentives for residential energy audits and energy efficiency retrofits. Provide technical assistance where possible to homeowners.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
236 MT CO2e **(16 MT CO2e achieved)**	$0	0 years		
Good	Excellent	Excellent		
2	3	3	2.7	

EC4

Selected Measure: **Adopt a Commercial Green Building Ordinance**
Emissions Category: Energy (Community)
Status: Proposed in SAP and GPU
Measure Description: Adopt a Commercial Green Building Ordinance that mandates higher building performance in commercial buildings. The approach could include providing developers with the option to choose from several different rating systems such as CALGreen Tier 1 or 2, LEED, or Build it Green.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
703 MT CO2e	$0	2 years		This measure should be considered together with EC5 and EC6 for maximum reductions in commercial GHG emissions.
Excellent	Excellent	Good		
3	3	2	2.7	

EC5

Selected Measure: **Encourage and Facilitate Business Energy Efficiency Upgrades**
Emissions Category: Energy (Community)
Status: Proposed in SAP ; Initial Implementation has Occurred
Measure Description: Use existing rebates from the County, State and utility companies to create incentives and technical assistance for businesses to perform energy efficiency upgrades.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
1,018 MT CO2e	$0	0 years		
Excellent	Excellent	Excellent		
3	3	3	3.0	

EC6

Selected Measure: **Provide Financing for Commercial Energy Efficiency and Renewable Energy**
Emissions Category: Energy (Community)
Status: Proposed in SAP; Initial Implementation has Occurred
Measure Description: Participate in CaliforniaFIRST to finance energy efficiency and renewable energy improvements for commercial properties.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
961 MT CO2e **(561 MT CO2e achieved)**	$0	0 years		
Excellent	Excellent	Excellent		
3	3	3	3.0	

EC7

Selected Measure: **Encourage Solar Panel Installation**
Emissions Category: Energy (Community)
Status: Proposed in SAP; Already Implemented
Measure Description: Encourage residential homeowners and landlords, as well as commercial property owners, to install solar panels by removing the building permit fee for solar panels and encourage participation in the City's Collective Solor Bulk Purchase Program.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
293 MT CO2e **(77 MT CO2e achieved)**	$0	0 years		
Good	Excellent	Excellent		
2	3	3	2.7	

EC8

Selected Measure: **Create a Requirement for Urban Forestation**
Emissions Category: Energy (Community)
Status: Proposed in SAP and GPU
Measure Description: Create a requirement for urban forestation at all new residential and commercial developments.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
930 MT CO2e	$0	2 years		
Excellent	Excellent	Good		
3	3	2	2.7	

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

EC9

Selected Measure: **Work with Developers and Employers to Develop Robust Sustainability Plans to Minimize GHG Emissions**

Emissions Category: Energy (Community)

Status: New measure

Measure Description: Strongly encourage developers of larger projects and major local employers to develop sustainability plans. "Larger" projects include projects that would generate 100 or more peak hour vehicle trips. "Major" employers include businesses that employ 250 or more people in Foster City.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EC 5, EC 6, and TL1	$0	Ongoing		
NA	Excellent	Good		
0	3	2	1.7	

EM1

Selected Measure: **Implement Energy Efficient Lighting**

Emissions Category: Energy (Municipal)

Status: New Measure; Already Implemented

Measure Description: Replace street, signal lights, parks and parking lot lighting with efficient LED lighting, which is significantly more efficient than conventional lamps and can save on maintenance costs due to longer lifetimes.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
130 MT CO2e (130 MT CO2e achieved)	$0	0 years		The City's traffic and pedestrian signals have been converted to LED's and has taken steps to replace more lights to LED.
Fair	Excellent	Excellent		
1	3	3	2.3	

EM2

Selected Measure: **Implement an Environmentally Preferred Purchasing Policy**

Emissions Category: Energy (Municipal)

Status: New Measure

Measure Description: Implement a sustainable purchasing policy in local government departments, which emphasizes recycled materials and energy star equipment.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
52 MT CO2e	$0	0 years		
Fair	Excellent	Excellent		
1	3	3	2.3	

EM3

Selected Measure: **Adopt Green Building Standards for Municipal Buildings**

Emissions Category: Energy (Municipal)

Status: Proposed in SAP

Measure Description: Adopt green building standards for municipal buildings as part of the Commercial Green Building Ordinance, to mandate higher building performance in municipal buildings. Mandate achievement of LEED Silver in any new municipal building construction and significant remodels, as several other municipalities in the Bay Area have done.

Annual GHG Reduction	Total Cost	Implementation Time Required	Cost-Benefit Indicator	Considerations
38 MT CO2e	$0	2 years		This measure could be dependent on Measure EC6.
Fair	Excellent	Good		
1	3	2	2.0	

EM4

Selected Measure: **Consider a Municipal Renewable Energy System Installation Program**

Emissions Category: Energy (Municipal)

Status: Proposed in SAP; Partially implemented

Measure Description: Continue to review existing City facilities to evaluate the benefits of installing solar panels or another comparable renewable energy system, and install solar or other renewable energy facilities on suitable facilities to the greatest extent feasible. The measure promotes consideration of solar panel group purchases with other cities.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
11 MT CO2e (11 MT CO2e achieved)	$715,761	6 years		
Fair	Fair	Fair		
1	1	1	1.0	

EM5

Selected Measure: **Audit Municipal Facilities for Energy Efficiency Opportunities and Implement Energy Efficient Retrofits**

Emissions Category: Energy (Municipal)

Status: Proposed in SAP ; Partially implemented

Measure Description: Participate in San Mateo County Energy Watch programs to audit municipal facilities for energy efficiency opportunities, and implement energy efficient retrofits.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
32 MT CO2e (11 MT CO2e achieved)	$1,393,000	0 years		
Fair	Fair	Excellent		
1	1	3	1.7	

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

TL1 **Selected Measure:** **Implement Smart Growth Development**

Emissions Category: Transportation and Land Use

Status: Proposed in existing General Plan and GPU; implementation is ongoing

Measure Description: Achieve SB 375 goals for mixed use, transportation-oriented and infill development, and greater jobs/housing balance. This measure includes several goals and policies implemented together with the 2025 General Plan Update. Work with employers to implement employer-based trip reduction programs and create opportunities to improve transit and access to regional transit.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
1,313 MT CO2e **(1,313 MT CO2e will be achieved in 2020)**	$0	0 years		
Excellent	Excellent	Excellent		
3	3	3	3.0	

TL2 **Selected Measure:** **Implement Complete Streets and Pedestrian & Bicycle-friendly Design**

Emissions Category: Transportation and Land Use

Status: Proposed in existing General Plan and GPU; Partially Implemented

Measure Description: Plan for a balanced, multimodal transportation network and encourage bicycling and walking instead of driving by prioritizing pedestrian and bicycle-friendly improvements. Implement bike lanes on main streets, an urban bike-trail system, bike parking, and pedestrian crossings.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
2,931 MT CO2e **(2,931 MT CO2e will be achieved in 2020)**	$0	0 years		
Excellent	Excellent	Excellent		
3	3	3	3.0	

TL3 **Selected Measure:** **Incentivize and Explore Car and Bike Sharing**

Emissions Category: Transportation and Land Use

Status: New Measure

Measure Description: Incentivize car sharing companies to open pods in town, and explore a bicycle sharing program.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
625 MT CO2e	$50,000	4 years		
Excellent	Fair	Good		
3	1	2	2.0	

TL4 **Selected Measure:** **Encourage a Preferred Parking/Electric Plug-in Policy for Alternative Fuel Vehicles**

Emissions Category: Transportation and Land Use

Status: Proposed in SAP or GPU

Measure Description: Encourage and consider making it mandatory for businesses, developers, and property managers to create preferred parking for electric and alternative fuel vehicles and study the installation of electric charging stations for plug-in vehicles.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
N/A, depends on implementation.	$0	5 years		
N/A	Excellent	Fair		
0	3	1	1.3	

TL5 **Selected Measure:** **Support Safe Routes to School**

Emissions Category: Transportation and Land Use

Status: New Measures; Already Implemented

Measure Description: Coordinate with schools in Safe Routes to School programs to support programs that would encourage walking and biking.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
238 MT CO2e	$0	0 Years		
Good	Excellent	Excellent		
2	3	3	2.7	

TM1 **Selected Measure:** **Implement a Fuel-efficient Fleet Policy**

Emissions Category: Municipal Operations

Status: New Measure

Measure Description: Prioritize the purchase of fuel-efficient vehicles and alternative fuel vehicles. Maintain existing vehicles for optimum mileage. Encourage staff to drive minimally and efficiently. Establish government operations idling policy.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
44 MT CO2e	$170,000	0 years		
Fair	Fair	Excellent		
1	1	3	1.7	

TM2 **Selected Measure:** **Implement a Low-emissions Fleet Policy**

Emissions Category: Municipal Operations

Status: New Measure

Measure Description: Purchase new or convert existing government vehicles to low emissions vehicles.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
18 MT CO2e	$92,000	2 years		
Fair	Fair	Good		
1	1	2	1.3	

TM3 **Selected Measure:** **Allow Flexible Working Schedules for Municipal Employees**

Emissions Category: Municipal Operations

Status: New Measure; Already implemented

Measure Description: Promote alternative work schedules and develop telecommuting guidelines to reduce employee commute.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
1,897 MT CO2e	$0	1 year		
Excellent	Excellent	Excellent		
3	3	3	3.0	

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

TM4

Selected Measure: **Establish a Public Employee Commuting Program**
Emissions Category: Municipal Operations
Status: New Measure; Already implemented
Measure Description: Establish commute alternatives program to promote and incentivize public transportation, carpooling, biking, etc. among City employees.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
12 MT CO2e	$10,080	1 year		
Fair	Good	Excellent		
1	2	3	2.0	

WC1

Selected Measure: **Achieve a Higher Waste Diversion Rate of 75 Percent**
Emissions Category: Waste (Community)
Status: Proposed in SAP or GPU
Measure Description: Achieve a higher waste diversion rate of 75% by 2020.
The diversion of more trash away from landfill to recycling or composting in Foster City will need to be accomplished by implementing or participating in several programs:
a. Adopt an ordinance to prohibit disposable polystyrene food ware (Already implemented).
b.Adopt a grading or award program for commercial food waste collection.
c. Implement a gradual ban on single use plastic carryout bags and charge for paper and reusable bags (Already implemented.
d. Adopt a Construction and Demolition Ordinance (Already implemented).
e. Adopt a Yard Waste Ordinance.
f. Facilitate recycling of Styrofoam and hard-to-recycle plastics.
g. Adopt RecycleBank or pay-as-you-throw program.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
2,267 MTCO2e **(1,581 MT CO2e achieved as of 2011)**	$0	2 years (for all programs)		
Excellent	Excellent	Good		
3	3	2	2.7	

WC2

Selected Measure: **Adopt an Ordinance to Prohibit Disposable Polystyrene Food Ware.**
Emissions Category: Waste (Community)
Status: New Measure; Already Implemented
Measure Description: Effects a ban on single-use polystyrene food containers used by restaurants and food vendors. This ban is enforced by San Mateo County Environmental Health Division personnel.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

WC3

Selected Measure: **Continue Participation in a Grading or Award Program for Commercial Food Waste Collection**
Emissions Category: Waste (Community)
Status: Proposed in SAP; Already Implemented
Measure Description: Set up a grading system to grade each business based on its food waste diversion rate. The grade would be publicized and businesses with the highest grades would be given an award or recognition.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$12,000	0 years		
NA	Good	Excellent		
0	2	3	1.7	

WC4

Selected Measure: **Implement a Ban on Single Use Plastic Carryout Bags and Charge for Paper and Reusable Bags**
Emissions Category: Waste (Community)
Status: Proposed in SAP; Already implemented
Measure Description: Implemented through Section 8.09 of the Foster City Municipal Code, which regulates the use of paper and plastic single use carryout bags in Foster City.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

WC5

Selected Measure: **Adopt a Construction and Demolition Ordinance**
Emissions Category: Waste (Community)
Status: Based on proposed measure in SAP; Already implemented
Measure Description: Adopt a Construction and Demolition Ordinance to include incentives for deconstruction, and require mandatory recycling and reuse rates for contractors.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

WC6

Selected Measure: **Adopt a Yard Waste Ordinance**
Emissions Category: Waste (Community)
Status: Proposed in SAP
Measure Description: Adopt an ordinance that requires all landscapers and landscape maintenance businesses to recycle and divert yard waste.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$0	2 years		
NA	Excellent	Good		
0	3	2	1.7	

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

WC7

Selected Measure: **Facilitate Recycling of Styrofoam and Hard-to-Recycle Plastics**
Emissions Category: Waste (Community)
Status: Proposed in SAP
Measure Description: Facilitate recycling of Styrofoam and hard-to-recycle plastics by holding regular collection events and establishing permanent drop-off points in coordination with neighboring agencies.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under WC 1	$0	1 year		
NA	Excellent	Excellent		
0	3	3	2.0	

EW1

Selected Measure: **Lower Residential and Commercial Water Usage in Foster City**
Emissions Category: Water
Status: Based on proposed measures in SAP;
Measure Description: Utilize six measures in total, three of which have already been implemented by EMID and therefore contribute to the total reduction of GHG emissions. Three include increasing promotion for water-saving programs, advocating for more informative water bills, and working with BAWSCA to establish a Water Conservation Help Line. Please see measures EW 2 to EW 7 for a detailed discussion.

The SAP also recommended an Education Garden program, and this is included under the Education and Outreach section of the CAP.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
995 MTCO2e **(995 MT CO2e will be achieved in 2020)**	$0	2 years maximum (includes all programs)		
Excellent	Excellent	Good		
3	3	2	2.7	

EW2

Selected Measure: **Adopt a Water-wise Landscaping Ordinance and Outdoor Water Saving Incentives.**
Emissions Category: Water
Status: Proposed in SAP; Already Implemented
Measure Description: Adopt a water-wise landscaping ordinance for new commercial and multi-family developments, that is consistent with the AB 1881 model ordinance and BAWSCA standards. Offer incentives to reduce outdoor water usage. Both of these have already been implemented.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

EW3

Selected Measure: **Adopt an Ordinance and Implement Incentives for Indoor Water Savings.**
Emissions Category: Water
Status: Proposed in SAP; Already Implemented
Measure Description: Implement an Indoor Water Use Efficiency Ordinance to specify various types of water appliances for new construction and applicable remodels. Continue the water appliance rebate program and explore expanding it to include dishwashers. Market the program and explore incentives for property managers and renters in multi-family developments to upgrade to water saving appliances.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

EW4

Selected Measure: **Establish Conservation-based Water Rates**
Emissions Category: Water
Status: Proposed in SAP; Already Implemented
Measure Description: Establish tiered water rates, with lower rates for lower levels of water consumption.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	0 years		
NA	Excellent	Excellent		
0	3	3	2.0	

EW5

Selected Measure: **Increase Promotion for Water-saving Programs.**
Emissions Category: Water
Status: New Measure; Partially implemented
Measure Description: Work with EMID to put together a marketing program to promote the various incentives that are available to the public. The marketing efforts should focus on groups that have not been previously reached out to, or groups that the City feels could have a larger contribution to water savings in the community.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	1 year		
NA	Excellent	Excellent		
0	3	3	2.0	

EW6

Selected Measure: **Create More Informative Water Bills**
Emissions Category: Water
Status: Proposed in SAP
Measure Description: Work with EMID to improve water bills to help users better understand and track their water usage, by using a commonly-understood unit system, showing changes from month to month and year to year, and consumer progress towards reaching a lower tier rate.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	2 years		
NA	Excellent	Good		
0	3	2	1.7	

Table 4.3
Prioritization and Selection of GHG Emission Reduction Measures

EW7

Selected Measure: **Work with BAWSCA and EMID to Improve Water Conservation Information**
Emissions Category: Water
Status: Proposed in SAP
Measure Description: Work with BAWSCA and EMID to continue to improve available resources that will educate customers and provide incentives to reduce water consumption and use within the community.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Included under EW 1	$0	1 year		
NA	Excellent	Excellent		
0	3	3	2.0	

ED1

Selected Measure: **Facilitate an Education Garden**
Emissions Category: Education
Status: Proposed in SAP
Measure Description: Facilitate an education garden through schools, social clubs, churches, or community groups.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Not easily quantifiable	$1,000	3 years		
NA	Excellent	Good		
0	3	2	1.7	

ED2

Selected Measure: **Conduct Educational Workshops on Sustainability**
Emissions Category: Education
Status: Proposed in SAP
Measure Description: Conduct regular educational workshops through the Foster City Recreation Center.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Not easily quantifiable	$7,000	3 years		
NA	Good	Good		
0	2	2	2.0	

ED3

Selected Measure: **Create a Dedicated Website Focused on the Climate Action Plan Measures**
Emissions Category: Education
Status: Proposed in SAP; Already Implemented
Measure Description: Utilize existing webpages focused on sustainability and climate action to track the development of Climate Action Plan measures. The webpages would focus on advertising the latest efforts towards reducing GHG emissions, and update the public regarding the latest developments and news.

Annual GHG Reduction	Cost to City	Implementation Time Required	Cost-Benefit Indicator	Considerations
Not easily quantifiable	$0	0 years		
NA	Good	Excellent		
0	2	3	2.0	

TOTAL ANNUAL GHG REDUCTIONS POSSIBLE IN 2020 (SUM OF ALL OPTIONS):	**16,838 MT CO2e**
TOTAL ANNUAL GHG REDUCTIONS REQUIRED TO REACH TARGETS IN 2020:	**16,625 MT CO2e**
TOTAL ANNUAL GHG REDUCTIONS ALREADY ACHIEVED AS OF 2012:	**7,626 MT CO2e**

(45% achieved)

(This includes GHG emission reductions achievable in 2020 based on existing measures.)

4.6 Reduction Measures

Each measure includes a detailed description of background information, measure description, cost and financial impact to the City/public, implementation process, and calculation assumptions for GHG reductions. Calculation assumptions are in Appendix B.

Any cost savings available to the public have been described in general terms. Specific estimates were not calculated because it would be difficult to quantify amounts given the numerous variables.

ENERGY (COMMUNITY)

Goal: Increase the energy efficiency of residential and commercial buildings in Foster City.

Residential and commercial buildings use electricity and natural gas for daily energy demands. Energy efficiency improvements may be made in older buildings that were built prior to the establishment of Title 24 in 1978; the current California Building Code that includes energy efficiency standards. Energy efficiency improvements may also be required of new buildings proposed for development in the future.

The list of measures below can be largely categorized into the adoption of codes to achieve energy efficiency, encouraging energy efficiency upgrades by utilizing existing energy efficiency funding and financing programs, and a new urban forestation program.

EC 1: Implement a Residential Green Building Ordinance. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Cost to City	Implementation Time required
962 MT CO_2e	5.7%	$0	0 years
Excellent		Excellent	Excellent

Background

This measure was originally recommended in the SAP. By implementing a mandatory Green Building Ordinance, Foster City can achieve a higher energy efficiency and significantly impact energy emission reductions in the built environment. The California Statewide Green Building Code, or CALGreen, went into effect on January 1, 2011, and updates the California Building Standards Code, otherwise known as Title 24. The voluntary tiers in CALGReen foster greater efficiency leading to more energy reductions. Many cities in the Bay Area have elected to implement an additional green building ordinance above that of mandatory CALGreen requirements.

The City's recent adoption of the 2013 Title 24 energy requirement standards are projected to increase energy efficiency beyond the 2008 Title 24 standards.

Measure Description
Implement the 2013 Title 24 energy requirement standards and encourage implementation of Tier 1 and Tier 2 standards for new development projects and significant remodels.

Cost and Financial Impact
This program has already been established and implementation of the program would require no additional City staff time. No direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description		Staff outreach to builders and property owners, including technical workshops. No direct costs anticipated.	Additional retrofit costs will be borne by the homeowner or building owner.
Total	**$0**	**$0**	**Varies**

Compliance with the 2013 Title 24 energy requirement standards would be checked for compliance during the building permit plan check process.

Developers and builders would see cost savings in the long run as they implement green building practices. The value and marketability of the built property could also be higher than if it were built using traditional but non-sustainable methods. Also, as green building standards become increasingly mandatory Statewide, such buildings would avoid compliance issues in the future.

Implementation
Implementation of this measure is already occurring.

EC 2: Encourage Personal Energy Audits and Energy Efficient Home Upgrades.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Cost to City	Implementation Time required
1,132 MT CO_2e	6.7%	$20,000	2 years
Excellent		Good	Good

Background

This measure is newly proposed with the Climate Action Plan. By encouraging residents to reduce their carbon footprint in their everyday activities and through home renovations, the City can achieve a noticeable reduction in GHG emissions through greater residential energy and natural gas efficiency. The GHG emission reductions will come from a cumulative impact of achieving small efficiency upgrades among numerous homes.

Previous programs have helped promote residential energy savings. These programs may be considered to assist residents in home energy audits.

The cities of Menlo Park, Redwood City, Palo Alto, Cupertino, Mountain View, Sunnyvale, and part of San Jose are currently participating in the Green@Home project, a service run by Acterra, a non-profit organization. Trained volunteers meet with residents in their homes to install simple energy-saving devices and create home energy conservation plans. The volunteers demonstrate environmentally friendly choices and foster a deeper awareness of the need for change. This service is available to homeowners and renters[1]. It is assumed that 15 percent of local homeowners and renters would commit to implementing the various changes proposed in the conservation plans.

House calls by a two-person team of trained volunteers are scheduled for 2.5 hours. During the house call, the Green@Home team offers homeowners the following energy-saving upgrades:

- Installed retractable clothesline
- Placement of three compact fluorescent light bulbs
- Optimization of water heater and refrigerator temperatures
- Installation of faucet aerators and low flow showerheads
- Instructions on how to measure and adjust tire pressure
- Installation of up to five outlet or light switch gaskets
- Measurement of energy draw of home electronics

In addition, the team goes over a comprehensive checklist of additional steps the homeowner might take, ranging from no-cost ideas like vacuuming refrigerator coils to low-cost options like weather-stripping or more significant investments in energy efficiency such as double-paned

[1] Acterra, Green@Home. http://www.acterra.org/programs/greenathome/index.html

windows. Together, the homeowner and the team creates a customized conservation plan to meet the household's budget and needs.

If the homeowner agrees, the Green@Home team also reviews the home's utility bill, comparing the usage with others and suggesting what to look for in the future.[2] Additional information on energy efficiency is also available.

Measure Description
Encourage residents to reduce their carbon footprint by promoting programs like "Personal Climate Action Plans" and promotion of home renovations and upgrades that increase energy efficiency. The greenhouse gas reductions achieve through this measure will be primarily tied to residential upgrades and renovations.

Cost and Financial Impact
This program may require approximately $20,000 from the City for the energy audit organization to begin work in Foster City. Once the organization has begun work in the City, no ongoing costs to the City are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	**$20,000**	Staff time for outreach and marketing of the program to residential homeowners and renters.	While there is no upfront cost for residents to obtain information on energy efficiency upgrades, steps to implement changes would require upfront costs on the part of the homeowner. Residents would see a decrease in their energy usage bills after implementation of energy saving measures.
Total	**$20,000**	**$0**	**No cost for energy audit; upfront costs for retrofits; eventual energy cost savings.**

Implementation
This program will require staff time to promote personal carbon footprint reduction and home energy efficiency strategies to the community.

[2] http://www.acterra.org/programs/greenathome/housecalls.html

EC 3: Encourage and Facilitate Residential Energy Efficiency Upgrades. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
236 MT CO_2e (16 MT CO_2e already achieved)	1.4%	$0	0 years
Good		Excellent	Excellent

Background
A similar version of this measure was originally recommended in the SAP for businesses, however, this particular measure is aimed at helping homeowners make their homes more energy efficient through funding and technical assistance. This measure has already been implemented as Foster City has joined Energy Upgrade California. Other measures are included in the Climate Action Plan to assist businesses.

To qualify for the Energy Efficiency Upgrade California rebate, homeowners need to hire a contractor and perform an initial assessment.

In 2010, the City entered into an agreement with CaliforniaFIRST to allow property owners within the City limits to voluntarily participate in its PACE program. Since that time, CaliforniaFIRST has offered commercial PACE loans in cities where it has been adopted, but put its residential PACE program on hold since federal programs had determined not to insure mortgages with PACE liens. On August 4, 2014, the City Council voted to allow the HERO program, which has focused on residential PACE and Figtree Financing program, which has focused on commercial PACE, to operate in Foster City as well. These two new programs are moving through the implementation process and are expected to go into effect during the first quarter of 2015.

Measure Description
Participate in the Energy Upgrade California program and other relevant programs such as PACE (CaliforniaFIRST, HERO, Figtree, etc.), and provide other similar rebates and incentives for residential energy audits and energy efficiency retrofits. Provide technical assistance where possible to homeowners.

Cost and Financial Impact
There are no capital or setup costs involved as this measure has already been implemented. Continued implementation of the program would require the allocation of City staff time, but no other direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	Staff time	Rebates will not only provide a one-time savings to homeowners for energy efficient projects, but will also provide ongoing savings in energy bill reductions going forward. In addition, the market value of the home will increase with documentation of higher energy efficiency. Rebates vary depending on type of project, including one-time energy credits for times of hardship ($200), $1500-$4500 per household for comprehensive home upgrades, and monthly discounts on utility bills for income-qualified households.
Total	**$0**	**$0**	**High upfront costs of upgrades may be mitigated through rebates, and will result in energy bill reductions and increases in home value.**

Implementation

Foster City has already joined Energy Upgrade California, but the take-up rate was modest up to 2012. Additional outreach and resources are required to market the program and provide technical assistance to homeowners.

EC 4: Adopt a Commercial Green Building Ordinance.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
703 MT CO_2e	4.2%	$0	2 years
Excellent		Excellent	Good

Background
This measure was originally recommended in the SAP. Similar to Measure EC 1, adopting a commercial green building ordinance would increase the energy efficiency required for future buildings and in significant remodels for existing buildings, which would reduce energy-related emissions.

There are currently three major green rating systems that are currently available on the market: CALGreen Tier 1 or 2 (voluntary tiers above the mandated portion of the CALGreen code), Leadership in Energy and Environmental Design (LEED), or Build it Green (BIG). LEED and BIG are well-established systems. If a CALGreen Tier was adopted, it would require decisions by the City, but this option could offer more choices.

Typically, jurisdictions use Leadership in Energy and Environmental Design (LEED) to rate commercial buildings as the system is well-suited for various scenarios of commercial development, including new construction, tenant improvements, core and shell, and provides differentiation between retail, office, or other uses. LEED is an internationally recognized sustainability rating system regulated by the U.S. Green Building Council.

Measure Description
Adopt a Commercial Green Building Ordinance that mandates higher building performance in commercial buildings. The approach could include providing developers with the option to choose from several different rating systems such as CALGreen Tier 1 or 2, LEED, or Build it Green.

Cost and Financial Impact
The setup and implementation of the program would require the allocation of City staff time, but no direct costs are anticipated. The proposed development mandatory ordinance would be checked for compliance during the building permit plan check process. A “third party” plan check would be required for evaluation beyond the basic CALGreen requirements. Developers and builders would have the additional cost of a third party plan check, but would see cost savings in the long run.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	Staff time would be required to screen and recommend the appropriate Green Building Ordinance rating systems. No direct costs anticipated.	Staff outreach to builders and property owners, including technical workshops. No direct costs anticipated.	Developers and builders would have the additional cost of a third party plan check, but would see cost savings in the long run.
Total	**$0**	**$0**	**Varies**

The mandatory ordinance would be checked for compliance during the building permit plan check process.

Developers and builders would see cost savings in the long run as they implement green building practices. The value and marketability of the built property would also be higher than if it were built using traditional but non-sustainable methods. Also, as green building standards become increasingly mandatory Statewide, such buildings would avoid compliance issues in the future.

Implementation

This ordinance would require research and coordination with the Building Inspection Division to check for compliance with the California Building Code and other similar model ordinances in the Bay Area. Staff time would be required to draft the ordinance, and also to bring it to the Council for adoption. Due to the wide-reaching impact of this ordinance on all commercial new construction and significant remodels, careful thought should be given to the ordinance. An estimated two years is required for implementation.

The ordinance would require the definition of a significant remodel for commercial projects, taking into consideration Fire Code and energy efficiencies of certain types of remodels.

Staff would also need to propose ways to mandate or incentivize the ordinance, for example by requiring a refundable deposit, imposing penalties, or expediting permit plan checks, to ensure or encourage applicants to abide by the requirements of the new ordinance.

EC 5: Encourage and Facilitate Business Energy Efficiency Upgrades. *(initial implementation has occurred)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
1,018 MT CO2e	6.1%	$0	0 years
Excellent		Excellent	Excellent

Background
This measure was originally recommended in the SAP. The SAP recognized that it was important for businesses to gain energy efficiency as well, and that it was difficult for small businesses to find time or personnel to become energy efficient.

Measure Description
Use existing rebates from the County, State, utility companies, and other relevant programs such as PACE (CaliforniaFIRST, HERO, Figtree, etc.), to create incentives and technical assistance for businesses to perform energy efficiency upgrades.

Cost and Financial Impact
The setup and implementation of the program would require the allocation of City staff time, but no direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	**None.**	Staff time for outreach and marketing of program and provision of technical assistance to small businesses, through workshops, guidance documents, etc.	Rebates will not only provide a one-time savings to businesses for energy efficient projects, but will also provide ongoing savings in energy bill reductions going forward. In addition, the market value of the building will increase with documentation of higher energy efficiency. The rebates available vary depending on the type of project.
Total	**$0**	**$0**	**Savings to businesses for energy efficient projects, ongoing energy bill savings, increased property value.**

Implementation
This measure has already been introduced and preliminary implementation has begun. Continued outreach and technical assistance would need to be provided to small businesses.

EC 6: Provide Financing for Commercial Energy Efficiency and Renewable Energy. *(initial implementation has occurred)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
961 MT CO_2e (561 MT CO_2e already achieved)	5.8%	$0	0 years
Excellent		Excellent	Excellent

Background

This measure is newly proposed with the Climate Action Plan. This program is similar to the financing program described in EC 3 for residential energy efficiency and renewable energy, and should be considered together with EC 4 and EC 5 for maximum impact on energy efficiency in the commercial sector.

While the residential portion of the Property Assessed Clean Energy (PACE) financing program is currently halted and awaits reevaluation, 14 counties and 126 cities in California have launched CaliforniaFIRST, the nation's largest finance program similar to the PACE model, for green building upgrades. The Program allows property owners to finance the installation of energy and water improvements on commercial, industrial or multi-family (over 5 units) buildings and pay the amount back as a line item on their property tax bill. The CaliforniaFIRST Program is a program of the California Statewide Communities Development Authority (CSCDA), a joint powers authority co-sponsored by the California State Association of Counties and the League of California Cities, and is administered by Renewable Funding.[3]

Property owners enter into an assessment contract with CSCDA to finance the installation of eligible clean energy projects, and agree to repay the cost of improvements through a line item on their property tax bill. The line item obligation receives priority over private liens, and therefore secures low cost financing. Property owners are allowed to work with any licensed contractor and qualified financing partner, including capital providers listed by the program.

In 2010, the City entered into an agreement with CaliforniaFIRST to allow property owners within the City limits to voluntarily participate in its PACE program. Since that time, CaliforniaFIRST has offered commercial PACE loans in cities where it has been adopted, but put its residential PACE program on hold since federal programs had determined not to insure mortgages with PACE liens. On August 4, 2014, the City Council voted to allow the HERO program, which has focused on residential PACE and Figtree Financing program, which has focused on commercial PACE, to operate in Foster City as well. These two new programs are moving through the implementation process and are expected to go into effect during the first quarter of 2015.

[3] https://californiafirst.org/property_owners_faq

Measure Description
Participate in CaliforniaFIRST to finance energy efficiency and renewable energy improvements for commercial properties.

Cost and Financial Impact
No cost is anticipated for the setup and implementation of the entire program as it has already been implemented in San Mateo County.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	No initial setup cost, as this measure has already been implemented.		The property owner receives a substantial amount to finance energy efficiency upgrades such as a solar panel, and pays the amount back at an interest rate through property tax assessments. Pay back terms and interest rates vary from one provider to another. The value of the commercial property would likely increase with energy efficiency upgrades.
Total	--	--	**Upfront costs largely mitigated through financing; repayment in property tax assessments. Energy bill reductions and increase in property value.**

PACE programs typically do not impact local budgets as administrative costs are covered by bond issuance, and interest is paid by property owners who participate in the program. Financing can also come from an investment bank or company who invests in these projects to make money back in interest.

Implementation
This program has already been implemented in San Mateo County and Foster City, per Resolution 2010-23.

EC 7: Encourage Solar Panel Installation. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
293 MT CO2e (77 MT CO_2e already achieved)	1.7%	$0	0 years
Good		Excellent	Excellent

Background

This measure was originally recommended in the SAP. A similar SolarCity Collective Power Bulk Purchase Program in Portola Valley and Ladera in 2006 was taken up by 38 homes, totaling at least 175 kilowatts of photovoltaic panels[4]. According to the program, which was able to take advantage of State rebates and Federal tax credits, a 10 kW system would cost about $61,000, whereas a 3 kW system would cost $15,000.

There are other communities that require solar systems for new residential projects. One such project is the Sutter Pointe Specific Plan (a planned community just north of Sacramento), which requires solar water heaters on at least 25 percent of the residential units.[5] Also, there are other options for renewable energy system installation besides solar systems. These include ground source heat pumps (which may not be feasible in Foster City), solar hot water heating, hydronic heating and cooling, small wind turbines, micro-hydroelectric power, and HVAC heat recovery systems.[6]

Measure Description

Encourage residential homeowners and landlords, as well as commercial property owners, to install solar panels by removing the building permit fee for solar panels and encouraging participation in the City's Collective Solar Bulk Purchase program.

Cost and Financial Impact

No cost is anticipated for the setup and implementation of the entire program as implementation in Foster City has already begun.

[4] Boyce, David, "Residents win discount in buying solar panels", The Almanac Online. http://www.almanacnews.com/story.php?story_id=3382

[5] http://www.co.sutter.ca.us/pdf/cs/ps/measureM/eir/Sutter_Pointe_EIR_Volume_I.pdf

[6] http://www.energyhomes.org/

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None. Foster City is currently working with the cities of Belmont, Brisbane, Burlingame, Millbrae, Palo Alto, and Redwood City to establish a solar bulk purchase program.	Outreach and provision of resources to developers, builders, business and property owners, including possible technical workshops would require the allocation of staff time, but no direct costs.	The upfront cost of installing a solar or renewable energy system to homeowners is high and therefore sometimes prohibitive. Mandating new developments to include such installations would pass the cost to the developer, but the ultimate cost of homes may also increase as a result. However, homeowners and landlords would see a lowered electricity bill. A 10 kW unit could possibly cover the entire electrical needs of a household.
Total	**$0**	**$0**	**Upfront costs of solar system installation are high, but will result in lowered electricity bills and increased home value.**

Participation in programs which provide rebates and other State or Federal financial assistance programs would be helpful to lower the upfront cost to developers and homeowners. Financing options include Property Assessed Clean Energy (PACE) financing programs for residential and non-residential properties (discussed in EC 6), but a more common way to provide financing to homeowners for solar energy systems is through power purchase agreements and leases.

Implementation
This measure has already been implemented.

EC 8: Create a Requirement for Urban Forestation.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
930 MT CO_2e	5.5%	$0	2 years
Excellent		Excellent	Good

Background
An increase in the tree canopy coupled with the appropriate selection of trees has many beneficial environmental impacts, including the direct absorption of ozone and its precursors, lowering of local temperatures which reduce the rate of ozone formation, and provides shade to buildings which reduces the cooling energy needs, and a reduction of parking lot temperatures which reduces gasoline evaporation. Trees also help in sequestering (or removing) carbon dioxide, the most prevalent greenhouse gas, from the atmosphere.

The SAP recommended reviewing the existing City planting and irrigation guidelines to ensure that carbon sequestration was a high priority in plant selection. The SAP also recommended that the planting and irrigation guidelines should become requirements for all new developments and large landscaping renovations. In addition, this recommendation should also include an education campaign to encourage homeowners to plant appropriate trees for the same purpose.

Measure Description
Create a requirement for urban forestation at all new residential and commercial developments.

Cost and Financial Impact
The setup and implementation of the program would require the allocation of City staff time, but no direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	Staff time to research appropriate tree species and coordination with the Foster City Parks and Recreation Department, as well as other relevant agencies. Staff time to revise existing guidelines.	Staff time for outreach and marketing of program and provide assistance to homeowners.	A requirement for an increased number of trees could mean an increase in development costs, however developers may be able to reduce costs by choosing specific species of shade trees. The development would benefit from reduced cooling energy needs in the long run.
Total	**$0**	**$0**	**Possible increase in development cost; savings in energy bills.**

Implementation
This measure is expected to take up to two years to implement due to the amount of time required to research trees appropriate for Foster City, write, and adopte requirements for new developments and major renovations.

After implementation, outreach will be conducted to also encourage homeowners to plant similar trees in existing yards.

EC 9: Work with Developers and Employers to Develop Robust Sustainability Plans to Minimize GHG Emissions.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
Included under EC 5, EC 6, and TL1	N/A	$0 Excellent	Ongoing

Background
The City is currently working with local employers to encourage the development of business-specific sustainability plans for large businesses and major employers. This voluntary effort can greatly assist businesses in not only reducing their GHG emissions, but can also assist in saving

money associated with electricity costs, water usage, solid waste disposal, and reduce employee commute times.

Measure Description

Strongly encourage developers of larger projects and major local employers to develop sustainability plans. "Larger" projects include projects that would generate 100 or more peak hour vehicle trips. "Major" employers include businesses that employ 250 or more people in Foster City. Plans may include, but are not limited to, efforts to reduce electricity and natural gas consumption; reduce the generation of solid waste through increased recycling, composting and other appropriate measures; reduce water consumption and use in both indoor and outdoor areas; and promote alternative modes of transportation including increased use of public transit, car-sharing, and bicycle/pedestrian travel.

Cost and Financial Impact

The ongoing implementation of the program would require the allocation of City staff time, but no direct costs are anticipated.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	None.	Staff time for outreach and marketing of program and provide assistance to developers and businesses	Encouraging developers and businesses to develop sustainability plans may result in near-term expenses, but will likely result in operational cost savings over time.
Total	**$0**	**$0**	**Possible increase in development and operational costs; savings in energy bills.**

Implementation

This measure would be implemented over time as new development projects are proposed, as businesses seek permits for expansion projects, and as the City conducts outreach and marketing to encourage additional developers and businesses to prepare sustainability plans.

ENERGY (MUNICIPAL)

Goal: Increase the energy efficiency of municipal and public buildings in Foster City.

Although the percentage of the City's contribution to the Community's greenhouse gas emissions is small at 1 percent, the City should take a lead and set an example by increasing the energy efficiency of municipal operations, buildings and facilities. The measures listed below include revised building standards, the purchase of solar systems, purchase of environmentally-friendly materials, and leveraging funding.

EM 1: Implement Energy Efficient Lighting. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
130 MT CO_2e (130 MT CO_2e already achieved)	0.7%	$0	0 years
Good		Excellent	Excellent

Background
This measure was not previously proposed, however, it has already been implemented. The City of Foster City has replaced 100 percent of its street lights with energy efficient LEDs. Phase 1 of this effort involved the replacement of 269 existing Foster City streetlights with more energy efficient LED technology, and was completed in February 2011. Phase 2 of this effort involved the replacement of 1,762 additional lights, and was completed in March 2013.

Measure Description
Replace street, signal lights, parks and parking lot lighting with efficient LED lighting, which is significantly more efficient than conventional lamps and can save on maintenance costs due to longer lifetimes.

Cost and Financial Impact
The total project cost was $1,251,365. In Phase 1, the City used a $33,825 rebate from PG&E and a $157,426 grant received from the American Recovery and Reinvestment Act (ARRA)[7].

In Phase 2, the City contributed $150,000 to this project, received zero percent interest loan from PG&E in the amount of $196,000, and a grant from ARRA totaling $747,939. The repayment of the PG&E loan will come from the energy savings from the streetlights. The entire project will save the City 1,000,689 kWh a year in energy use, and therefore result in $130,083 of energy savings a year, as well as $14,217 maintenance savings a year for the City.

[7] http://www.fostercity.org/publicworks/streetsandstormdrains/LED-Street-Lights-and-Retrofit-Project.cfm

There are no setup costs or ongoing implementation costs, as this measure has been fully implemented.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None	None	None
Total	--	--	--

Implementation
This measure has already been implemented.

EM 2: Implement an Environmentally Preferred Purchasing Policy.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
52 MT CO_2e	0.3%	$0	0 years
Fair		Excellent	Excellent

Background
This is a new proposed measure with the Climate Action Plan document. Environmentally preferred purchasing policies have become increasingly common with businesses. Implementing this in municipal operations shows determination on the part of the local government to set an example for reducing greenhouse gases.

Environmentally preferred purchasing policies can be derived from standard green business checklists, such as purchasing copy paper and notebooks printed on recycled paper, recycled toilet paper and paper towels, replacing aerosols with spray bottles, and so on. Other opportunities include installing more energy efficient parking lot and park lighting equipment.

Measure Description
Implement a sustainable purchasing policy in City departments, which emphasizes recycled materials, energy star equipment, and consideration of energy-saving alternatives, as appropriate, in purchasing decisions. The City should make sustainable purchasing decisions on a case-by-case basis, and where costs associated with purchasing a more sustainable option represent 10 percent increase or less when compared to the cost of purchasing a less-sustainable option, preference should be given to the more sustainable option.

Cost and Financial Impact
No costs are required for the setup and implementation of the entire program, as this measure will be implemented within normal business operations and activities. While not all sustainable products are necessarily cheaper than regular products, prices of sustainable products today are

very competitive, and it is possible to maintain existing purchase costs or even achieve cost savings.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None	None	None
Total	--	--	--

Energy star appliances such as refrigerators and dishwashers will result in substantial cost savings over the long run as electricity and natural gas usage will decrease.

Implementation
Implementing this measure will change standard purchasing policies within municipal departments, and set a culture of choosing environmentally friendly products and services through daily business activities and choices. This measure would require City Council action to amend the City's Purchasing Ordinance and Administrative Purchasing Policy.

EM 3: Adopt Green Building Standards for Municipal Buildings.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
38 MT CO_2e	0.2%	$0	2 years
Fair		Excellent	Good

Background
This measure should be implemented together with the Commercial Green Building Ordinance (EC 4) as standards would generally apply to municipal buildings as well. This measure would increase energy efficiency and reduce energy emissions in municipal buildings.

Measure Description
Adopt green building standards for municipal buildings as part of the Commercial Green Building Ordinance, to mandate higher building performance in municipal buildings. Mandate achievement of LEED Silver in any new municipal building construction and significant remodels, as several other municipalities in the Bay Area have done.

Cost and Financial Impact
No additional costs are required for the setup and implementation of this program, as it would be implemented together with Measure EC 4, the adoption of a Commercial Green Building Ordinance.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None	While this program would not result in direct costs to the City, the City may incur future costs as new facilities are constructed and existing facilities are retrofitted or modified. Future costs are highly speculative and cannot be quantified at this time.	None
Total	--	--	--

Implementation
During the preparation of the Commercial Green Building Ordinance, some considerations should be given to relevant standards for municipal buildings.

EM 4: Consider a Municipal Renewable Energy System Installation Program. *(initial implementation has occurred)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
11 MT CO2e (11 MT CO_2e already achieved)	0.06%	$715,761	6 years
Fair		Fair	Fair

Background
This measure is similar to Measure EC 7, which promotes installation of solar panels or another comparable renewable energy system when constructing new homes and commercial buildings of a certain size and/or capacity and for renovations of a certain value for existing buildings.

Measure Description
Continue to review existing City facilities to evaluate the benefits of installing solar panels or another comparable renewable energy system, and install solar or other renewable energy facilities on suitable facilities to the greatest extent feasible. The measure promotes

consideration of solar panel group purchases with other cities. At its meeting on November 5, 2012, the City Council directed staff to issue a Request for Proposal to install solar panels on the roof of the Library/Community Center, on carports in the public parking lot of the Library/Community Center and on carports in the secured parking lot behind the Police Station.

Cost and Financial Impact

The City Council previously approved the expenditure of $10,000 towards a feasibility study for solar installations at the Community Center. The City is currently under contract for the installation of solar PV facilities at the Community Center in the amount of $715,761, and the project is estimated to be completed by the end of the 2014/15 fiscal year.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	None	The contract for installation of solar PV panels at the Community Center is $715,761. Additional costs could be incurred if the facility design changes or if additional sites are selected for PV installation.	None
Total	--	**$715,761**	--

Implementation

Steps to install PV facilities at the Community Center are underway, and construction is estimated to be complete by the end of the 2014/15 fiscal year. The City may wish to explore opportunities to install PV or other alternative energy facilities at other municipal buildings and sites in the future.

EM 5: Audit Municipal Facilities for Energy Efficiency Opportunities and Implement Energy Efficient Retrofits. *(already implemented)*

Annual GHG Reduction	**Percent GHG Reduction towards 2020 Target**	**Total Cost**	**Implementation Time required**
32 MT CO2e (11 MT CO_2e already achieved)	0.2%	$1,393,000	0 years
Fair		Fair	Excellent

Background
This measure was not previously proposed, but has already been implemented. The goal of this measure is also to increase energy efficiency and reduce energy emissions in municipal buildings.

Foster City participates in the San Mateo County (SMC) Energy Watch, which performs no-cost, no-obligation energy surveys to identify opportunities for energy efficiency upgrades and cost savings. At its meeting on March 3, 2014, the City Council authorized staff to move forward with the preparation of a "sole source" contract with Thermal Mechanical for implementation of Energy Efficiency Upgrades to City Facilities identified in the San Mateo County Energy Watch Energy Efficiency audit.

Measure Description
Participate in San Mateo County Energy Watch programs to audit municipal facilities for energy efficiency opportunities, and implement energy efficient retrofits.

Cost and Financial Impact
The final contract cost with Thermal Mechanical for a range of Energy Efficiency Upgrades is $1,442,738, with an estimated $49,808 in qualifying rebates making the total cost to the City of the project $1,393,000. Of that total, $606,230 is eligible for On-Bill Financing, to be paid back at 0% interest over 10 years through the energy savings from the project.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	No capital or setup costs are projected, as the measure has already been implemented.	The final contract cost with Thermal Mechanical for a range of Energy Efficiency Upgrades is $1,442,738, with an estimated $49,808 in qualifying rebates making the total cost to the City of the project $1,393,000. Of that total, $606,230 is eligible for On-Bill Financing, to be paid back at 0% interest over 10 years through the energy savings from the project.	None
Total	--	**$1,393,000**	--

The costs do not take into account savings in electricity and natural gas usage after retrofits.

Implementation
Implementation of this measure is underway.

TRANSPORTATION AND LAND USE (COMMUNITY)

Goal: Encourage smart growth development and the usage of alternative modes of transportation in Foster City.

Transportation goes hand-in-hand with land use, and the City's General Plan Land Use and Circulation Element update incorporates previous policies and newer policies that achieve the goals of reducing the use of automobiles through land use patterns, encourage alternative modes of transportation, and encourage hybrid and electric cars compared to regular automobiles.

TL 1: Implement Smart Growth Development. *(implementation is ongoing)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
1,313 MT CO_2e	7.8%	To be determined	0 years
Excellent		Excellent	Excellent

Background
SB 375 enhances California's ability to reach its AB 32 goals, by promoting good planning with the goal of more sustainable communities. It also requires the California Air Resources Board (CARB) to establish targets for 2020 and 2035 for each metropolitan planning region (e.g. the Bay Area).

The transportation sector of GHG emissions is determined through Vehicle Miles Traveled (VMT). VMT is then analyzed for standard proportions of gallons of gasoline and diesel consumed, and their respective GHG emissions using standard emission factors.

As part of the ongoing efforts to reduce VMT within the community, new development projects and proposed land use changes that would generate 100 or more peak hour vehicle trips are required to prepare a Transportation Demand Management (TDM) Plan. The TDM must contain a range of measures and programs that will effective reduce vehicle trips generated by the project. Measures may include, but are not limited to, bicycle parking and onsite bike lanes and facilities, onsite shows and lockers, bicycle and pedestrian safety facilities, coordination with other local and regional trip reduction measures, and payment of fees towards citywide vehicle trip reduction efforts.

Measure Description
Achieve SB 375 goals for mixed use, transportation-oriented and infill development, and greater jobs/housing balance. This measure includes several goals and policies implemented together with the 2025 General Plan Update. Work with employers to implement employer-based trip reduction programs and create opportunities to improve transit and access to regional transit.

Review new development projects to ensure that effective and appropriate TDM measures are incorporated into new projects.

Cost and Financial Impact

No capital or setup costs are projected as these sub-measures are implemented as part of the General Plan Update and occur during the development review process for project applications. Although some staff coordination is required for programs related to employer trip reductions and traffic reduction programs, including review and approval of TDM plans, all of these programs are accounted for under the General Plan update and development review process.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	None.	None.	None.
Total	--	--	--

Implementation

All sub-measures will be implemented under the General Plan update. The list below provides a summary of the policies that contribute toward the reduction of VMT in the proposed Land Use and Circulation Element update:

a. (LUC-21) Foster City will encourage housing production by allowing the residential portion of mixed use residential and commercial projects to be built at the maximum allowed densities, to reduce trips from and within the City.
b. (LUC-25) Allow and encourage vertically and horizontally mixed use developments that maximize the use of land, organize land uses, and pedestrian/vehicular circulation in a safe, logical and functional manner.
c. (LUC-49) Allow and encourage change that response to the employment needs of businesses, and that results in greater density and intensity of a broad array of compatible land uses.
d. (LUC-59) Foster City will work with existing employers and developers of new non-residential development to participate in traffic reduction programs.
e. (LUC-60) Foster City will work with employers to implement employer-based trip reduction programs that shuttle people to and fro from employment centers and regional destinations.
f. (LUC-61) Create opportunities to improve transit and access to regional transit with new or modified development, as appropriate.
g. (LUC-K) Encourage the redevelopment of under-utilized properties, with an increased density or intensity of uses.

These smart growth policies will work in tandem to improve air quality and economic efficiency. They also have high potential for synergetic effects on costs, resources, and GHG emission reductions.

TL 2: Implement Complete Streets and Pedestrian and Bicycle-friendly Design. *(initial implementation has occurred)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
2,931 MT CO_2e	17.4%	To be determined	0 years
Excellent		Excellent	Excellent

Background

Complete streets are also known as living streets, designed to provide safe and attractive access and travel for all users, including public transport users, motorists, bicyclists, and pedestrians of all ages and abilities[8]. This concept is based on the street being a balanced shared space. In the Foster City context, pedestrian and bicycle-friendly design is particularly emphasized. The City Council passed a resolution adopting the Complete Streets policy in September 2012. In September 2014, the City Council passed Minute Order No. 1385, directing staff to conduct a study of all intersections in the City from a holistic perspective which would consider the needs of pedestrians, bicyclists, and motorists. The City Council also approved Minute Order No. 1384, which directed staff to identify bikes routes that may need enhancements to increase safety, particular on routes to schools, and to identify major thoroughfares and enhancements to bicycle facilities that would allow cyclists to get to the levee safely.

The City has taken recent steps to improve bicycle and pedestrian safety within the community, including the installation of rapid rectangular flashing beacons (RRFB) at Edgewater Blvd/Port Royal Ave., and Beach Park Blvd. near Bowditch School. These measures help to improve pedestrian safety in these locations.

Measure Description

Plan for a balanced, multimodal transportation network and encourage bicycling and walking instead of driving by prioritizing pedestrian and bicycle-friendly improvements. Implement bike lanes on main streets, an urban bike-trail system, bike parking, and pedestrian crossings.

Cost and Financial Impact

Costs would be incurred as the City initiates roadway improvement projects. The incorporation of complete streets components into future roadway improvement projects is not anticipated to significantly increase construction costs.

[8] Complete Streets. http://en.wikipedia.org/wiki/Complete_streets

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None (Resolution for Complete Streets already passed, other sub-measures accounted for under the General Plan Update effort).	Traffic calming measures and complete streets features would be incorporated into future roadway improvement projects. Detailed cost estimates cannot be generated at this time.	None.
Total	--	--	--

Implementation
All sub-measures will be implemented under the General Plan update. The list below provides a summary of the policies that contribute to a reduction in VMT in the proposed Land Use and Circulation Element update:

a. (LUC-E) Provide for diversified circulation needs, including efficient and safe access for all users.
b. (LUC-55) The City will plan for a balanced, multi-modal transportation network that meets the needs of all users of the streets, roads, and highways for safe and convenient travel.
c. (LUC-63) Encourage bicycling and walking instead of driving to reduce greenhouse gas emissions. Prioritize pedestrian and bicycle-friendly improvements including bike lanes on main streets, an urban bike-trail system, bike parking, pedestrian crossings, and associated master plans with new or modified development.
d. (LUC-65) Encourage secured bicycle parking for all commercial and industrial buildings, and reduce parking requirements where bicycle parking spaces are provided, according to code.

TL 3: Incentivize and Explore Car and Bike Sharing.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
625 MT CO_2e	3.7%	$50,000	4 years
Good		Fair	Good

Background
This measure is a newly proposed measure with the Climate Action Plan document. While car sharing has become a fairly common practice in several cities around the United States and the Bay Area, car sharing is still in the pipeline for Foster City.

Bicycle sharing, or bike sharing, is a more recent concept where bicycles are made available to individuals who do not own them. Bike sharing programs could be organized and implemented by local community groups, government agencies, or through public-private partnerships. The idea is to provide free or affordable access to bicycles for short-distance trips as an alternative mode of transport, connecting users to public transit networks and also reducing traffic congestion[9].

In the United States, the City of Boston uses Hubway, a company who provides members a key to unlock a bike from numerous docking stations around the City, and Washington D.C. has a similar program called Capital Bikeshare. Chicago and Minneapolis also have bike sharing programs, and a regional pilot program led by the Bay Area Air Quality Management District (BAAQMD) in partnership with the SFMTA will bring approximately 50 bike share stations and 500 bikes to San Francisco's downtown core beginning in fall 2012. The San Mateo County Transit District is participating in a first-of-its-kind regional pilot bike-sharing program which will run for 12 months beginning in summer 2012.

In 2011, the San Mateo County Board of Supervisors also approved the spending of over $5.75 million in grant funding towards a Regional Bicycle Share Pilot Program and the Last Mile Connection Pilot Program. This Bicycle Share Pilot will put bicycles at 100 kiosks along the Peninsula, and the Last Mile Connection Program will put electric and hybrid rideshare cars for public use in Redwood City. These programs may be expanded to Foster City in the future.

Measure Description
Incentivize car sharing companies to open pods in town, and explore a bicycle sharing program.

Cost and Financial Impact
It is estimated that approximately $50,000 will be required for the setup of both programs. This estimate assumes a private sector model for the car and bike sharing program. Foster City's role would be to bring in a car-sharing and a bike-sharing company to launch the programs, and search and apply for federal grants to start the programs.

[9] Bicycle sharing system. http://en.wikipedia.org/wiki/Bicycle_sharing_system

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	Incentive fund for car and bike sharing companies to set up in Foster City. **$50,000**	None. Implementation funded by private entities.	Any fees charged to use the shared cars or bicycles. With conveniently located cars and bicycles, residents would save on gas purchases. Some residents may decide not to purchase a car as a result, therefore saving money and greatly reducing greenhouse emissions.
Total	**$50,000**	**$0**	**Fees for using shared cars or bicycles. Money saved on gas or car purchase.**

Implementation

Both programs are assumed to take 4 years to implement. Both programs require buy-in from the City Council and community. Car sharing programs require coordination talks and bike sharing programs require substantial investment on the local government's part.

TL 4: Encourage a Preferred Parking/Electric Plug-in Policy for Alternative Fuel Vehicles.

Annual GHG Reduction	Total Cost	Implementation Time required
N/A, depends on implementation	$0	5 years
N/A	Excellent	Fair

Background

Currently, both the Foster City General Plan Update and the SAP contain policies or programs that address preferred parking for electric vehicles. Incentives and infrastructure is required to encourage more drivers in Foster City to switch to lower emission vehicles. The policies/programs are:

a. (LUC-67) Encourage businesses, developers, and property managers to create preferred parking for electric and alternative fuel vehicles, and study the installation of electric charging stations for plug-in vehicles.
b. (AQT 1 of SAP) Develop a requirement that businesses, developers, and property managers create preferred parking for electric and alternative fuel vehicles and study the installation of electric charging stations for plug-in vehicles.

To date, an electric car charging station has been installed at City Hall. Additionally, electric car plug in stations are often included as part of the required Transportation Demand Management Program for new development projects.

Measure Description

Encourage and consider making it mandatory for businesses, developers, and property managers to create preferred parking for electric and alternative fuel vehicles and study the installation of electric charging stations for plug-in vehicles.

Cost and Financial Impact

No operational costs for the City are projected, as the reviews for electric vehicle charging locations and design would be conducted during building permit plan checks.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	Additional cost to businesses, developers, property managers. However, electric vehicle parking is gaining popularity in California. The property will be seen as a green development. This measure will assist in promoting a culture of sustainability in Foster City.
Total	--	--	**Additional cost to development.**

Implementation

Research and prepare an ordinance which would require new developments to install a specified number of electric car charging spaces on-site. Implementation of this measure should occur after the City has determined that technology for plug in vehicles has reached a point of industry standardization that will allow the City to make an informed decision regarding the appropriate number of charging stations to require for new development projects.

TL 5: Support Safe Routes to School. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
238 MT CO_2e	1.4%	$0	0 years
Good		Excellent	Excellent

Background

This is a newly proposed measure in this Climate Action Plan document, but it is already being implemented by the City. Safe Routes to School is a national movement that encourages children to walk or bike to school by creating opportunities for safe and convenient travel. In 2005, the U.S. Congress approved funding to implement Safe Routes to School programs in each state to fund infrastructure improvements, such as bike lanes and sidewalks, as well as educational programs.

Foster City has adopted a resolution to support Safe Routes to School policies and programs by partnering with local schools to promote safe and comfortable travel environments for children. In September 2014, the City Council passed Minute Order No. 1385, directing staff to conduct a study of all intersections in the City from a holistic perspective which would consider the needs of pedestrians, bicyclists, and motorists. The City Council also approved Minute Order No. 1384, which directed staff to identify bikes routes that may need enhancements to increase safety, particular on routes to schools, and to identify major thoroughfares and enhancements to bicycle facilities that would allow cyclists to get to the levee safely.

The City has taken recent steps to improve bicycle and pedestrian safety within the community, including the installation of rapid rectangular flashing beacons (RRFB) at Edgewater Blvd/Port Royal Ave., and Beach Park Blvd. near Bowditch School. These measures help to improve pedestrian safety in these locations and enhance opportunities for Safe Routes to School.

Measure Description
Coordinate Safe Routes to School programs in local schools to encourage walking and biking.

Cost and Financial Impact
No costs are required for the setup and implementation of the program.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	**None.**	No direct costs. Staff time would be needed to coordinate with schools to find strategies that would encourage students to travel by walking and biking. Other costs that may be related to the program, such as the addition of bike lanes would be included in measure TL 2.	None for the general public. Individuals may need to spend money on their own transportation necessities, such as bikes for individuals who wish to bike but do not own one.
Total	**--**	**$0**	**None, but individuals may need to pay for their own transportation necessities.**

Implementation
Implementation of this program is currently ongoing.

TRANSPORTATION-RELATED MUNICIPAL OPERATIONS

Goal: Reduce greenhouse gas emissions through purchasing fuel-efficient and low-emission vehicles, incentivizing alternative modes of transportation, and promoting telecommuting where feasible.

The City can take a lead on the transportation measures for the community by initiating policies to change its current fleet of vehicles to include more fuel-efficient and low-emission vehicles. Allowing telecommuting will also reduce the number of trips taken by employees to the City, and will result in decreased emissions.

TM 1: Implement a Fuel-efficient Fleet Policy. *(initial implementation has occurred)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
44 MT CO2e	0.3%	$170,000	0 years
Fair		Fair	Excellent

Background
Fuel efficient vehicles and alternative fuel cars are increasingly populating the auto market, and many other jurisdictions have considered or purchased alternative fuel vehicles for their fleets due to higher fuel economy and gasoline cost savings. ”Fuel-efficient” refers to alternative forms of fuel such as biodiesel, ethanol, and compressed natural gas vehicles such as garbage trucks, buses, or regular four-door sedans. This is different from “low-emission”, which is described in Measure TM 2. There are currently 89 vehicles in the City’s fleet of non-specialized vehicles (which excludes heavy trucks, police cruisers, fire apparatus, etc.). Of these 89 vehicles, the City has eight alternative fuel and low emission vehicles, which includes seven Toyota Priuses and one Ford Fusion Electric Vehicle.

Measure Description
Prioritize the purchase of fuel-efficient vehicles and alternative fuel vehicles. Maintain existing vehicles for optimum mileage. Encourage staff to drive minimally and efficiently. Establish a policy against car idling during government operations. This measure does not apply to specialty vehicles such as fire trucks and fire apparatus, heavy trucks, police cruisers, and other vehicles that are not suitable for replacement with alternative fuel vehicles.

Cost and Financial Impact
It is estimated that approximately $170,000 will be required for the setup and implementation of this measure, including staff time to implement policies that reduce idling and encourage efficient driving, and the City’s investment in new electric or fuel efficient vehicles.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	Cost of purchasing new vehicles *over* conventional vehicles: $170,000 (upgrade 30 percent of current fleet for approximately 17 cars/light-duty vehicles, at a surplus over conventional vehicle cost of $10,000 per vehicle)	None.
Total	**$0**	**$170,000**	**--**

The estimated difference between the (higher) cost of a fuel efficient car or light-duty vehicle compared to a conventional vehicle is approximately $10,000. While maintenance costs are factored in under existing vehicle fleet budgets, the City will likely experience future cost savings in maintenance by upgrading its vehicle fleet, as newer and more efficient cars will require less maintenance and less fuel.

Implementation

This measure could be implemented almost immediately to achieve cost savings through the purchase of new fuel-efficient or alternative fuel vehicles, and through employee policies that would reduce fuel usage. This measure should be considered in conjunction with TM 2, which promotes the purchase of low-emission government vehicles. Both measures are assumed to contribute an approximate 47 percent turnover in the existing City's vehicle fleet by 2020 (the current total is 58 vehicles), with TM 1 contributing about 30 percent and TM 2 contributing about 17 percent. Measure TM 1 has more significant emission reductions and should therefore have a greater focus than TM 2.

TM 2: Implement a Low-emissions Fleet Policy.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
18 MT CO2e	0.1%	$92,000	2 years
Fair		Fair	Good

Background
This is a newly proposed measure. The City may again set an example to promote the purchase of low emissions vehicles for its own fleet. This measure covers low emission vehicles or hybrid technology, and the goal is to replace inefficient vehicles in the City fleet.

"Low emission" is a regulatory term that refers to vehicles that have lower levels of motor emissions compared to older vehicles. Low-emission vehicles (LEVs) became the minimum standard for all new cars sold in California as of 2004. California was allowed by the Federal government to establish its own emission standards due to the State's pre-existing standards, and also the severe motor vehicle pollution problems in the Los Angeles metropolitan area. Other States have adopted similar standards in recent years, following the California model.

Ultra-low emission vehicles (ULEV), super-ultra-low-emission vehicles (SULEV, 90 percent cleaner than the average new model year car), and partial-zero-emission vehicles (PZEV, which have no evaporative emissions), and zero-emissions vehicle (ZEV, which are 98 percent cleaner than the average new model year vehicle with no tailpipe emissions), are all types of low-emission vehicles that are available on the market today.

Measure Description
Purchase new or convert existing light-duty government vehicles to low emissions vehicles where appropriate and feasible.

Cost and Financial Impact
Costs associated with this measure total approximately $92,000 and represent the incremental cost increase of purchasing advanced vehicles over conventional vehicles.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	$10,000 cost per vehicle replaced by a new or newer low emissions vehicle. **$100,000**	Ongoing maintenance costs of LEV vehicles would not be appreciably higher than maintenance costs for "traditional" vehicles. The City may realize future cost savings associated with decreased fuel usage.	None.
Total	**$100,000**	**-$8,000 (a cost savings)**	**--**

Maintenance costs are already considered under existing fleet budgets. The City will achieve cost savings in maintenance by upgrading its vehicle fleet, as newer and more efficient cars will require less maintenance. In addition, the City will achieve an estimated $8,000 annual savings on gasoline.

No additional staff time will be required, as this measure assumes that the City will need to purchase future vehicles regardless of this program, and is therefore part of existing staff duties.

Implementation

Begin to modify the existing fleet purchasing preference to incorporate a preference for the purchase of low emissions vehicles. This measure is an adoption of the existing Statewide approach to vehicle fleet transitions. Due to the pre-existing Californian standards for vehicle emissions, this measure has a lower impact than TM 1. Hence, the assumption is that the City should place a bigger emphasis on TM 1 compared to TM 2. TM 2 assumes that the City would replace 10 vehicles for lower-emissions vehicles, and TM 1 assumes that the City would replace 17 cars with a more fuel-efficient version.

As the municipal government has more control over its own actions, this will set an example for other regional agencies and local businesses.

TM 3: Allow Flexible Working Schedules for Municipal Employees. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
1,897 MT CO_2e	11.3%	$0	0
Excellent		Excellent	Excellent

Background
Telecommuting and providing flexible work hours for staff allows staff to reduce or avoid a commute and perform office work from home or under a condensed office work schedule. The City currently implements a 9/80 work schedule option for non-public safety employees. The City may also wish to explore allowing certain classifications of employees to work from home on a part-time basis to further reduce commutes. Public safety employees, including police and fire personnel, currently have opportunities to select from a variety of shift options and alternate schedules that reduce the number of commute days and travel during peak commute hours.

Measure Description
Promote alternative work schedules and develop telecommuting guidelines to reduce employee commutes.

Cost and Financial Impact
There would be no operational costs associated with this measure.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	None. City staff would save money on fuel through the telecommuting program.
Total	--	--	**None. Gas savings for City staff.**

Staff would spend less on gasoline when they are allowed to telecommute and GHG emissions would be reduced.

Implementation
Update employee policy allowing certain categories of employees to telecommute on certain days, or work flexible work schedules that reduce the number of days employees need to commute to work, thereby reducing the amount of VMT. The City can utilize its Virtual Private Network (VPN) and web-based emails, which are already in place, to allow successful telecommuting. Establish clear systems to set mutually monitored work goals so that telecommuting is not abused.

TM 4: Establish a Public Employee Commuting Program. *(already implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
12 MT CO2e	0.07%	$10,080	1 year
Fair		Good	Excellent

Background
This measure is a proposed modification to the City's existing policy. The City will set an example by promoting the usage of alternative transportation for its own employees, by encouraging the use of public transit, carpooling, and other alternative methods of commuting. The current program offers a $15 rebate to commuters who take alternative methods of transportation.

San Francisco Bay Area employers with 50 or more full-time employees within the Bay Area Air Quality Management District (Air District) geographic boundaries were required to register and offer commuter benefits to their employees by September 30, 2014 in order to comply with the Bay Area Commuter Benefits Program. Through this program, employers must offer their employees one of four Commuter Benefit options in order to comply with Air District Regulation 14, Rule 1. Commuter benefits encourage employees to take transit, vanpool, carpool, bicycle and walk rather than drive alone to work. The City is already registered with the Air District in compliance with this program.

Measure Description
Continue to implement and expand the commute alternatives program to promote and incentivize public transportation, carpooling, biking, etc. among City employees. Request feedback from City employees to improve the current program offerings.

Cost and Financial Impact
The total cost estimated with this measure is $10,080, mainly for coordination.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	Cost of passes, assuming partial sponsorship by the City at $15 a month for seven years (84 months) and with an average of 8 participants per year. **$10,080**	None. Costs of commuting for City employees would be reduced.
Total	**$0**	**$10,080**	**None. Gas savings for City staff.**

Staff would spend less on gasoline when carpooling or taking public transportation, which takes cars off the road. GHG emissions from municipal employee travel would experience a reduction.

Implementation
Update and expand existing employee program on commute alternatives such as carpooling, public transit, and biking, thereby reducing the amount of VMT per employee. Incentivize public transportation by giving out free (sponsored) passes to employees. Conduct additional outreach among municipal employees.

WASTE (COMMUNITY)

Goal: Achieve a higher waste diversion rate.

When waste is diverted away from landfills and into recycling or compost, the amount of greenhouse gases generated from landfills (mostly methane) is also reduced. The measures listed below collectively work towards achieving a higher waste diversion rate than the current achieved rate in Foster City (45 percent in 2005).

WC 1: Achieve a Higher Waste Diversion Rate of 75 Percent. *(partially implemented)*

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
2,267 $MTCO_2e$ (1581 MT CO_2e achieved as of 2011)	13.5%	$0	2 years maximum (for all programs)
Excellent		Excellent	Good

Background
In 2005, the community diversion rate for Foster City was at 45 percent, meaning 45 percent of Foster City's waste was recycled or composted, while 55 percent of waste went to the landfill[10].

The California Integrated Waste Management Act of 1989, called AB 939, required each jurisdiction to divert 50 percent of its solid waste from being disposed in landfills. Cities such as Foster City were required to prepare and implement plans to achieve 25 percent waste reduction from 1995 through 1999, and 50 percent waste reduction from 2000 and after. Foster City applied for and received two extensions, and eventually achieved the 50 percent diversion mandate in 2006[11].

[10] https://fostercity.org/community_info/Recycling-Rates.cfm
[11] 2006 data from San Mateo County's RecycleWorks showed an average diversion rate of 56 percent for San Mateo jurisdictions, with actual diversion rates ranging from as high as 82 percent achieved by East Palo Alto, to as low as 28 percent achieved by Daly City. San Carlos and Burlingame, which are closest to Foster City in population size, had achieved 47 percent and 60 percent respectively. Foster City's diversion rate in 2006 was 50 percent.

The California Integrated Waste Management Board (CIWMB) also set a goal of Zero Waste in its strategic plan for the State in 2001, referring to a goal to divert all or nearly all of waste materials from landfills. Several jurisdictions and counties in California have adopted this goal.

Jurisdictions in San Mateo County and around the Bay Area have adopted varying goals for waste diversion, and are at different levels of achieving their goals. Some jurisdictions implement an actual diversion rate while others aim to reduce emissions by a certain percentage.

Jurisdiction	Diversion or Zero Waste goals
San Carlos	Divert additional 1 percent per year.
Redwood City	Reduce emissions from waste by 15 percent in 2020
Pacifica	75 percent by 2020; Zero Waste by 2030
San Francisco; Oakland; Berkeley	75 percent by 2010; Zero Waste by 2020
Marin County	80 percent by 2012, Zero Waste by 2025

Based on actual waste data for Foster City up to 2011, the rate at which Foster City is reducing its landfill waste is increasing quickly, averaging a drop in 264 tons from each previous year since 2005. At this rate, Foster City would be able to achieve a 75 percent diversion rate by 2015.

A later bill, SB 1016, built on AB 939's requirements by implementing simplified measures. For 2007 and subsequent years, CalRecycle (which replaced the California Integrated Waste Management Board) introduced a new diversion measurement system based on a jurisdiction's population and disposal tons, to calculate a per capita disposal rate expressed in pounds per person per day. Foster City achieved compliance in 2008 by achieving a disposal rate below the per capita disposal rate of 3.7 pounds per resident per day, and 7.1 pounds per employee per day. In 2013 the City continued to meet or exceed the target disposal rates for residents and employees. Foster City achieved 2.6 lbs/person/day (per resident) and 4.1 lbs/person/day disposal rate for employees. Both are well within the 50% reduction goal.

To continue compliance with SB 1016, Foster City needs to measure and track its citywide waste disposal rate every year. Increasing the overall waste diversion rate is an effective way to dramatically reduce greenhouse gas emissions.

Foster City is a member of Rethinkwaste/South Bayside Waste Management Authority (SBWMA); a joint powers authority comprised of 12 Member Agencies (Atherton, Belmont, Burlingame, East Palo Alto, Foster City, Hillsborough, Menlo Park, Redwood City, San Carlos, San Mateo, the County of San Mateo and the West Bay Sanitary District) in San Mateo County and is a leader in implementing innovative waste reduction and recycling programs. Waste generated in Foster City is disposed of at the Shoreway Environmental Center, which is owned and managed by Rethinkwaste/SBWMA. The Shoreway Environmental center is a permitted solid waste transfer station, a new recycling processing facility, and a new education center. Solid waste collection services are provided by Recology San Mateo County under its frachise agreement with Foster City.

Measure Description
Achieve a higher waste diversion rate of 75 percent by 2020.

The diversion of more trash away from landfill to recycling or composting in Foster City will need to be accomplished by implementing or participating in several programs, as a single effort is unlikely to achieve a substantial increase in overall diversion. The programs listed below were originally recommended as part of the SAP[12], and would have a direct impact on reducing waste or diverting waste from a landfill, and therefore a direct impact on reducing greenhouse gases.

a. A program prohibiting disposable polystyrene food ware.
b. A grading or award program for commercial food waste collection.
c. A gradual ban on single use plastic carryout bags and charge for paper and reusable bags.
d. A Construction and Demolition Ordinance which includes incentives for deconstruction and requires higher mandatory recycling/reuse rates for contractors.
e. A yard waste ordinance that requires all landscapers and landscape maintenance businesses recycle or divert yard waste.
f. Recycling of Styrofoam and hard-to-recycle plastics by holding regular collection events and establishing permanent drop-off points in coordination with neighboring agencies.
g. RecycleBank or a pay-as-you-throw program to incentivize good recycling habits.

These programs have been updated where necessary based on the latest developments, and are described in detail on the following pages.

Cost and Financial Impact
A summary of the costs required for each program is listed below. Please see each individual program description for more details.

[12] Two other measures from the SAP were not included – a) Establishing pharmaceutical drop-off locations, as this measure is more directed towards reducing water pollution, and b) Sponsoring a city-wide swap meet, which supports the overall goal of reducing greenhouse gas emissions, but is difficult to quantify.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Total Costs to set up and run program
a. A program to prohibit disposable polystyrene food ware. (completed)	$0	$0	$0
b. Grading or award program for commercial food waste collection.	$0	$0	$0
c. Ban on single use plastic carryout bags and charge for paper and reusable bags. (completed)	$0	$0	$0
d. Construction and Demolition Ordinance. (completed)	$0	$0	$0
e. Yard Waste Ordinance.	$0	$0	$0
f. Recycling of Styrofoam and hard-to-recycle plastics.	$0	$0	$0
g. RecycleBank or a pay-as-you-throw program.	$0	$0	$0
		TOTAL:	**$0**

Implementation

Most of the measures take a short to moderate amount of time for implementation, ranging between 0 to 3 years.

	Years assumed for implementation
a. A program to prohibit disposable polystyrene food ware. (completed)	0 years (already implemented)
b. Grading or award program for commercial food waste collection.	2 years
c. Ban on single use plastic carryout bags and charge for paper and reusable bags. (completed)	0 years (already implemented)
d. Construction and Demolition Ordinance. (completed)	0 years (already implemented)
e. Yard Waste Ordinance.	2 years
f. Recycling of Styrofoam and hard-to-recycle plastics.	1 years
g. RecycleBank or a pay-as-you-throw program.	2 years

WC 2: Adopt an Ordinance to Prohibit Disposable Polystyrene Food Ware. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$0	0 years
NA	Excellent	Excellent

Background
On October 17, 2011, Foster City adopted by reference the San Mateo County ordinance prohibiting single-use polystyrene-based food containers for restaurants and food vendors. The ban went into effect on April 1, 2012. It encourages food vendors to reduce the negative environmental impacts of disposable food service ware by utilizing biodegradable, compostable, reusable, or recyclable food service ware products instead.

Measure Description
This measure effects a ban on single-use polystyrene food containers used by restaurants and food vendors. This ban is enforced by San Mateo County Environmental Health Division personnel.

Cost and Financial Impact
There are no setup and implementation costs for this measure as it has already been implemented, and enforcement is carried out by County personnel.

The County of San Mateo prepared a cost analysis to demonstrate the average cost difference between polystyrene and alternative products, showing that prices are generally (although not always) higher for other products used to replace polystyrene. The exact fiscal impacts to individual businesses vary depending on the size and needs of each business, but it was estimated that small to medium size businesses would see additional costs of $142 to $328 annually.

Implementation
This measure has already been implemented.

WC 3: Continue Participation in a Grading or Award Program for Commercial Food Waste Collection. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$12,000	Ongoing
NA	Good	Excellent

Background

This measure was recommended in the SAP to incentivize commercial businesses to improve participation in food waste collection, which would help increase the overall commercial diversion rate and therefore community-wide diversion rate.

Foster City participates in an award program for commercial food waste collection in association with the South Bayside Waste Management Authority (SBWMA). The SBMWA holds a BizSMART@Work awards luncheon every spring (starting in 2012) to acknowledge businesses and multi-family development complexes for their achievements in recycling and composting to reduce their waste streams through the BizSMART Recycle, Compost, and Garbage collection services.

Measure Description

This measure includes continued participation in the SBWMA BizSMART program to award businesses and multi-family developments based on food waste diversion rates, recycling rates, and waste stream reductions. The awards are publicized and businesses and multi-family developments with the highest grades are recognized at an annual awards luncheon.

Cost and Financial Impact

This program is already established and no setup costs would be incurred. It is assumed that the City may provide marketing assistance to increase local participation, which may result in costs of approximately $2,000 per year over six years, for a total cost of $12,000.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	Marketing materials, assuming $2,000 a year for 6 years. **$12,000**	Businesses that participate in this program should see savings in their waste collection fees as they divert more waste from the landfill. Landfill waste has a higher collection fee than recycling (free) and food waste (25 percent discount from landfill collection cost). Businesses that perform well in the program could use their awards as a marketing tool and receive an economic benefit by gaining patrons who find sustainable practices to be important.
Total	**$0**	**$12,000**	**Savings to businesses**

Implementation

This measure has already been implemented. Additional staff time and limited marketing materials may be required in order to increase participation in the program.

WC 4: Implement a Ban on Single Use Plastic Carryout Bags and Charge for Paper and Reusable Bags. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$0	0 years
NA	Excellent	Excellent

Background

Twenty billion single use plastic grocery bags are used every year in California, and most end up in landfills, or as litter on land and in water. As plastic does not biodegrade, it instead breaks down into smaller and smaller particles that seep into soil and water. Meanwhile, statistics on paper bags are also somewhat discouraging. A study by the Environmental Protection Agency found that only 4.3 percent of paper bags are recycled, and a single use paper bag has an even larger greenhouse gas emission than a single use plastic bag.

This measure was first recommended as a gradual ban on plastic bags and polystyrene containers in the SAP document, with a recommendation to look at the 2009 Palo Alto ordinance outlawing plastic bags at grocery stores as a similar model. In 2012, San Mateo County began work to produce an Environmental Impact Report (EIR) on a proposed Single Use Bag Ban Ordinance[13], and Foster City joined this effort as one of the responsible agencies.

The Foster City Reusable Bags Ordinance, Section 8.09 of the Municipal Code, went into effect on April 22, 2013.

The intent of the Reusable Bags Ordinance is to reduce the environmental impacts related to single-use carryout bags, and to promote a shift toward the use of reusable bags. It is anticipated that by prohibiting single-use plastic carryout bags and requiring a mandatory charge for each paper bag distributed by retailers, the ordinance would provide a disincentive to customers to request paper bags when shopping at regulated stores and promote a shift to the use of reusable bags by retail customers, while reducing the number of single-use plastic and paper bags.

Measure Description

The Reusable Bags Ordinance regulates the use of paper and plastic single use carryout bags in Foster City. The ordinance (1) prohibits the free distribution of single-use carryout paper and plastic bags and (2) requires retail establishments to charge customers for recycled paper bags and reusable bags at the point of sale. The minimum charge is ten cents ($0.10) per paper bag until December 31, 2014 and twenty-five cents ($0.25) per paper bag on or after January 1, 2015.

Cost and Financial Impact

This program has already been implemented. No additional costs are anticipated.

[13] San Mateo County Health Systems: We think it's time to bag the bag. http://smchealth.org/BagBan

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None, this measure is already implemented.	Staff time will be needed for continued coordination with the Foster City Chamber of Commerce and continued outreach to businesses.	Members of the public who continue to buy goods and request paper or plastic bags would pay the relevant charge per bag. Members of the public who purchase reusable bags would pay the price of each reusable bag. If the ordinance includes a discount for each paper bag saved, customers would see some savings in their purchases.
Total	--	**$0**	**Cost of paper and plastic bags, or reusable bags. Varies per person.**

Retail establishments are required to keep a complete and accurate record for at least three years from the date of purchase and sale, available for inspection. The charge would be retained by the affected stores to compensate for increased costs resulting from the ordinance, actual costs associated with providing recyclable paper carryout bags or reusable bags, and costs associated with a store's educational efforts encouraging the use of reusable bags[14].

Implementation

This program is implemented through Section 8.09 of the Foster City Municipal Code.

[14] Notice of Availability of a Draft Environmental Impact Report, County of San Mateo Single Use Bag Ban Ordinance. http://smchealth.org/sites/default/files/docs/EHS/PlasticBagBan_NOA.pdf

WC 5: Adopt a Construction and Demolition Ordinance. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$0	0 years (already implemented)
NA	Excellent	Excellent

Background
This measure was originally recommended as part of the SAP. Deconstruction refers to the dismantling of a structure in order to salvage, reuse, and recycle as many of the building materials as possible. Deconstruction often does not cost more than regular demolition, and could be carried out with cost savings to the homeowner because of reduced disposal fees, the donation value of the materials, as well as the tax benefits.

Currently, the Foster City Municipal Code addresses this issue through Chapter 15.44 on Recycling and Salvaging of Construction and Demolition Debris. The Ordinance requires the submission of a Waste Management Plan, a minimum of 50 percent of total generated construction and demolition debris to be diverted, with violations to be punishable by fines and civil penalties. The 50 percent diversion rate is consistent with State law requiring diversion of at least 50 percent of waste from landfills.

Measure Description
Adopt a Construction and Demolition Ordinance to include incentives for deconstruction, and require mandatory recycling and reuse rates for contractors.

Cost and Financial Impact
No costs are required for the setup and implementation of the program, as it has already been accomplished and requires no amendments in the foreseeable future.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None, as this measure has already been implemented.		Contractors and applicants find cost savings as landfill waste incurs a higher fee compared to recycling.
Total	--	--	**The public would see savings.**

Depending on the age and type of buildings, contractors may find that there are overall cost savings per project due to reduced disposal fees (landfill fees are more costly compared to recycling, which is typically free), and tax benefits due to the donation value of materials. For example, the deconstruction brochure produced by Los Altos Hills Town staff states that the deconstruction of a typical 2,000 square feet wood-frame house could result in 127 tons of debris, resulting in $2,000 to $4,000 in disposal fees that could be saved through diversion to

recycling. Deconstruction for such a project could also yield 6,000 board feet of reusable lumber, equivalent to 33 mature trees, or the yearly output of 10 acres of planted pine trees[15].

Implementation
This measure has already been implemented by Foster City and requires no updates in the foreseeable future. However, it would be useful for the Building Inspection Division to continue the dialog with contractors over the counter to find out whether the new ordinance has been effective but not overly onerous, especially given the current development climate. The City has already prepared educational materials such as brochures and website updates for applicants.

It would also be helpful for the Building Inspection Division to keep track of the amount of debris diverted yearly through information submitted by each applicant, to monitor the success of this ordinance.

WC 6: Adopt a Yard Waste Ordinance.

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$0	2 years
NA	Excellent	Good

Background
This measure was originally recommended in the SAP. Yard waste is made up of organic materials and should be almost entirely diverted away from landfills.

Measure Description
Adopt an ordinance that requires all landscapers, landscape maintenance businesses, and property owners to recycle and divert yard waste to compost bins.

Cost and Financial Impact
No direct costs would be incurred from the setup and implementation of this measure.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	Landscapers and landscape maintenance businesses should see savings as it costs less to collect organic waste compared to landfill waste.
Total	--	--	**The public would see savings.**

[15] Town of Los Altos Hills: Your Guide to Deconstruction Permits. http://www.losaltoshills.ca.gov/documents-forms/browse/doc_download/163-deconstruction-permit-brochure

Implementation
It would be useful for staff to speak with landscapers, landscape maintenance businesses, and homeowners, to find out how the new ordinance could be best tailored for effectiveness in Foster City. Staff or consultants would then update the existing ordinance for Foster City.

After the ordinance is adopted, educational materials such as brochures and website updates would need to be created.

WC 7: Facilitate Recycling of Styrofoam and Hard-to-recycle Plastics.

Annual GHG Reduction	Total Cost	Implementation Time required
Included under WC 1	$0	1 year
NA	Excellent	Excellent

Background
This measure was originally recommended as part of the SAP. Styrofoam is typically hard to deal with as it requires recycling, but few trash haulers accept Styrofoam for recycling. Currently, Recology San Mateo County accepts Styrofoam as trash, not as a recyclable. The Recology FAQ webpage asks users to avoid using or buying products made of Styrofoam, and to check shipping/mail houses such as UPS to see if you can drop off Styrofoam peanuts for reuse. Some local art organizations may reuse large pieces for art projects. However, these methods are unlikely to gain traction with the community.

Recology and RecycleWorks[16] have identified a few programs and companies which take in Styrofoam blocks or peanuts, but all are some distance away and require a Foster City resident or business to make a special effort[17].

Recology San Mateo also lists the following as plastics that are not recyclable:

- Plastic cutlery
- Plastic bags
- Plastic corks
- Plastic film, shrink wrap, bubble wrap, pallet wrap
- Plastic hangers

Measure Description
Facilitate recycling of Styrofoam and hard-to-recycle plastics by holding regular collection events and establishing permanent drop-off points in coordination with neighboring agencies.

[16] www.recycleworks.org
[17] Both Styrofoam blocks and peanuts: Green Citizen in Burlingame charges a fee of $5.00 per 33 gallon garbage bag, and takes packing peanuts and other packaging materials at no charge. Styrofoam blocks: GB Industrial in Union City; Recology of the Coast in Pacifica; Materials Reuse in Oakland. Styrofoam peanuts: All UPS Store locations in the City of San Mateo; Pack and Mail in Redwood City; Savvy Skirts in Half Moon Bay; Strawflower Electronics in Half Moon Bay.

Cost and Financial Impact
Staff time would be required, but there are no direct costs to the City anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	Residents would see savings in their waste bills by diverting materials from the landfill, assuming the collection fees of these materials are still less than landfill waste collection fees.
Total	--	--	**The public would see savings.**

Implementation
Foster City could work with SBWMA and the operator of the transfer station to discuss a regional drop-off point to collect Styrofoam and hard-to-recycle plastic waste.

As an example, RethinkWaste/SBWMA teams up with the City of Foster City to hold e-waste and shredding events. Additionally, Foster City holds Earth Day Fairs in April, and carries out various events that offer e-waste disposal, document shredding, and compost material give-aways. As this trend becomes more popular in Foster City, these events can be expanded, or more events can be held, for the recycling of Styrofoam and hard-to-recycle plastics.

(ENERGY AND) WATER

Goal: Lower the residential and commercial water usage, and in turn reduce energy usage. (Already Implemented)

The measurement of greenhouse gas emissions in relation to water usage is generally limited to the amount of energy required to heat water, as the delivery of water from Hetch Hetchy is not included in the emission calculations (see Appendix A for more explanation). The measures listed below focus on ways to save water both indoors and outdoors.

EW 1: Lower Residential and Commercial Water Usage in Foster City.

Annual GHG Reduction	Percent GHG Reduction towards 2020 Target	Total Cost	Implementation Time required
995 MT CO_2e (995 MT CO_2e achieved in 2020)	5.9%	$0	2 years maximum (includes all programs)
Excellent		Excellent	Good

Background

The City of Foster City's entire water supply is delivered by the Estero Municipal Improvement District (EMID), which also supplies a small portion of the water needs of the City of San Mateo on Mariner's Island. EMID purchases water wholesale from the San Francisco regional water system. Foster City and EMID's interests are represented by the Bay Area Water Supply and Conservation Agency (BAWSCA), whose goals are to ensure a reliable and high-quality water supply at a fair price.

California needs to comply with Senate Bill SBX7-7 or the Water Conservation Act of 2009, which requires the reduction of urban per capita water usage Statewide by 20 percent by December 31, 2020. Through 2013, EMID had already reduced water consumption by 17% within its service area. The 20x2020 Water Conservation Plan was released in 2010, which required urban water suppliers to establish water conservation targets for 2015 and 2020, and laid out a range of measures to reach that target.

EMID's 2010 - 2015 Urban Water Management Plan (UWMP) showed its gross water projections in the year 2020 without conservation measures would be 168 gallons per capita per day, or 6.37 million gallons per day.

With the implementation of the latest plumbing codes, EMID's Program Environmental Impact Report commitments from 2004 (including capital improvement projects to the Hetch-Hetchy water delivery system), and BAWSCA's 2009 Water Conservation Implementation Plan (WCIP) savings (for BAWSCA to assist its member agencies achieve water saving goals committed to in

2004), EMID projected that water use will be reduced to 5.84 million gallons per day, or an 8 percent decrease, by the year 2020[18].

On top of these plans and other regional efforts, EMID has also drawn up additional Demand Management Measures to meet the 20 percent total reduction requirement by 2020.

The most recent data available, from September 2014, indicates that water conservation efforts in Foster City have been extremely effective. EMID's water purchases have decreased approximately 25% from 2007 levels, which indicates that the portfolio of conservation measures implemented in recent years have had a marked effect on reduced water consumption within the EMID service area.

The EMID measures are shown in the table below:

Determination of Demand Management Measures (DMM) Implementations

DMM 1	**Water Survey Programs for Single-Family and Multi-Family Residential Customers** Residential customer surveys are performed on an informal basis by the customer or EMID following a high water bill complaint. Other programs include DMM 5.
DMM 2	**Residential Plumbing Retrofit** EMID Board approved the rebate program effective July 2010 to encourage customers to install smart irrigation controllers. The program includes waiving meter installation fees, and offering a below-market-rate three-year loan of up to $50,000 to assist homeowner associations and apartment owners. Metering domestic and irrigation water usage separately will result in a better management of water consumption.
DMM 3	**System Water Audits, Leak Detection and repair** "Unaccounted for" water usage makes up approximately 7 percent of EMID's total water usage, and includes water from hydrants. EMID has also trained staff members and equipment to better detect leaks and implement repairs in the distribution system.
DMM 4	**Metering with Commodity Rates** EMID adopted a tier-rate structure for residential domestic and commercial irrigation in 2010, and plans to implement a graduating scale for excess use charges when consumption over allotment increases.
DMM 5	**Large Landscape Conservation Programs and Incentives** EMID implemented a Water Conservation Landscape Program, providing landscape audits, workshops, and water use reports, for almost all 250 such customers. EMID has also created Smart Irrigation Controller rebates and Efficient Irrigation System rebates, providing up to $5,000 respectively per year per customer to install water-efficient irrigation. EMID also prepared a guideline booklet available to the public to assist in planting and irrigation decisions.
DMM 6	**High Efficiency Washing Machine Rebate Programs** Washing machine rebates are provided to customers that replaced old clothes washers with

[18] Estero Municipal Improvement District Serving City of Foster City/Part of City of San Mateo, 2010-2015 Urban Water Management Plan. http://www.fostercity.org/Services/water/upload/UWMP-2010%20FINAL-3.pdf

	new ENERGY STAR water conserving units. The program is administered by BAWSCA and funded by EMI, with a rebate of $175 per washing machine.
DMM 7	**Public Information Programs** Water conservation information is posted on the City of Foster City's website, and public information is distributed at city sponsored events. EMID has also worked with the Foster City Environmental Sustainability Task Force to target key water users and programs to impact the community's water use. EMID has also sent out letters to residential customers who use 200 percent or more of the median residential usage to educate such users and invite them to participate in rebate programs to reduce usage.
DMM 8	**School Education Programs** EMID continues to work with local schools and teachers to promote water conservation, including presentations and tours of local water facilities.
DMM 9	**Conservation Programs for Commercial, Industrial, and Institutional Accounts** EMID provides rebates for commercial, industrial, and institutional users in the form of high-efficiency toilet / urinal rebate programs of up to $150 per unit, and a commercial washing machine rebate program of $300 per washing machine.
DMM 10	**Wholesale Agency Programs** (NA, however this is listed in the UWMP for reference.)
DMM 11	**Conservation Pricing** EMID implemented conservation-based water rate structures in 2010, to encourage consumers to use less water, and also fund the operations and capital improvement requirements.
DMM 12	**Water Conservation Coordinator** EMID does not have a dedicated Water Conservation coordinator. Responsibilities are administered by staff from other departments and BAWSCA.
DMM 13	**Water Waste Prohibition** EMID prohibits wasteful or negligent water waste, including knowingly permitting leaks. EMID receives assistance from the code enforcement division for this program.
DMM 14	**Residential Ultra-Low Flush Toilet Replacement Programs** Up to three toilets per household are eligible for a rebate of up to $150 or 50 percent of the total labor and material cost, whichever is less, for a high efficiency toilet. This program was started in 1992. Current EMID regulations require high efficiency toilets to be installed at all new construction.

Several measures were also recommended in the SAP to reduce water usage in Foster City, including:

- Water-wise landscaping (included in Climate Action Plan)
- Education Garden (included in Climate Action Plan under education and outreach)
- Tiered Water Rates (already implemented by EMID)
- More informative Water Bills (included in Climate Action Plan)
- Water Conservation Help Line (included in Climate Action Plan)

- Expanded rebates for water saving appliances (included in Climate Action Plan)
- Conservation Programs for Multi-family Dwellings (included in Climate Action Plan together with expanding rebates)
- Research reliable and uninterruptible alternative water sources for Foster City (ongoing work by EMID)

The measures that do not overlap with the EMID efforts include expanding rebates for water saving appliances, conservation programs for multi-family dwellings, more informative water bills, and a water conservation help line. The education garden program is included under Education and Outreach measures.

Measure Description

This Climate Action Plan looks into six measures in total, three of which have already been implemented by EMID and therefore contribute to the total reduction of GHG emissions. The other three include increasing promotion for water-saving programs, advocating for more informative water bills, and working with BAWSCA to establish a Water Conservation Help Line. Please see measures EW 2 to EW 7 for a detailed discussion.

The SAP also recommended an Education Garden program, and this is included under the Education and Outreach section of the Climate Action Plan.

Cost and Financial Impact

Staff time would be required to setup and administer various water conservation programs, but no direct costs to the City are anticipated. The cost of the programs administered (or to be administered) by EMID is not counted in this Climate Action Plan.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Total Costs to set up and run program
a. Adopt a water-wise landscaping ordinance and outdoor water saving incentives. *(already implemented)*	$0	$0	$0
b. Adopt an ordinance and implement incentives for indoor water savings. *(already implemented, could be expanded)*	$0	$0	$0
c. Establish conservation-based water rates. *(already implemented)*	$0	$0	$0
d. Increase promotion for water-saving programs.	$0	$0	$0
e. Advocate for more informative water bills.	$0	$0	$0
f. Work with BAWSCA and EMID to establish a Water Conservation Help Line.	$0	$0	$0
		TOTAL:	**$0**

Implementation
As some of the work in this area would be implemented by BAWSCA or EMID, Foster City's focus is mainly on advocacy, coordination, and outreach to residential and commercial consumers.

	Years assumed for implementation
a. Adopt a water-wise landscaping ordinance and outdoor water saving incentives. *(already implemented)*	0 years
b. Adopt an ordinance and implement incentives for indoor water savings. *(already implemented)*	0 years
c. Establish conservation-based water rates. *(already implemented)*	0 years
d. Increase promotion for water-saving programs.	1 year
e. Advocate for more informative water bills.	2 years
f. Work with BAWSCA and EMID to establish a Water Conservation Help Line.	1 year

EW 2: Adopt a Water-wise Landscaping Ordinance and Outdoor Water Saving Incentives. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	0 years
NA	Excellent	Excellent

Background
A water-wise landscaping ordinance was originally recommended in the SAP. The Water Conservation in Landscaping Act of 2006, or AB 1881, required cities and counties to adopt landscape water conservation ordinances by January 1, 2010, and the Department of Water Resources prepared an updated Model Water Efficient Landscape Ordinance for cities to use. EMID adopted an "Outdoor Water Conservation in Landscaping" Ordinance (Chapter 8.80) in 2010.

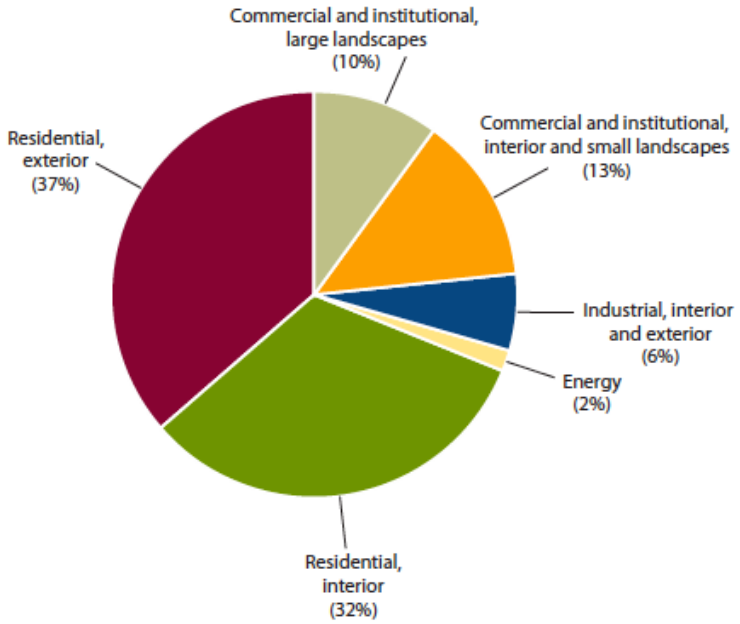
Aspects of the ordinance adopted by Foster City require:

- Selection of plants such that the estimated water use for landscaping does not exceed a maximum water allowance, based on adaptability to the climatic, geologic, and topographical conditions of the project;
- Landscape design that addresses fire safety and prevention in fire-prone areas;
- Water features which utilize recirculating water systems and use of recycled water for decorative water features;
- Mulch and amendments of a minimum thickness and stabilization mulch products for slopes;
- Irrigation design plans that meet criteria for proper installation, management and maintenance; and

- Grading design plans which minimize soil erosion, runoff, and water waste.

The chart below provides a breakdown of typical gross urban water use, showing that landscaping accounts for at least 60 percent of gross urban water use. Water for landscaping includes residential use, large non-residential uses such as golf courses and parks, cemeteries, and a portion of commercial and industrial water use[19]. Hence, this is a significant area in which water savings could be achieved.

Breakdown of Typical Gross Urban Water Use



Source: Ellen Hanak et al., "Water and the California Economy", Public Policy Institute of California (2012): 7. Pie chart created using author calculations from 2009 California Department of Water Resources data.

Measure Description

Adopt a water-wise landscaping ordinance for new commercial and multi-family developments, that is consistent with the AB 1881 model ordinance and BAWSCA standards. Offer incentives to reduce outdoor water usage. Both of these have already been implemented.

Cost and Financial Impact

No future cost will be required for this measure, as it has already been implemented. No operational costs are projected, as future developments are checked for compliance with the ordinance during permit plan checks.

[19] Ellen Hanak et al., "Water and the California Economy", Public Policy Institute of California (2012): 7. Pie chart created using author calculations from 2009 California Department of Water Resources data.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None, this program has already been implemented.	None, this program does not require updating in the foreseeable future.	It is difficult to determine whether there is an increase in initial costs to developers to incorporate the plan in new construction as the choice of equipment and landscaping could be modified to comply with the ordinance and fit the development budget. However, this ordinance is common in the Bay Area and developers have integrated it into their practices. Furthermore, there will be future savings in water bills.
Total	--	--	**Developers will see savings in water bills.**

Implementation
This program has already been implemented and the sub-programs described are ongoing.

EW 3: Adopt an Ordinance and Implement Incentives for Indoor Water Savings. *(already implemented; could be expanded)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	0 years
NA	Excellent	Excellent

Background
All new construction and applicable remodels are required to comply with the Estero Municipal Improvement District Code (Chapter 8.70) Indoor Water Use Efficiency Ordinance that has specifications for residential and non-residential water appliances in new construction and applicable remodels (such as toilets, showers, washers, dishwashers, food steamers, automatic vehicle wash facilities).

In addition, EMID offers a rebate program for water saving appliances, mainly directed toward existing homes and multi-family developments that are looking to replace water appliances. This incentive complements the Indoor Water Use Efficiency Ordinance.

EMID has been offering these rebates for low-flow toilet upgrades to Foster City residents since 1992, and washing machines since 2000. The program has been very successful and has seen 40

percent of the toilets in Foster City upgraded. The rebate provides $150 per toilet, maximum three per home, for the replacement of a higher water use toilet with a low water use toilet (from over 3.5 to 1.3 gallons per flush). EMID has also been offering rebates of $125 per machine for high-efficiency washing machines. From 2000 to 2010, EMID provided over 2045 washing machine rebates totaling $235,000. This represents about 17 percent of EMID's households.

Based on information from the EPA website, toilets generally take up about 25 percent of a household's total water usage, while washing machines take up about 20 percent of a household's total water usage[20]. WaterSense-labeled toilets require 75 percent to 80 percent less water than their older counterparts, and an energy star washer uses about 50 percent less water and 50 percent less energy compared to a non-energy star washer. Hence, an approximate 30 percent reduction in household water usage is highly feasible based on upgrading the above-mentioned appliances.

Measure Description

Implement an Indoor Water Use Efficiency Ordinance to require various types of water-using appliances for new construction and applicable remodels. Continue the water appliance rebate program and explore expanding it to include dishwashers. Market the program and explore incentives for property managers and renters in multi-family developments to upgrade to water saving appliances.

Cost and Financial Impact

The Ordinance and rebate program have both already been implemented. No additional costs are anticipated.

	Initial Setup Cost to City	**Ongoing Implementation Costs to City**	**Cost to Public**
Cost and Description	None, both aspects of this measure have already been implemented.	The rebate program is run by EMID and therefore the funding for rebates would come from EMID.	Difference between cost of water saving appliances versus traditional water appliances, if any after rebates. Savings in applicance costs through rebates. Savings in water bills in the long run.
Total	--	--	**Possible costs of water saving appliances. Savings in water bills.**

[20] http://www.epa.gov/watersense/pubs/indoor.html

Implementation
The Indoor Water Use Efficiency Ordinance and indoor water appliance rebates have already been implemented, but there may be room for expanding the rebates for indoor water appliances in the future.

Foster City staff would focus on marketing and outreach. This measure may be publicized through notices in water bills, banners, City Website, and FCTV. Staff would also need to spend some time reaching out to owners and managers of multi-family developments, as renters do not have the option to change water appliances. This is a typically untapped group with a great potential for water and energy savings to be implemented in multi-family developments.

EW 4: Establish Conservation-Based Water Rates. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	0 years
NA	Excellent	Excellent

Background
This measure was recommended in the SAP. Previously, Foster City had only one water rate for all residential and commercial users. In 2010, EMID adopted a tier-rate structure for residential domestic and commercial irrigation, and plans to implement a graduating scale for excess use charges when consumption over allotment increases. Meter charges also increased in 2011 in order to fund EMID operations and capital improvement projects.

Measure Description
Establish tiered water rates, with lower rates for lower levels of water consumption.

Cost and Financial Impact
No costs are projected for the setup and implementation of this measure, as it has already been implemented and does not require operational costs.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None, this program has already been implemented.	None, this program does not require updating in the foreseeable future.	None. The public would benefit from a better understanding of their water bills and be encouraged to save water.
Total	--	--	**No costs. Customers will see cost savings if they respond to a clearer understanding of their water usage.**

This measure is aimed at helping water consumers to conserve water, in order to qualify for a lower tier rate.

Implementation
This measure has already been implemented by EMID and requires no further action in the foreseeable future.

EW 5: Increase Promotion for Water-saving Programs. *(already implemented; could be expanded)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	1 year
NA	Excellent	Excellent

Background
The City currently has several water-saving programs and incentives on its website to inform the public. In order to gain the attention of more customers and therefore a wider implementation of these programs and incentives, the City could step up marketing efforts to advertize these programs together with EMID.

Measure Description
Work with EMID to put together a marketing program to promote the various incentives that are available to the public. The marketing efforts should focus on groups that have not been previously reached out to, or groups that the City feels could have a larger contribution to water savings in the community.

Cost and Financial Impact
No direct costs to the City would be incurred through implementation of this measure.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	None.
Total	--	--	--

Implementation
Begin discussions with EMID to determine the focus and scope of the marketing program. This measures assumes an implementation timeframe of only three years, as there should be sufficient knowledge of the water-saving incentives and measures at the end of that period.

EW 6: Create More Informative Water Bills. *(already implemented; could be expanded)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	2 years
NA	Excellent	Good

Background
This measure was recommended in the SAP. Current water bills are listed in hundreds of cubic feet, where 100 cubic feet of water is equivalent to 748 gallons. Water consumers are more familiar with gallons and would have a better understanding of their water usage if references were instead in gallons.

The City has taken recent steps in improve information contained in water bills, and water bills now include a comparative bar graph that allows consumers to compare water usage during the current year to the same time period in the previous year.

Additional improvements to water bills could include the provision of information showing consumers how close they are to reaching a lower tier water rate. This would encourage consumers to continue making adjustments to save more water. An interactive online tool would help facilitate this effort.

Measure Description
Work with EMID to improve water bills to help users better understand and track their water usage, by using a commonly-understood unit system, showing changes from month to month and year to year, and consumer progress towards reaching a lower tier rate.

Cost and Financial Impact
No direct costs to the City would be required for the setup and implementation of the program.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	No operational costs are considered as part of this measure as the implementation efforts are almost entirely by EMID.	None. The public would benefit from a better understanding of water bills and learn why and how to save water.
Total	--	--	**No costs. Customers will see cost savings if they respond to a clearer understanding of their water usage.**

Implementation
While Foster City could begin discussions with EMID on more consumer-oriented bills, the changes need to be implemented by EMID within their budget and timeline. As this is a fairly major system change, this document assumes that it would take two years for implementation to be achieved.

EW 7: Work with BAWSCA and EMID to Improve Water Conservation Information. *(already being implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Included under EW 1	$0	1 year
NA	Excellent	Excellent

Background
This measure was recommended in the SAP. A regional program established with either BAWSCA or EMID could allow consumers to quickly find resources about water conservation. The City and EMID currently have extensive information related to water conservation resources and programs available online for customers. The information includes descriptions of available rebate programs and various resources to help customers reduce water usage through education and tips.

Measure Description
Work with BAWSCA and EMID to continue to improve available resources that will educate customers and provide incentives to reduce water consumption and use within the community.

Cost and Financial Impact
Staff time would be required to implement the program, but no direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None.	None.	None. The public would benefit from being able to direct their questions to a point person and gain knowledge on how to save water.
Total	--	--	**No costs. Customers will see cost savings if they gain knowledge and implement measures to save water.**

Implementation
Foster City could spearhead discussions with BAWSCA and EMID on the help line and FAQ programs, however the changes would likely require additional BAWSCA or EMID staff, and would be implemented in line with their budgets and timelines. This document assumes that it would take one year for implementation to be achieved.

EDUCATION

Goal: Educate the public regarding sustainability, and promote the measures in the Climate Action Plan to achieve reductions in greenhouse gas emissions.

To achieve greater greenhouse gas reductions in the future, a community-wide approach supported by individual actions can have a substantial impact. The City can make information about climate change more readily available to citizens and create opportunities to learn about sustainability. The proposed measures can motivate individuals to take the lead in pursuing sustainable actions, which would contribute to the collective effort by the City and other community members in the goal of greenhouse gas reductions.

ED 1: Facilitate an Education Garden.

Annual GHG Reduction	Total Cost	Implementation Time required
Not easily quantifiable	$1,000	3 years
NA	Good	Good

Background
This measure was originally recommended in the SAP. The ESTF recommended an education garden over a community garden due to the possibility of having one funded through the California Landscape Contractors Association (CLCA).

This education garden could be located in a school yard, church ground, existing City park sites, or similar outdoor space that proves access to school children and residents. The gardens would be maintained by volunteers, and could be used to demonstrate native plant species, water-wise landscaping, mulching, composting, and basic gardening skills.

Measure Description
Facilitate an education garden through schools, social clubs, churches, or community groups.

Cost and Financial Impact
Approximately $16,000 will be required for the setup and implementation of the entire program.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	Fund part of the set up of the garden, assuming ten 5' x 20' raised beds will cost $100 each[21]. **$1,000** The set up of irrigation system and purchase of tools is assumed to be funded by another organization or through donations.	None.	Some members of the public may wish to donate resources and time to start the education garden.
Total	**$1,000**	**$0**	**There will be some costs to volunteers.**

If the education garden includes fruits and vegetables, harvests could be used for cooking at its host school or organization.

Implementation

This program requires coordination with potential funding sources, as well as some time spent searching for the appropriate organization to take on the project. Once the project has started, some coordination may be required with local groups to advertise the uses of the garden, to get visits and classes started on a regular basis.

This measure is assumed to take 3 years to implement due to potential difficulties in selecting a site and finding a willing partner organization to maintain the education garden.

[21] Urban Harvest, Funding Your School Garden. http://www.urbanharvest.org/education/schoolyouth/schoolfunding.html

ED 2: Coordinate Educational Workshops on Sustainability.

Annual GHG Reduction	Total Cost	Implementation Time required
Not easily quantifiable	$7,000	3 years
NA	Good	Good

Background
This measure was originally recommended in the SAP. The ESTF recommended finding local and regional experts to conduct workshops for the public on environmental sustainability topics, such as:

- Green building, purchasing, green business,
- Composting, worm bins,
- Water efficient landscaping and irrigation technology,
- Alternative water supplies,
- Renewable energy systems,
- Transportation alternatives, and
- Household actions.

Measure Description
Conduct regular educational workshops through the Foster City Recreation Center.

Cost and Financial Impact
Approximately $7,000 will be required for the setup and implementation of the entire program.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	Assumes **$2,000** for the preparation and dissemination of marketing materials and outreach.	Assumes $1,000 of material costs per workshop for a total of 5 workshops. **$5,000**	Cost of attending workshops.
Total	**$2,000**	**$5,000**	**Cost of attending workshops.**

Implementation
This program would be implemented in conjunction with other measures as a catch-all for outreach and marketing efforts.

ED 3: Create a Dedicated Website Focused on the Climate Action Plan Measures. *(already implemented)*

Annual GHG Reduction	Total Cost	Implementation Time required
Not easily quantifiable	$0	0 years
NA	Excellent	Excellent

Background
This measure was originally recommended in the SAP to create a website focused on Sustainability, for Foster City residents, businesses and employees. Foster City has started such a website to share the progress of sustainability plan recommendations and promote outreach efforts. This website can be used to present the Climate Action Plan as a part of the overall push towards sustainability efforts in the community.

Measure Description
Utilize existing webpages focused on sustainability and climate action to track the development of Climate Action Plan measures. The webpages would focus on advertising the latest efforts towards reducing GHG emissions, and update the public regarding the latest developments and news.

Cost and Financial Impact
Staff time would be required, but no direct costs are anticipated.

	Initial Setup Cost to City	Ongoing Implementation Costs to City	Cost to Public
Cost and Description	None, already set up.	Staff time for website maintenance and updates related to Climate Action Plan measures.	None. The public would benefit from being able to find information and implement measures in their homes and workplaces.
Total	**$0**	**$0**	**None. The public would gain knowledge on reducing greenhouse gases.**

Implementation
The City has already implemented an updated website with a section titled “Sustainable Foster City Plans”. The Climate Action Plan and future updates on the progress of Climate Action Plan Measures may be posted to the website.

4.7 Effectiveness of Proposed Reduction Measures

The implementation of all of the measures listed above would achieve a total reduction of 16,838 MTCO2e in 2020. As previously described, the City is already achieving a reduction of at least 7,626 MTCO2e in 2012 towards the 2020 target from programs currently being implemented. The City continues to expand and implement a wide range of programs and measures contained in this Climate Action Plan on a daily basis. As such, the GHG reductions achieved by this Climate Action Plan increase on a continuous basis, and have certainly increased since the time the initial calculations for this document were prepared. The City will continuously monitor, and periodically reassess the effectiveness of the Climate Action Plan measures and the progress towards achieving the future reduction targets.

In order to reach the 2020 reduction target of 15 percent below 2005 levels, a reduction of 16,625 MTCO2e is required. In order to reach the 2025 reduction target of 20 percent below 2005 levels, a reduction of 23,420 MTCO2e is required. Upon implementation, the measures included in this Climate Action Plan would reach the established reduction targets for 2020 and 2025.

Chapter 5 describes how the City will work to implement this Climate Action Plan, including staff roles, timing of measure implementation and potential funding sources for implementation of the Climate Action Plan.

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Chapter 5: Implementation and Monitoring

5.1 Implementation

For this Climate Action Plan to be successful, it must be integrated with regional and local plans and operations. This Climate Action Plan and the GHG reduction measures included herein will serve as a living document, and will be updated on a regular basis to incorporate new programs and emissions reduction strategies as they are developed and as technological advancements are made. The Climate Action Plan's relationship to the General Plan Land Use and Circulation Element gives the Climate Action Plan a tie to all new development in the City. As the City contemplates future zoning code updates, specific plans, housing elements, and other planning documents, staff will make sure that these documents support and are consistent with the Climate Action Plan. City staff will implement the Climate Action Plan through ongoing planning activities, programs, and the discretionary review process. As part of implementation, City staff will develop tools such as a checklist to identify all mandatory and voluntary Climate Action Plan measures for development projects.

Furthermore, as a programmatic tiering document under the California Environmental Quality Act (CEQA), the Climate Action Plan will be the City's primary tool for greenhouse gas analysis and mitigation under CEQA. Although this Climate Action Plan identifies numerous mandatory and voluntary measures, the City will ensure appropriate use of the Climate Action Plan for CEQA streamlining by maintaining the prerogative to use both mandatory and voluntary measures in this Climate Action Plan as standards for new development when appropriate. The City will work with applicants on a project-by-project basis to determine appropriate use of the CEQA benefits of the Climate Action Plan, identifying appropriate mandatory and voluntary measures to integrate into project design or mitigation.

Climate Action Plan implementation also requires strong leadership. The City will designate a staff person to conduct annual monitoring and reporting on implementation of Climate Action Plan measures and overall progress toward Climate Action Plan reduction targets. This Climate Action Plan outlines estimated costs associated with the implementation of each measure, the timeframe required for the implementation of each measure, and additional implementation steps required for each measure (see Chapter 4).

5.2 Monitoring

Successful implementation of the Climate Action Plan requires regular monitoring and reporting. The City is committed to monitoring the Climate Action Plan's implementation progress on an ongoing basis and reporting to the City Council on the Climate Action Plan's progress every two-to-three years. If the City determines during its periodic reviews that the City is falling short of reduction targets, the City will investigate the need to create additional voluntary and mandatory measures to attain the City's overall reduction goals. The City is also committed to updating the inventory, forecast, and reduction measures a minimum of once every five years. Development of an implementation and monitoring tool will assist in tracking progress.

The City will develop a monitoring and reporting tool with an implementation matrix to track, monitor, and update the Climate Action Plan. As the City reports on progress in implementing

the Climate Action Plan, staff will evaluate the effectiveness of each measure to ensure that the anticipated GHG reductions are occurring. In the event that GHG reductions do not occur as expected, the City will be able to modify and add further policies to the Climate Action Plan to ensure the City meets the local reduction target.

To assist in the monitoring process, PG&E is providing Foster City with a Green Communities Data Request service, by streamlining data on Foster City municipal energy usage and community-wide energy usage and providing it to City staff. This represents a large component of the efforts required to document energy usage and will reduce the time required to compile this data repeatedly for Foster City.

5.3 Implementation Measures

The City is committed to the following implementation measures as the path to achieve the target 15 percent reduction below 2005 levels by 2020 and the target 20 percent reduction below 2005 levels by 2025.

The following policies are presented to ensure the City is successful in the implementation of the Climate Action Plan.

Implementation Measure 1: Monitoring
Regularly monitor and report the City's progress toward achieving the reduction target.

Action Items

- Action 1.1: Facilitate implementation of measures and actions related to municipal operations.
- Action 1.2: Provide support to City staff to facilitate implementation of measures and actions.
- Action 1.3: Prepare a progress report for review and consideration by the City Council, Planning Commission, and other applicable advisory bodies at least once every two-to-three years.
- Action 1.4: Develop and utilize a monitoring and reporting tool to assist with annual reports, which will include an implementation matrix for consolidated tracking and reporting on measure-by-measure progress.
- Action 1.5: Identify key staff responsible for Climate Action Plan reporting and monitoring.
- Action 1.6: Integrate the results of the ongoing monitoring and reporting into the General Plan annual report or other annual monitoring exercises.

Implementation Measure 2: Update GHG Inventory and Plan
Update the baseline greenhouse gas emissions inventory and Climate Action Plan at a minimum every five years.

Action Items

- Action 2.1: Inventory 2015 GHG emissions no later than 2018.
- Action 2.2: Update the Climate Action Plan no later than 2018 to incorporate new technology, programs, and policies to reduce GHG emissions.
- Action 2.3: Consider updating and amending the Plan, as necessary, should the City find that specific reduction measures are not meeting intended GHG reductions.

Implementation Measure 3: Collaborative Partnerships
Continue to develop partnerships that support implementation of the Climate Action Plan.

Action Items

- Action 3.1: Continue formal memberships and participation in local and regional organizations that provide tools and support for energy efficiency, energy conservation, greenhouse gas emissions reductions, adaptation, education, and implementation of this Plan, including the City/County Association of Governments of San Mateo County (C/CAG), San Mateo County Energy Watch and other jurisdictions in the Bay Area.

Implementation Measure 4: Funding Sources
Secure necessary funding to implement the Climate Action Plan.

Action Items

- Action 4.1: Identify funding sources for reduction measures as part of annual reporting.
- Action 4.2: Ensure implementation through the inclusion of emissions reduction and adaptation measures in department budgets, the capital improvement program, and other plans as appropriate.
- Action 4.3: Pursue local, regional, state, and federal grants as appropriate to support implementation.

Implementation Measure 5: Development Review
Review future development projects for consistency with, and appropriate implementation of, the Climate Action Plan.

Action Items

- Action 5.1: Amend the City's development review process to include steps that screen project applications for consistency with the Climate Action Plan.
- Action 5.2: Require new development projects to implement, where applicable and appropriate, the following Climate Action Plan Measures: EC1, EC4, EC8, TL1, TL2, WC2, WC4, WC5, EW2, and EW3.
- Action 5.3: Encourage new development projects to implement, where applicable and appropriate, the following Climate Action Plan Measures: EC2, EC3, EC5, EC7, EC9, TL3, TL4, and WC3.

5.4 Implementation Timeframe

City will initiate all of the measures listed below. Some measures require partnerships with other organizations, such as Acterra, the San Mateo County Energy Watch Program, and local trash haulers. Certain measures require participation in existing State or regional programs, such as the Energy Efficiency Upgrade.

The bulk of measures range from near-term to mid-term, with a number already implemented. Some mid-term and longer-term measures need stakeholder and public outreach, which would affect the implementation success of the measure.

Measures recommended in the Climate Action Plan	**Near term:** 2015 to 2016	**Mid-term**: 2017 to 2018	**Longer-term**: After 2018
Energy (Community)			
EC 1: Implement a Residential Green Building Ordinance.	X		
EC 2: Encourage Personal Energy Audits and Energy Efficient Home Upgrades.	X		
EC 3: Encourage and Facilitate Residential Energy Efficiency Upgrades.	X (Already implemented)		
EC 4: Adopt a Commercial Green Building Ordinance.	X		
EC 5: Encourage and Facilitate Business Energy Efficiency Upgrades.	X (Already implemented)		
EC 6: Provide Financing for Commercial Energy Efficiency and Renewable Energy.	X (Already implemented)		
EC 7: Encourage Solar Panel Installation.	X (Already implemented)		
EC 8: Create a Requirement for Urban Forestation.		X	
EC 9: Work with Employers to Develop Robust Sustainability Plans to Minimize GHG Emissions	X		
Energy (Municipal)			
EM 1: Implement Energy Efficient Street Lighting.	X (Already		

Measures recommended in the Climate Action Plan	Near term: 2015 to 2016	Mid-term: 2017 to 2018	Longer-term: After 2018
	implemented)		
EM 2: Implement an Environmentally Preferred Purchasing Policy.	X		
EM 3: Adopt Green Building Standards for Municipal Buildings.	X		
EM 4: Consider a Municipal Renewable Energy System Installation Program.	X		
EM 5: Audit Municipal Facilities for Energy Efficiency Opportunities and Implement Energy Efficient Retrofits.	X (Already implemented)		
Transportation and Land Use			
TL 1: Implement Smart Growth Development.	X (Already implemented)		
TL 2: Implement Complete Streets and Pedestrian and Bicycle-friendly Design.	X (Already implemented)		
TL 3: Incentivize and Explore Car and Bike Sharing.		X	
TL 4: Encourage a Preferred Parking/Electric Plug-in Policy for Alternative Fuel Vehicles.			X
Transportation-related Municipal Operations			
TM 1: Implement a Fuel-efficient Fleet Policy.	X		
TM 2: Implement a Low-emissions Fleet Policy.	X		
TM 3: Allow Flexible Working Schedules for Municipal Employees.	X (Already implemented)		
TM 4: Establish a Public Employee Commuting Program.	X		
Waste (Community)			
WC 1: Achieve a Higher Diversion Rate of 75 Percent.		X (includes WC 2 to WC 8.)	
WC2: Adopt an Ordinance to Prohibit Disposable Polystyrene Food Ware.	X (Already implemented)		
WC 3: Adopt a Grading or Award Program for Commercial Food Waste Collection.			X
WC 4: Implement a Gradual Ban on Single Use Plastic Carryout Bags and Charge for Paper and Reusable Bags.	X (Already implemented)		
WC 5: Adopt a Construction and Demolition Ordinance.	X (Already implemented)		
WC 6: Adopt a Yard Waste Ordinance.	X		
WC 7: Facilitate Recycling of Styrofoam and Hard-to-Recycle Plastics.	X		
WC 8: Adopt RecycleBank or a Pay-As-You-Throw Program.	X		
(Energy and) Water			
EW 1: Lower Residential and Commercial Water Usage in Foster City.	X (includes EW 1 to EW 7.)		
EW 2: Adopt a Water-wise Landscaping Ordinance and Outdoor Water Saving.	X (Already implemented)		
EW 3: Adopt an Ordinance and Implement Incentives for Indoor Water Savings.	X (Already implemented)		

Measures recommended in the Climate Action Plan	Near term: 2015 to 2016	Mid-term: 2017 to 2018	Longer-term: After 2018
EW 4: Establish Conservation-based Water Rates.	X (Already implemented)		
EW 5: Increase Promotion for Water-Saving Programs.	X		
EW 6: Advocate for More Informative Water Bills.	X		
EW 7: Work with BAWSCA and EMID to Establish a Water Conservation Help Line.	X		
Education			
ED 1: Facilitate an Education Garden.		X	
ED 2: Conduct Educational Workshops on Sustainability.		X	
ED 3: Create a Dedicated Website Focused on the Climate Action Plan Measures.	X (Already implemented)		

5.5 Potential Funding Sources

Staff time and resources are required for the successful implementation of the Climate Action Plan measures. As a first step, City staff should identify where work may be shared with staff from other nearby jurisdictions and County offices, in order to save time and effort to promote similar goals.

Private organizations, local businesses and community-based non-profits may be available to provide funding support for City efforts. City staff and the Chamber of Commerce could reach out to potential organizations to obtain funding and volunteer support.

Foster City may take advantage of the various Federal, State, regional funding programs that are currently available.

Energy:

- The California Energy Commission (CEC) has a large number of funding and financing programs for energy efficiency initiatives and upgrades:
- Bright Schools Program, helps public K-12 school districts and non-profit schools reduce building energy costs.
- Energy Partnership Program, helps Cities finance their public facility energy efficiency upgrades, and provides technical assistance studies.
- Energy Efficiency Financing, offering 1 percent interest loans to Cities for eligible projects such as streetlights and lighting systems, pumps and motors, energy management systems and equipment controls, heating, ventilation and air conditioning (HVAC) equipment, water and waste water treatment equipment, and building insulation.
- New Solar Homes Partnership (NSHP) solar program provides financial incentives and support for home builders.

- California Solar Initiative (CSI) offers cash back for installing solar facilities on residential or business facilities. The cash back is administered by Pacific Gas and Electric Company (PG&E). CSI also offers cash rebates for solar water heating systems.

- PG&E provides additional rebates and funding programs.

Transportation and Land Use:

- National Center for Safe Routes to School provides mini-grants and federal funding to support walking and bicycling to school programs.

- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has a Clean Fuels Grant Program for clean fuel buses which would assist SamTrans.

- The California Strategic Growth Council, created by SB 732, awards grants to qualifying Cities for sustainability planning projects, including urban center revitalization, infill and compact development projects, and transportation improvement projects. Foster City may apply for future cycles of grant awards.

- California's Bicycle Transportation Account (BTA) is an annual program providing State funds for City and County projects that improve safety and convenience for bicycle commuters. Approximately $7.2 million annually is appropriated for related projects. This account is funded by the Highway User's Tax Account and the Transportation Tax Fund.

- The San Mateo County Transportation Authority and the City/County Association of Governments of San Mateo County (C/CAG) provide local government with assistance, including studies and funding, for a wide range of transportation, transit, and bicycle/pedestrian projects and improvements.

Water and Wastewater:

The measures listed in the Climate Action Plan do not involve new infrastructure projects. State and regional low-cost financing is available from the Infrastructure State Revolving Fund Program, and a bond pool administered by the Association of Bay Area Governments (ABAG) for infrastructure projects.

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Appendix A: Greenhouse Gas Inventory Calculations and Assumptions

A.1 Assumptions

A.1.1 Building Energy Assumptions

Estimations of electricity purchased through Direct Access (DA) contracts are derived from County level DA consumption figures, provided by the California Energy Commission (CEC). The County-wide ratio of DA to utility-supplied-electricity is multiplied by a community's utility-supplied energy use to determine the amount of DA in a given community. According to the CEC, DA was 20.89 percent of "non-residential" electricity consumption and 55.08 percent of "non-residential" natural gas consumption in San Mateo County in 2005.

Formula: $DA_c / (DA_c + u_c) = DA / (DA + u)$ ("c" refers to County-wide)

The table below shows the emission factors used to calculate emissions for various categories of energy consumption, and their sources. Data was gathered from the City of Foster City 2005 Community-Scale Greenhouse Gas Emissions Inventory.

Table A.1: Building Energy Emissions Factors

Emission Source	GHG	Emission Factor	Emission Factor Source
Electricity	CO_2	489.16 lbs/MWh	California Climate Action Registry Power/Utility Protocol Public Reports; http://www.climateregistry.org/; also see Local Government Operations Protocol, Table G.5
	CH_4	0.029 lbs/MWh	Local Government Operations Protocol, Table G.6
	N_2O	0.011 lbs/MWh	Local Government Operations Protocol, Table G.6
Natural Gas	CO_2	53.06 kg/MMBtu*	U.S. EPA, Inventory of Greenhouse Gas Emissions and Sinks: 1990-2005; see also Local Government Operations Protocol, Table G.1
	CH_4	5.0 g/MMBtu (residential & commercial sectors) 1.0 g/MMBtu (industrial sector)	EPA Climate Leaders, Stationary Combustion Guidance (2007), Table A-1, based on U.S. EPA, Inventory of Greenhouse Gas Emissions and Sinks: 1990-2005 (2007),Annex 3.1; see also Local Government Operations Protocol, Table G.3
	N_2O	0.1 g/MMBtu	
Default Direct Access Electricity	CO_2	958.49 lbs/MWh	CO_2 emissions factor is calculated from total in-state and imported electricity emissions divided by total consumption in MWh. Emissions from California Air Resources Board, Greenhouse Gas Inventory, 1990-2004 (November 17, 2007 version), available at
	CH_4	0.029 lbs/MWh	
	N_2O	0.011 lbs/MWh	

Emission Source	GHG	Emission Factor	Emission Factor Source
			http://www.arb.ca.gov/cc/inventory/data/data.htm Factors for CH_4 and N_2O from Local Government Operations Protocol, Appendix G, Table G.7. Consumption data from California Energy Commission, http://www.energy.ca.gov In Local Government Operations Protocol, Appendix G, Table G.6, pages 174.
Default Direct Access Natural Gas	CO_2	53.06 kg/MMBtu	Standard Emissions factors from The Climate Registry V1.1 Appendix Table G.1 (CO_2) and G.3 (CH_4 and N_2O).
	CH_4	0.005kg/MMBtu	
	N_2O	0.0001kg/MMBtu	

*10 therms = 1 million British thermal units (or MMBtu)

A.1.2 Transportation Assumptions

Data for Local Roads Vehicle Miles Traveled (VMT) in 2005 was obtained from the 2005 California Public Road Data, Highway Performance Monitoring System, State of California, Department of Transportation[1]. The County has also just completed a draft of its Countywide Transportation Climate Action Plan (or TCAP) in December 2012, and the information in that report may be able to inform future greenhouse gas inventories.

Data for State Highways Vehicle Miles Traveled (VMT) in 2005 was created using Geographic Information Systems (GIS), by dividing a GIS file of Caltrans road segments for State Highways into jurisdictions using a jurisdictional boundary layer. VMT was divided proportionally between each segment, and VMT was split equally between jurisdictions for areas where the highway was on the border of two jurisdictions.

Local Road and state highway VMT data provided by the Metropolitan Transportation Commission (MTC) is in Daily VMT (DVMT); Annual VMT = DVMT x 365.

VMT is converted into gas and diesel, based on the VMT mix. Then it is converted into gallons of fuel using fuel efficiency. CO2 is calculated from resulting fuel consumption.

Methane and nitrous oxide is calculated directly from VMT by fuel type. It is separated into fuel by VMT mix.

[1] http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php

Table A.2: Transportation Emission Factors

Emission Source	GHG	Emission Factor	Emission Factor Source
Transportation	CH_4	Gas: 0.058 grams/mile Diesel: 0.030 grams/mile	Bay Area Air Quality Management District (BAAQMD), using EMFAC 2007
	N_2O	Gas: 0.070 grams/mile Diesel: 0.050 grams/mile	
	VMT Mix	Gas: 96.8% Diesel: 3.2%	
	CO_2 Rates	Gas: 8,609 grams/gallon Diesel: 10,216 grams/gallon	
	Fuel Efficiency	Gas: 19.6 miles/gallon Diesel: 8.1 miles/gallon	

A.1.3 Off-road Emissions Assumptions

Data on total County-wide emissions from off-road equipment came from the BAAQMD's report with a base year of 2007, as there was no report for 2005 and no other reliable way to quantify off-road emissions in 2005. Emissions were divided into two categories – emissions from lawn and garden equipment and emissions from construction, industrial, and light commercial equipment.

Emissions per household were calculated using BAAQMD's data on County-wide emissions from lawn and garden equipment and the total amount of households County-wide, per data from the Association of Bay Area Governments (ABAG). To calculate emissions from lawn and garden equipment generated in the County, emissions per household were multiplied with the number of households in the unincorporated community per ABAG data. Foster City's share was then derived using the ratio of the City's population to the County population.
Emissions per job were calculated using BAAQMD's data on County-wide emissions from construction, industrial, and light commercial equipment and the total amount of jobs County-wide. To calculate emissions from construction, industrial, and light commercial equipment generated in the County, emissions per job were multiplied with the number of jobs in the unincorporated community. The number of jobs was taken from ABAG data, and Foster City's share was derived using the ratio of the City's population to the County population.

Table A.3 below shows how emissions were derived from lawn and garden equipment and from construction, industrial, and light commercial equipment.

Table A.3: Off-road Emission Factors

Emission Source	Unit of Measure	Total County-wide Emissions (metric tons CO_2e)	Total Units County-wide	Emissions per Unit	Units in Jurisdiction	Jurisdiction's Emissions (metric tons CO_2e)
Lawn and Garden Equipment	Households	14,182	260,000 Households	~0.055	12,090 Households	659
Construction, Industrial, and Light Commercial Equipment	Jobs	255,468	337,350 Jobs	~0.757	14,230 Jobs	10,776
Total		**269,650 metric tons CO_2e**				**11,435 metric tons CO_2e**

Total County-wide emissions were taken from the "Source Inventory of Bay Area Greenhouse Gas Emissions," published by the Bay Area Air Quality Management District for the base year of 2007[2]. Jobs and households data were taken from the Projections 2007 report published by the Association of Bay Area Governments (ABAG).

A.1.4 Waste Generation:

The Waste Reduction Model (WARM) was created by the U.S. Environmental and Protection Agency (EPA) to help organizations track and report GHG emissions reductions and energy savings from several different waste management practices. While the WARM model often calculates upstream emissions, as well as carbon sequestration (process of capturing and storing atmospheric carbon dioxide) in the landfill, these dimensions of the model were omitted for this inventory as neither are applicable to the purpose of the inventory and the Climate Action Plan. The inventory is for the purpose of an end-use analysis (from the point of disposal in the City to the point of decomposition), rather than a life-cycle analysis (from mining to disposal), and hence upstream emissions are not relevant. A landfill is also a typical example of an artificial sequestration 'sink', as it accumulates and stores some carbon-containing compounds for a long period of time. However, this aspect is also not relevant to the Climate Action Plan.
As some types of waste (e.g., paper, plant debris, food scraps, etc.) generate methane within the anaerobic environment of a landfill and others do not (e.g., metal, glass, etc.), it is important to characterize the various components of the waste stream. Waste characterization was estimated using the California Integrated Waste Management Board's 2004 statewide waste characterization study[3]. Please see Table 5 in Chapter 2 for a summary of this study according to the waste categories of the Clean Air and Climate Protection Software. This summary was conducted by staff at ICLEI.

[2] http://www.baaqmd.gov/Divisions/Planning-and-Research/Emission-Inventory-and-Air-Quality-Related/Emission-Inventory/~/media/64A8751292F44BEEAD56B7569B68DB27.ashx, (Table Q, pg. 25)
[3] http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

Most landfills in the Bay Area capture methane emissions either for energy generation or for flaring. The US EPA estimates that 60 percent to 80 percent[4] of total methane emissions are recovered at the landfills. Following the recommendation of the Local Government Operations Protocol[5] LGOP, the County adopted a 75 percent methane recovery factor, which has been used in this inventory.

Recycling and composting programs are reflected in ICLEI's Clean Air and Climate Protection (CACP) software model as reduced total tonnage of waste going to the landfills. The CACP model, however, does not capture the associated emissions reductions in "upstream" energy use from recycling as part of the inventory ("upstream" emissions include emissions that may not occur in a jurisdiction resulting from manufacturing or harvesting virgin materials and transportation of them). This is in-line with the "end-user" or "tailpipe" approach taken throughout this inventory. It is important to note that, recycling and composting programs can have a significant impact on GHG emissions when a full lifecycle approach is taken. Manufacturing products with recycled materials avoids emissions from the energy that would have been used during extraction, transporting and processing of virgin material.

Data for Landfilled Waste was obtained from the California Integrated Waste Management Board (CIWMB) Disposal Reporting System (DRS). Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons was recorded by Facility[6].

Data for Alternative Daily Cover was obtained from the California Integrated Waste Management Board Disposal Reporting System (DRS). Alternative Daily Cover (ADC) was recorded by Jurisdiction, of Origin and Material Type[7]. The assumed waste composition for ADC is based on the approved materials listed in Table 5 of Chapter 2, which includes paper products, food waste, plant debris, wood/textiles, and all other waste, as there is no other data available for ADC waste share at this time.

Waste characterization was derived from the CIWMB 2004 Statewide Waste Characterization Study. This state average waste characterization accounted for residential, commercial and self-haul waste[8].

Table A.5 below summarizes the amount of emissions derived from each type of waste.

[4] EPA AP 42 Emission Factors, Solid Waste Disposal, pg. 2, 4-6 (1998), http://www.epa.gov/ttn/chief/ap42/index.html

[5] Local Government Operations Protocol is a protocol used for the quantification and reporting of greenhouse gas emissions inventories. It was developed in partnership by California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and The Climate Registry. Version 1.1, May 2010.

[6] http://www.ciwmb.ca.gov/LGcentral/Reports/DRS/Destination/JurDspFa.aspx

[7] http://www.ciwmb.ca.gov/LGCentral/Reports/DRS/Origin/ADCMatlType.aspx

[8] http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

Table A.4: Waste Generation Emission Factors

Waste Type	Methane Emissions (metric tons CH4/metric ton of waste)	Emission Factor Source
Paper Products	2.138	US EPA
Food Waste	1.120	
Plant Debris	0.686	
Wood / Textiles	0.605	
All Other Waste	0.000	

Appendix B: Considerations for Reduction Measures

B.1 Details Considered for Reduction Measures

This Appendix supports Chapter 4 of the Climate Action Plan. The assumptions used to calculate the reduction of greenhouse gas emissions are listed per measure.

B.2 General Assumptions Used

Setup and implementation of most of the measures contained in the CAP would require the allocation and dedication of staff time. It was assumed that the existing City staff would be utilized, and that no direct costs to the City would be incurred as a result of the use of staff time.

B.3 Calculation Assumptions for Each Measure

EC 1: Implement a Residential Green Building Ordinance.

Calculation Assumptions for GHG Reductions

The amount of space in residential new construction and significant remodels by 2020 was estimated to be over 4.4 million square feet. This is based on several assumptions.

The number of new residential housing units in 2020 was estimated to be 13,666. This projection data was prepared by the Community Development Department based on Census data trends. The number of housing units in 2010 was determined to be 12,458 per Census data. The difference in housing units between these ten years was then broken down into housing characteristics stated in the 2009 Housing Element update (39 percent single-family detached, 20 percent single-family attached, 6 percent in 2-4 unit buildings, and 33 percent in ≥5 unit buildings). Square footages were assumed for each housing type (2,000, 1,500, 1,000, and 1,000 square feet respectively), to arrive at about 1.8 million square feet for future new residential development.

To calculate the number of square feet for significant remodels, the same housing characteristics and square footages for each housing type were applied to the number of housing units in 2010. In addition, a homeownership rate of 59.2 percent (per the 2010 Census Factfinder website) was applied to each housing type for existing homes, as homeowners are more likely than landlords to remodel their homes. The homeownership rate is computed by dividing the number of owner-occupied housing units by the number of occupied housing units or households. From there, the percentage of square footage remodeled by 2020 was assumed for each housing type (30 percent, 10 percent, 25 percent, 25 percent respectively as homeowners of single-family detached houses would have the most control over remodeling, versus townhomes and apartment buildings). The percentage of square footage remodeled was conservatively estimated, even though a significant remodel would normally refer to modifications to 50 percent or more of a building. The estimated residential square footage existing in 2010 that would undergo significant remodeling by 2020 is therefore estimated to be around 2.7 million square feet.

These two categories were added to estimate that a total of about 4.4 million square feet of residential space would either be constructed or undergo significant remodel by 2020. A 15

percent energy savings was applied, based on the fact that all major green rating programs today would exceed energy efficiencies in Title 24 by 15 percent, to derive the greenhouse gas emission reductions.

Another key assumption was the percentage of energy savings above standard levels with the implementation of this Residential Green Building Ordinance. The BIG GreenPoint Rated (GPR) program includes a requirement for 15 percent above Title 24, to earn 30 points. An assumption was made that for 75 points, the homeowner would definitely meet the 15 percent energy savings along with several other measures.

The 2013 update to the energy requirement in Title 24 would likely lead to greater energy efficiency. Mandatory standards in the updated Title 24 would create a 10 percent energy reduction compared to the 2008 version of Title 24, which has no energy reductions.

CALGreen standards would likely receive increased or unchanged energy reductions from the update of the energy component in Title 24. Although the scope of energy efficiency is still being evaluated at this time, estimates for the energy reductions could change previous expectations set in the 2008 standards for CALGreen:

Mandatory: 10 percent energy reduction compared to the previous CALGreen level (0 percent in 2008)
Tier 1 (voluntary): 20 percent energy reduction compared to the previous CALGreen level (15 percent in 2008)
Tier 2 (voluntary): 30 percent energy reduction compared to the previous CALGreen level (30 percent in 2008)

The changes would likely lead to greater energy reductions than expected. It should be important to note again that these reductions are due to the updated energy standards in Title 24, which ties in to CALGreen.

EC 2: Encourage Personal Energy Audits and Energy Efficient Home Upgrades.

Calculation Assumptions for GHG Reductions
This measures assumes 15 percent of new and existing homes will take up a “Personal Climate Action Plan” by 2020, resulting in a modest 25 percent reduction in energy usage. The measure is based on similar efforts in Berkeley and Pacifica that have encouraged residents and households to purse actions that will minimize their carbon footprint.

This measure assumes that about 15 percent of 800 existing homes would pursue energy efficient upgrades, resulting in almost 180,000 square feet of homes being upgraded. The number of homes was based on data from participation in Redwood City which achieved 330 house call audits since October 2008, and 95 house call audits from July 2011 to June 2012, demonstrating an increase in house call audits over time. About 15 percent of 13,000 new homes, with about 2.8 million square feet, is also assumed to undergo upgrades.

To achieve the amount of square feet that would be upgraded, calculations were performed similar to those in Measure EC1, with single family detached homes at 39 percent of the housing stock and at 2,000 square feet; single family attached homes at 20 percent and 1,500 square feet; multi-family housing of two to four units at 6 percent and 1,000 square feet; and multi-family housing of five or more units at 33 percent and 1,000 square feet. 2.7 percent of the housing stock is considered vacant or not eligible to participate.

Internet searches show a varied estimate of the percentage savings, ranging from 20 percent to 50 percent. However, as energy retrofits would have the most results in older homes, newer homes would likely benefit from less energy savings. Hence, the average savings is estimated at a modest 25 percent for this measure.

EC 3: Encourage and Facilitate Residential Energy Efficiency Upgrades.
(already implemented)

Calculation Assumptions for GHG Reductions

The amount of residential square feet upgraded by 2020 was estimated using Energy Upgrade California (EUC) data for participating Foster City residents from San Mateo County records. Over a period of nine months from 2011-2012, between 7-15 homeowners participated in the EUC program, five of whom received matching rebates from the County. It was assumed that 15 homeowners participated during this timeframe, with an average size of 2,250 square feet each, resulting in an emission reduction of 16 MT CO_2e. It is estimated that an average of 25 homes per year will participate from 2011 through 2020, resulting in the upgrade of 225 homes at an average of 2,250 square feet per home. 25 homes per year were assumed in subsequent years from 2012 because of existing trends that point to more homeowners participating the longer the program is in place. This brings the total upgraded residential square footage to 506,250 square feet.

Another key assumption was the target percentage of electricity energy and natural gas savings with the implementation of this measure. According to County data, each home on average saved approximately 30 percent in electricity energy, but they had no data for natural gas. Therefore a conservative assumption of 20 percent in natural gas savings was made.

Although the EUC Federal rebate was only approved through the end of 2012, State of California energy upgrade rebates for up to $4,000 may be approved through the end of 2014. For the purpose of this Climate Action Plan, it is assumed there will be additional rebate or incentive programs in which homeowners will be able to participate through 2020.

EC 4: Adopt a Commercial Green Building Ordinance.

Calculation Assumptions for GHG Reductions

The amount of space in commercial new construction and significant remodels by 2020 was estimated to be over 3.2 million square feet. This is based on the number of new commercial developments proposed by 2025 as stated in the Land Use and Circulation Element of the General Plan Update, and scaled down to 2020, which is approximately 2.3 million square feet.

It was assumed that about 15 percent of over 5.9 million square feet of existing and gradually aging commercial building stock would qualify for significant remodeling by 2020, or approximately 900,000 square feet. The existing commercial building stock does not include municipal or public buildings, as that square footage is accounted for in measure EM 3 discussed later in this document.

Another key assumption was the percentage of energy savings above standard levels with the implementation of this ordinance. The LEED-New Construction checklist requires a pre-requisite of 10 percent energy savings above Title-24, but a LEED Silver rating will produce more energy savings. At 15 percent above Title-24, this would generate 2 extra points from the LEED required pre-requisite, so it was assumed buildings would achieve a 15 percent energy savings for this measure.

EC 5: Encourage and Facilitate Business Energy Efficiency Upgrades.

Calculation Assumptions for GHG Reductions

Key assumptions to calculate a GHG reduction factor for this measure include the amount of commercial square feet upgraded by 2020. Please see the calculation assumptions in EC 1 for more information. It was assumed that approximately 30 percent of the existing commercial build-out by 2020 would likely participate in the program. In addition, it was assumed 5 percent of the existing business license renewals would also participate, and this was calculated with NCAIS data for 2010 using the total number of business licenses and assuming 3,000 square feet per business. The total amount upgraded by 2020 is therefore over 1.95 million square feet of commercial space.

Another key assumption was the target electricity energy and natural gas savings this measure would generate. Based on data from Ecology Action, an organization which partners with local and state agencies, cities, counties and utilities to provide environmental services that reduce energy use, it was conservatively assumed business energy upgrades would generate a 10 percent savings in electricity energy and a 10 percent savings in natural gas. For a small or medium commercial customer, typical savings could be 5-10 percent of annual kWh consumption, but it depends on the vintage, building type, and usage patterns. Savings can be higher too, as businesses may choose to replace chillers or boilers, which reduce kWh or natural gas consumption by 20 percent each.

EC 6: Provide Financing for Commercial Energy Efficiency and Renewable Energy.
(already implemented)

Calculation Assumptions for GHG Reductions

Approximately 1.2 million square feet of commercial space is assumed to be upgraded by 2020 based on the assumption that 20 percent of the total existing commercial square footage in Foster City would be upgraded based on this measure. More local PACE programs have been recently created, and it is considered an attractive program due to the removal of the upfront

cost, low-interest financing, reduced energy bills which provide more cash flow for property owners to make other payments.

In addition, this measure assumes a 15 percent electricity savings and 15 percent natural gas savings.

EC 7: Encourage Solar Panel Installation. *(already implemented)*

Calculation Assumptions for GHG Reductions

To achieve an estimated annual GHG reduction, assumptions were made to estimate the number and average size of both residential and commercial solar energy installations.

Based on existing Foster City data, over 90 residential solar systems and one commercial solar system have been installed from 2006 to 2012. It was assumed an additional 15 residential solar systems would be installed per year for eight years through 2020, reflecting the increasing popularity of solar systems. This would result in a total of 120 additional residential solar systems by 2020. However, the City has indicated that the target for residential solar systems is 500 by the year 2019, which would exceed the GHG reductions assumed in this CAP. In addition, it was assumed approximately one commercial system would be installed per year for eight years until 2020, for a total of eight additional commercial systems by 2020.

It was also assumed that an average solar panel system for residences is 5 kW, which is currently an industry standard. In addition, based on the recent 43.2 kW system installed on a smaller municipal building at the City of South San Francisco, it was assumed an average commercial installation would be approximately 50 kW.

EC 8: Create a Requirement for Urban Forestation.

Calculation Assumptions for GHG Reductions

For this measure, assumptions were made to estimate the average tree cost, the projected residential and commercial electricity and natural gas use in 2020, the number of housing units in 2020, the number of housing units participating in the program, the number of commercial units in 2020, and the number of commercial units participating in program.

The City does not keep data on the average cost of a tree installed on residential or commercial projects, but does know 12-36 inch boxes are typically installed in new projects. Based on this, a 24-inch box Blue Oak tree was used to generate an average cost at $350 per tree[1] for commercial projects. For residential projects, a 15-gallon Big Leaf Maple tree was used to generate an average tree cost of $238.

Residential and commercial electricity and natural gas use in 2020 was projected using the 2005 GHG emissions inventory data and projecting forward to 2020 using a 0.39 percent growth rate

[1] Wegman's Nursery in Redwood City stated the cost of a 24-inch box Blue Oak is $350-450.

for residential and a 0.88 percent growth rate for commercial.[2] The number of housing units in 2020 was determined by the number of housing units in 2012, extrapolated from U.S. Census data, and projecting forward to 2020 using the estimate as outlined in the Land Use and Circulation Element of the General Plan Update. The number of housing units participating in the program was estimated based on the number of housing units added between the time of implementation and 2020, plus 15 percent of existing housing units at the time of implementation. The number of commercial units was based on the number of business licenses in 2010 and using the commercial growth rate to project to 2020. Finally, it was assumed 15 percent of the total number of commercial units in 2020 would participate in the program.

EM 1: Implement Energy Efficient Street Lighting. *(already implemented)*

Calculation Assumptions for GHG Reductions

Based on an article on the City of Foster City's website that documented the LED Street Lights and Retrofit Project, Foster City completed the conversion of 100 percent of all its street lights to energy efficient LEDs.

The cost of each light fixture is estimated at approximately $100 each, based on estimated market values. This would mean that the cost of installation (including staff time and equipment cost) is equivalent to approximately $650 per lightbulb.

EM 2: Implement an Environmentally Preferred Purchasing Policy.

Calculation Assumptions for GHG Reductions

The first assumption associated with this measure is the percentage in Energy Star savings the City would realize with implementation, estimated at 20 percent. The second was the percentage of devices that will be replaced by 2020, which was estimated at 50 percent. This includes refrigerators, dishwashers, or other appliances and fixtures. Finally the third assumption was the applicable current baseline energy use in kWh/year, taken from ICLEI 2005 data, a total of 4,015,000 kWh.

EM 3: Adopt Green Building Standards for Municipal Buildings.

Calculation Assumptions for GHG Reductions

The first assumption to calculate the GHG reduction was the total square feet of estimated municipal new construction or significant remodels by 2020. As this figure is unknown and there are no current plans to build new municipal buildings by 2020, an assumption was made to generate a number for the amount of existing construction that would be upgraded per this ordinance by 2020. It was assumed 20 percent of existing municipal square footage would be constructed or upgraded by 2020, at 40,000 square feet.

[2] Based on ABAG data, the residential growth rate is determined by population growth, and the commercial growth rate is determined by job growth.

The next assumption was the amount of savings over Title 24 that would be realized. As local government has more control over how much energy can be saved in a building than what is mandated by code, it was assumed City buildings could achieve a 30 percent savings over Title 24.

EM 4: Consider a Municipal Renewable Energy System Installation Program.

Calculation Assumptions for GHG Reductions

This measure encourages the consideration of solar panel installation through group purchases with other cities. The City may explore solar panel installation for buildings like the Library.

At the time that this analysis was prepared, the assumed solar installation size was 50 kW (in comparison to South City's 43.2 kW). At its meeting on November 5, 2012, the City Council directed staff to issue a Request for Proposal to install solar panels on the roof of the Library/Community Center, on carports in the public parking lot of the Library/Community Center and on carports in the secured parking lot behind the Police Station.

The City has since entered into an agreement to have a 195.2 kW solar PV system installed on the Community Center, which is estimated to produce up to 288,842 kWh of electricity per year. The system is estimated to be complete and operational by the end of the 2014/15 fiscal year. The actual system contracted for installation exceeds the estimates used in these calculations. As such, the actual GHG reductions that would result from implementation of this measure will exceed the estimates used in this Climate Action Plan.

Other assumptions made were the solar generation efficiency, assumed at an industry standard of 19 percent, and hours of operation, assumed to be 8,760 hours per year, which means that the system is continuously used at all times.

EM 5: Audit Municipal Facilities for Energy Efficiency Opportunities and Implement Energy Efficient Retrofits. *(already implemented)*

Calculation Assumptions for GHG Reductions

In order to come up with an estimated GHG reduction for this measure, the number of square feet of municipal building space to be upgraded by 2020 had to be generated. It was assumed 20 percent of existing facilities could be upgraded by 2020, which equates to approximately 40,000 square feet. The target electricity savings was assumed to be 30 percent, and the target natural gas savings at 20 percent.

The final contract cost with Thermal Mechanical for a range of Energy Efficiency Upgrades is $1,442,738, with an estimated $49,808 in qualifying rebates making the total cost to the City of the project $1,393,000. Of that total, $606,230 is eligible for On-Bill Financing, to be paid back at 0% interest over 10 years through the energy savings from the project.

TL 1: Implement Smart Growth Development.

Calculation Assumptions for GHG Reductions

To achieve the GHG reduction, some basic key assumptions were made and then used along with California Air Pollution Control Officers Association (CAPCOA) Measure LUT-1 as listed in the document, "Quantifying Greenhouse Gas Mitigation Measures (2010)[3]." Those basic key assumptions include the community-wide baseline number of vehicle miles traveled (VMT), taken from 2005 data. Included in this assumption were state and local roads, at 312,000,000 miles.

Next, a percentage increase in the number of housing units per acre was assumed at 12 percent. This increase is derived from the number of housing units in 2005 to the number of housing units in 2020, and the land area is not projected to change from one year to the other.

With these key assumptions, a GHG reduction target can be achieved while also considering the elasticity of VMT with respect to density, which is a universal factor of 0.07[4].

TL 2: Implement Complete Streets and Pedestrian and Bicycle-friendly Design.
(already implemented)

Calculation Assumptions for GHG Reductions

General assumptions for this measure included the baseline VMT for state and local roads (outlined in measure TL 1) and the average miles per gallon for the community wide fleet, which was estimated to be approximately 25 miles per gallon (mpg).

The calculations for resource savings are based on implementation of three types of programs: 1) traffic calming measures, 2) bicycle lanes, and 3) bicycle parking. Cost calculations are based on installing traffic calming measures and bicycle lanes. Costs are not estimated for increasing bicycle parking as Chapter 17.62 in the Foster City Code states one parking stall may be omitted for every eight bicycle spaces provided. The cost is borne by the developer.

Assumptions regarding traffic calming measures were based on the City considering up to ten additional pavement markings, signage installations, or speed radar installations by 2020. An estimated VMT reduction factor for installing basic traffic calming measures was taken from the same CAPCOA document as outlined in TL 1, and is a factor of 0.0025. The estimated average cost of a new traffic calming measure is $12,000, based on San Jose's traffic calming toolkit[5] for

[3] Document found here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

[4] Based on Boarnet, Marlon and Handy, Susan, 2010, "Draft Policy Brief on the Impacts of Residential Density Based on a Review of Empirical Literature."

[5] http://sanjoseca.gov/transportation/SupportFiles/TrafficCalming/Traffic_Toolkit.pdf

radar speed, enhanced crosswalks, and road bumps. Pavement marking and signage installations cost approximately $10,000 each, and radar speed signs up to $20,000.

Assumptions regarding new bicycle lanes include the number of miles of new bicycle lanes per square mile of land area. It was estimated Foster City would install 2.7 miles of new bike lanes by 2020, and this calculation was made by adding up the current mileage for bike lanes and assuming the City would add 10 percent more mileage by 2020. Additionally, a reduction factor of 0.01 was assumed as the estimated VMT reduction factor for incorporating bike lanes into street design.

Assumptions regarding new bicycle parking were based on a CAPCOA reduction factor of 0.00625, which is the estimated VMT reduction factor for providing bike parking in non-residential locations.

TL 3: Incentivize and Explore Car and Bike Sharing.

Calculation Assumptions for GHG Reductions

Key assumptions for the calculations in this proposed measure include two types of programs: 1) Car sharing and 2) Bicycle sharing. As the program details are yet to be determined, defaults from the RICAPS Measures document were used to achieve a GHG reduction of 234 MT CO_2e. Those include a general assumption of baseline VMT in 2005 for state and local roads as outlined in Measure TL 1.

For a Car Sharing Program, assumptions included an estimated VMT reduction factor which is the percentage VMT reduction for each car sharing member, estimated at 37 percent. A second assumption for this program is a dollar amount estimate on the incentive for car sharing companies, estimated to be $50,000.

For a Bicycle Sharing Program, assumptions included an estimated VMT reduction factor which is the percentage VMT reduction for the program as a whole, at 0.03 percent. Another assumption was that the startup cost for the program, estimated to be approximately $8,000 for initial staff time spent on coordination with car and bike sharing companies and $50,000 based on the amount of staff coordination time required to launch the program. Finally, the ongoing cost for the program was estimated to be $40,000 annually, based on staff coordination and correspondence time required for communication with the bicycle sharing company, public, and other entities.

TL 4: Encourage a Preferred Parking/Electric Plug-in Policy for Alternative Fuel Vehicles.

Calculation Assumptions for GHG Reductions

The annual GHG reduction for this measure is dependent on the scale of implementation and was not calculated using the RICAPS tool. However, assumptions were made to generate a GHG reduction once the scale of implementation is determined. This includes the cost for a plug-in

charging space at $1,750[6], and an assumption of the number of new plug-in parking spots by 2020. Based on the number of new developments planned by 2020 according to the Land Use and Circulation Element Update, this number was estimated to be 40 spaces, at 5 spaces per development.

TL 5: Support Safe Routes to School *(already implemented)*

Calculation Assumptions for GHG Reductions

Greenhouse gas reductions reflect the additional biking and walking trips that are shifted from vehicle trips.

For this proposed measure, three key assumptions were made. Calculation methodology for this measure was derived from CAPCOA measure TRT-1, which is a measure of programs voluntary trip reduction programs that would discourage vehicle travel and encourage alternatives. First, the baseline VMT in 2005 for state and local roads was used as a general assumption at 312,000,000 miles.

From the 2013 Walking and Biking Audit for Foster City elementary schools, vehicle trips to school accounted for roughly 325,000 miles of travel per year, or 0.11 percent of VMT. A large proportion of students live within a mile from school, which means reducing vehicle trips to school would have a slight impact on GHG reductions. However, the short distance to school for many students could also lead to more students choosing to walk or bike. Schools that receive infrastructure improvements see walking and biking trips increase from 20 to 200 percent.[7] Due to the close proximity of many students to their schools, calculations assume a 100 percent increase in students walking and biking to school.

The calculations in this measure share many similarities with TM 3.

TM 1: Implement a Fuel-efficient Fleet Policy.

Calculation Assumptions for GHG Reductions

A number of assumptions were made to generate a GHG reduction factor for this proposed measure. Calculation methodology was derived from CAPCOA measures VT-2 and VT-3 as outlined in the reference document listed under TL 1. First, GHG emissions from the current fleet of 58 vehicles were estimated based on 2005 baseline data at 695 metric tons. An assumed fuel economy average of 25 miles per gallon was used, and the average VMT trip for a single auto per day was estimated at 60 miles.

Additionally, it was assumed 30 percent of the vehicle fleet will switch to new fuel by 2020, which is a total of approximately 17 vehicles. An energy ratio of 1.56 from the U.S. Department

[6] Based on http://www.pluginbayarea.org/fileadmin/materials/zero_emissions/EV_and_PHEV/Solar_Fuel_Station_Brochure.pdf, it is $1,750 per charging space after federal incentives for businesses.

[7] Proportional of commute for school trips http://www.saferoutespartnership.org/resourcecenter/quick-facts

of Energy was used, and an emissions factor for the new alternatively-fueled vehicles at 4.46 is the alternative emission factor for CO_2 in kilogram emissions per gallon.

Costs were quantified at $20,000 for the old vehicles purchase cost, and $30,000 for the new vehicles purchase cost. The old vehicles' annual fuel cost based on 2005 gasoline and diesel cost was $93,311 and the new vehicles annual fuel cost was estimated at $31,103 which is approximately 1/3 of the old vehicles' fuel cost. Finally, expected annual repair and maintenance costs for old vehicles was assumed based on the Edmunds.com true cost of maintenance for a 2007 regular four-door sedan, which ranges from $614-$1,344 annually. The total number of vehicles was estimated to be approximately 58 based on fuel and mileage data, for a total annual repair and maintenance cost of $58,319 for the old vehicles. It was assumed this same figure would be the expected annual repair and maintenance costs for new vehicles.

TM 2: Implement a Low-emissions Fleet Policy.

Calculation Assumptions for GHG Reductions

A GHG reduction was calculated based on an assumption that the City would replace older vehicles with newer more efficient vehicles by 2020. Out of 58 vehicles owned by the City[8], it was assumed 10 vehicles would be replaced by 2020 considering an estimated implementation time of two to five years for this measure. Driving miles were assumed to be 10,000 miles per year per vehicle. As mentioned in previous measures, 25 miles per gallon was assumed to be the fuel efficiency of the old vehicles. The fuel efficiency of the new vehicles was assumed to be 50 miles per gallon. The incremental cost of advanced vehicles over conventional vehicles was assumed to be approximately $1,000 per vehicle per year for a total of $10,000 per year based on an ownership of ten years and a difference in price of approximately $10,000. Finally, the average cost of fuel was assumed to be $4.00 per gallon as this figure may fluctuate between years.

TM 3: Allow Flexible Working Schedules for Municipal Employees.

Calculation Assumptions for GHG Reductions

To calculate a GHG reduction for telecommuting to reduce employee commute, this proposed measure used a calculation methodology derived from CAPCOA measure TRT-6 based on the document referenced in TL 1.

First, the baseline VMT in 2005 for state and local roads was used as a general assumption. Key assumptions also called for the commuting VMT out of the total, which based on the National Household Travel Survey Tables website is 35 percent of all VMT.[9] The number of new telecommuters was estimated to be 48 people, based on an assumption of 25 percent of the number of employees from 2010. It can also be assumed that the number of employees may

[8] Estimate based on methodology from Measure TM 1.

[9] http://nhts.ornl.gov/det/Extraction3.aspx. 35 percent is based on selecting data from 2009, selecting "Combine Total" for all options except choose "Earn a Living" under the "Purpose" category, running the analysis again for 2009 and selecting "Combine Total" for all options, then dividing the first value by the second value.

increase based on implementation of these measures, which was the reason for the high assumption of 25 percent.

Another key assumption was the number of workdays per year the average telecommuter works from home, and that was assumed to be an average of 50 days per year. Finally, the fuel efficiency of vehicles used by employee commuter was assumed at 25 miles per gallon.

The calculations in this measure share many similarities with TL 5.

TM 4: Establish a Public Employee Commuting Program.

Calculation Assumptions for GHG Reductions
For this proposed measure, three key assumptions were made. Calculation methodology for this measure was derived from CAPCOA measure TRT-1, which is a measure of programs' voluntary trip reduction programs that would discourage vehicle travel and encourage alternatives. First, the baseline VMT in 2005 for state and local roads was used as a general assumption at 312,000,000 miles. Second, a percentage reduction in commute VMT for those eligible was assumed at 6.2 percent for urban settings. Finally, it was assumed 10 percent of public employees, or 0.12 percent of the 16,100 total workforce in Foster City, would participate in the alternative commuting program.

WC 1: Achieve a Higher Waste Diversion Rate of 75 Percent.

Calculation Assumptions for GHG Reductions
The GHG reduction for this measure is essentially an estimation of the amount of methane emissions that would not be produced due to the increased diversion of waste away from landfills. Individual measures will contribute at different rates to the total increase in waste diversion.

The overall calculations are based on the ICLEI CACP modeling software and EPA's WARM tool and assumes that the total amount of waste generated (before diversion) is the same for both 2005 (the base year) and the 2020 (future year in which waste diversion goal is reached).

WC 2: Adopt an Ordinance to Prohibit Disposable Polystyrene Food Ware.
(already implemented)

WC 3: Adopt a Grading or Award Program for Commercial Food Waste Collection.

WC 4: Implement a Gradual Ban on Single Use Plastic Carryout Bags and Charge for Paper and Reusable Bags.
(already implemented)

WC 5: Adopt a Construction and Demolition Ordinance.
(already implemented)

WC 6: Adopt a Yard Waste Ordinance.

WC 7: Facilitate Recycling of Styrofoam and Hard-to-Recycle Plastics.

EW 1: Lower Residential and Commercial Water Usage in Foster City.

Calculation Assumptions for GHG Reductions

EMID's water usage projection for the City of Foster City without conservation measures is about 168 gallons per capita a day..

Per an analysis of 2009 California Department of Water Resources, outdoor water usage consumes up about 60 percent of gross urban water use[10]. The emissions for this component are more difficult to calculate than indoor water usage. Also, as Foster City did not account for its share the upstream emissions of water coming from Hetch Hetchy, it would be inaccurate to take account for emission reductions derived from outdoor water measures. Hence, only the projected emission reductions derived from indoor water savings are recorded for the purposes of this Climate Action Plan, which is 995 $MTCO_2e$.

Typically, the reduction of indoor water usage leads to reductions in electricity and natural gas usage, and therefore a reduction in GHG emissions. Heating hot water is an example of where natural gas is used along with water usage. Replacing water appliances with energy-efficient models is one way of contributing to this overall in water and energy reduction. The calculations assume 0.00115 therms of natural gas are saved and 0.0023 kWh of electricity are saved per gallon of water reduced.

As Foster City has implemented a large number of indoor and outdoor water usage reduction measures, it is assumed that it will achieve the projected 20 percent usage reductions by 2020 as mandated by State law. The City could step up on its marketing efforts for these measures to encourage more community-wide participation and achieve the maximum reductions possible.

[10] Ellen Hanak et al., “Water and the California Economy”, Public Policy Institute of California (2012)

EW 2: Adopt a Water-wise Landscaping Ordinance and Outdoor Water Saving Incentives.
(already implemented)

EW 3: Adopt an Ordinance and Implement Incentives for Indoor Water Savings.
(already implemented; could be expanded)

EW 4: Establish Conservation-Based Water Rates.
(already implemented)

EW 5: Increase Promotion for Water-saving Programs.

EW 6: Advocate for More Informative Water Bills.

EW 7: Work with BAWSCA and EMID to Improve Water Conservation Information.

Calculation Assumptions for GHG Reductions
The GHG reductions that may be achieved for Measures EW 2 to EW 7 are included under GHG calculations for EW 1.

ED 1: Facilitate an Education Garden.

Calculation Assumptions for GHG Reductions
The total amount of GHG emission reductions for educational measures is difficult to quantify, however each measure would go a long way in supporting outreach, marketing, and awareness-building efforts, which would help the community as whole gain knowledge and familiarity with ways to reduce greenhouse gas emissions.

ED 2: Coordinate Educational Workshops on Sustainability.

Calculation Assumptions for GHG Reductions
The total amount of GHG emission reductions for educational measures is difficult to quantify, however each measure would go a long way in supporting outreach, marketing, and awareness-building efforts, which would help the community as whole gain knowledge and familiarity with ways to reduce greenhouse gas emissions.

ED 3: Create a Dedicated Website Focused on the Climate Action Plan Measures.
(already implemented)

Calculation Assumptions for GHG Reductions

The total amount of GHG emission reductions for educational measures is difficult to quantify, however each measure would go a long way in supporting outreach, marketing, and awareness-building efforts, which would help the community as a whole gain knowledge and familiarity with ways to reduce greenhouse gas emissions.

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Appendix C: Glossary

BAAQMD — Bay Area Air Quality Management District, the public agency entrusted with regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties.

BCDC — Bay Conservation and Development Commission, a 27-member commission made up of appointees from local governments and state/federal agencies that was created by the California Legislature in 1965 in response to broad public concern over the future of San Francisco Bay.

C/CAG — City and County Association of Governments of San Mateo County, deals with issues that affect the quality of life in general in San Mateo County; transportation, air quality, stormwater runoff, hazardous waste, solid waste and recycling, land use near airports, and abandoned vehicle abatement. C/CAG provides a unique forum for the cities and the County to work together on common issues to develop cost-effective solutions.

CAP — Climate Action Plan, a blueprint of a community's response to the challenges posed by climate change.

CARB — California Air Resources Board, established in 1967 to attain and maintain healthy air quality, conduct research into the causes of and solutions to air pollution, and systematically attack the serious problems caused by motor vehicles, which are a major cause of air pollution in the State.

CEQA — California Environmental Quality Act, a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

CIWMB — California Integrated Waste Management Board, was a state agency of California dealing with recycling and waste reduction. It was abolished as of January 1, 2010 and duties and responsibilities were transferred to the California Department of Resources Recycling and Recovery, or CalRecycle.[1]

ESTF — Environmental Sustainability Task Force, an ad hoc citizen task force established by the Foster City Council in 2008 to develop a recommended

[1] http://en.wikipedia.org/wiki/California_Integrated_Waste_Management_Board

Environmental Sustainability Action Plan[2] for City-wide environmental sustainability. The Plan was completed in 2009 and is composed of recommendations in four main categories – energy, water, air quality, and solid waste, from which parts of this CAP are based.

EIR — Environmental Impact Report, which shall be prepared if there is substantial evidence that the project may have a significant effect on the environment. This determination calls for careful judgment, based to the extent possible on scientific and factual data.

EMID — Estero Municipal Improvement District, provides water supply and distribution to the City of Foster City and the Mariner's Island area of the City of San Mateo

GHG — Greenhouse Gas, a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.[3]

HARA — HARA Sustainability and Energy Management, an energy management company that helps organizations reduce their energy consumption through software tools establishing a new system of record for energy and sustainability. Cities use the Online Calculation and Measurement Tool (Hara ESS Tool) to input and store the key data and assumptions for each CAP measure, as well as keep track of progress over time.

ICLEI — International Council for Local Environmental Initiatives, an association of over 1,220 local government Members who are committed to sustainable development.

IPCC — Intergovernmental Panel on Climate Change, is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

DNV KEMA — DNV KEMA Energy & Sustainability, a global company in business and technical consultancy, testing, inspections & certification, risk management, and verification, along the energy value-chain.

[2] http://www.fostercity.org/city_hall/committees/upload/Final+W8.pdf
[3] http://en.wikipedia.org/wiki/Greenhouse_gas

LGOP — Local Government Operations Protocol, designed to provide a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations. The Protocol provides the principles, approach, methodology, and procedures needed to develop a local government operations GHG emissions inventory.

RICAPS — Regionally Integrated Climate Action Planning Suite, a set of climate action planning tools to minimize the time, effort, and cost to develop and monitor a CAP. RICAPS was developed by C/CAG to benefit cities in San Mateo County. Each city in San Mateo County has the opportunity to develop its own CAP using these tools developed by C/CAG in conjunction with KEMA, Inc. and HARA.

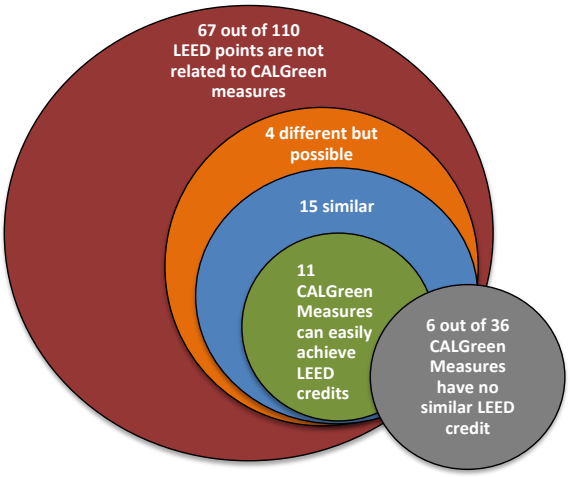
Appendix D: Comparison of Commercial Green Rating Systems

CALGreen 2013 Nonresidential Mandatory Measures Comparison to LEED Version 4 - Snapshot Chart

The following is a comparative analysis between the 2013 Nonresidential California Green Building Standards Code (CALGreen 2013) and the third party rating system "Leadership in Energy and Environmental Design - Building Design & Construction, New Construction version 4" (LEED v4). The analysis only compares CALGreen 2013 code mandatory measures against LEED v4 prerequisites & credits that have aligned or similar intent. The purpose of the comparison is to identify the number of LEED points that can be achieved on a new construction project when meeting the requirements of CALGreen 2013 code mandatory measures.

This comparative analysis includes assumptions for LEED and CALGreen, as determined by industry-leading Green Building experts. Actual LEED v4 points achieved may vary depending on a multitude of project specific circumstances. The following comparison should only be used as a reference for evaluation purposes.

CALGreen 2013 measures overlapping LEED v4



KEY

- **LEED points that can easily be achieved by meeting the CALGreen Requirements. Exact or similar standards overlap by comparison.**
- **Additional LEED points that can be achieved with minimal changes. LEED standards are slightly different than CALGreen.**
- **Additional LEED points that can be achieved with major changes. LEED standards are significantly different than CALGreen.**
- **CALGreen Measures for which there is no LEED overlap.**

CALGreen 2013 New Building Mandatory Measures and LEEDv4 - Comparison

Code/ Rating System	Measure or Credit Number	CALGreen 2013 Mandatory Measure LEEDv4 Prerequisite/Credit	Points for LEED Standards that meet or exceed CALGreen	Points for LEED standards ≠ CALGreen, but which are achievable with some changes	Points for LEED standards that are significantly different than CALGreen
CALGreen 2013	5.106.1	Storm Water Soil Loss Prevention Plan	0		
LEEDv4	SSp1	Prerequisite: Construction Activity Pollution Prevention			
CALGreen 2013	5.106.4.1	Short-Term and long-term bicycle parking			1
LEEDv4	LTc6	Bicycle Facilities			
CALGreen 2013	5.106.5.2	Designated Parking			2
LEEDv4	LTc7	Reduced Parking Footprint			
	LTc8	Green Vehicles			
CALGreen 2013	5.106.8	Light Pollution Reduction	1		
LEEDv4	SSc6	Light Pollution Reduction			
CALGreen 2013	5.106.10	Grading and Paving			
LEEDv4	N/A	N/A			
CALGreen 2013	5.201.1	Energy Efficiency		2	16
LEEDv4	EAp2	Minimum Energy Performance (Title 24 part 6 - 2013)			
	EAc1	Optimize Energy Performance			
CALGreen 2013	5.303.1	Water Meters and Submeters	1		
LEEDv4	WEp3	Prerequisite: Building Level Water Metering			
	WEc4	Water Metering			
CALGreen 2013	5.303.2	Water Reduction		4	2
	5.303.3	Water Conversing Plumbing Fixtures and Fittings			
	5.303.4	Wastewater Reduction			
LEEDv4	WEp2	Prerequisite: Indoor Water Use Reduction			
	WEc2	Indoor Water Use Reduction 25 - 50%			
CALGreen 2013	5.304.1	Water budget		2	
	5.304.2	Outdoor Potable Water Use			
	5.304.3	Irrigation Design			
LEEDv4	WEp1	Prerequisite: Outdoor Water Use Reduction			
	WEc1	Outdoor Water Use Reduction			
CALGreen 2013	5.407.1	Weather Protection			
LEEDv4	N/A	N/A			
CALGreen 2013	5.407.2	Moisture Control: Sprinklers, entries and openings, flashings			
LEEDv4	N/A	N/A			

CALGreen 2013 Nonresidential Mandatory Measures Comparison to LEED Version 4 - Snapshot Chart

CALGreen 2013	5.408.1	Construction Waste Management Plan	1	1	
LEEDv4	MRp2	Prerequisite: Construction Waste Management Planning			
	MRc5	Construction Waste Management			
CALGreen 2013	5.410.1	Recycling by occupants	0		
LEEDv4	MRp1	Prerequisite: Storage and Collection of Recyclables			
CALGreen 2013	5.410.2	Commissioning: OPR, BOD, Plan, Functional Performance Testing, Documentation and Training		2	1
	5.410.4	Testing and Adjusting, Balancing, O&M Manual, Inspection & Reports			
LEEDv4	EAp1	Prerequisite: Fundamental Commissioning			
	EAc3	Enhanced Commissioning			
CALGreen 2013	5.503.1	Fireplaces & Woodstoves			
LEEDv4	N/A	N/A			
CALGreen 2013	5.504.1.3	Temporary Ventilation		1	
	5.504.3	Covering of duct openings and protection of mechanical equipment during construction			
LEEDv4	EQc3	Construction Indoor Air Quality Management Plan			
CALGreen 2013	5.504.4.1	Adhesives, sealants and caulks	3		
	5.504.4.3	Paints and Coatings			
	5.504.4.4	Carpet Systems			
	5.504.4.5	Composite wood products			
	5.504.4.6	Resilient flooring systems			
LEEDv4	EQc2	Low-Emitting Interiors			
CALGreen 2013	5.504.5.3	Filters		1	
LEEDv4	EQc1	Enhanced IAQ Strategies			
CALGreen 2013	5.504.7	Environmental Tobacco Smoke Control	0		
LEEDv4	EQp2	Prerequisite: Environmental Tobacco Smoke Control			
CALGreen 2013	5.505.1	Indoor moisture control			
LEEDv4	N/A	N/A			
CALGreen 2013	5.506.1	Outside air delivery			0
LEEDv4	EQp1	Prerequisite: Minimum Indoor Air Quality Performance			
CALGreen 2013	5.506.2	Carbon dioxide (CO2) monitoring		Already Counted Above	
LEEDv4	EQc1	Enhanced IAQ Strategies			
CALGreen 2013	5.507.4	Acoustical Control			1
LEEDv4	EQc9	Acoustic Performance			
CALGreen 2013	5.508.1	Ozone depletion and greenhouse gas reductions		1	
LEEDv4	EAp3	LEED Prerequisite: Fundamental Refrigerant Management			
	EAc4	Enhanced Refrigerant Management			
CALGreen 2013	5.508.2	Supermarket refrigerant leak reduction			
LEEDv4	N/A	N/A			
CALGreen 2013	N/A	N/A			
LEEDv4	General	There are credits totaling 67 points within the LEED-NC v4 system that do not have similar mandatory measures.			
		LEED Points Available =	6	14	23

In summary, CALGreen 2013 has the potential to earn a maximum of 43 points out of the 110 points possible within the LEED-NC v4 system. While this is technically enough points to achieve a Certified LEED rating, points in the Orange column are significantly different than CALGreen mandatory measures and should be considered difficult to achieve compared to LEED. Therefore a realistic comparison of LEEDv4 to CALGreen 2013 equates to 15-25 readily achievable points, which is not equivalent to LEED minimum certification.

LEED Certification Point Thresholds	
Certified	40-49 pts
Silver	50-59 pts
Gold	60-79 pts
Platinum	80+ pts
110 points possible	

Although CALGreen projects do not automatically qualify for LEED certification, code minimums do effectively close the gap and lessons the effort needed to achieve LEED. However, there are two LEEDv4 prerequisites (EAp1 Building Commissioning and EQp1 Minimum Indoor Air Quality Performance) that are not readily achieved without significant changes. There are credits totaling 67 points within the LEED-NC v4 system that do not have similar mandatory measures for comparison and are therefore unrepresented and unaccounted for in CALGreen 2013.

Note: this analysis compares the June 2013 balloted version of LEED v4 for New Construction and July 2013 First Printing of the 2013 California Green Building Standards Code - California Code of Regulations, Title 24, Part 11 (Nonresidential).

LEED v4 CALGreen Scorecard for Hypothetical Nonresidential 2013-2016 Code Compliant Building

Code*	Tier 1*	Tier 2*	
6	16	30	**Total LEED v4 points likely based on hypothetical project at each level of CALGreen compliance.** Note: points are not cumulative across columns.

Three CALGreen 2013 Compliant Scenarios with potential LEED v4 New Construction points achieved by CALGreen measures.
1. **CALGreen Code:** Only Code Mandatory Measures
2. **Tier 1:** Mandatory + Tier 1 required measures + 1 elective measures per non-energy category + 1 from any category (5 total elective measures)
3. **Tier 2:** Mandatory + Tier 1 & 2 required measures + 3 elective measures per non-energy category + 3 from any category (15 total elective measures)

1	3	4		Planning and Design
P	P	P	5.106.1	Stormwater Pollution Prevention
0	0	0	5.106.4	Bicycle Parking
0	0	0	5.106.5.2	Designated Parking
1	1	1	5.106.8	Light Pollution Reduction
0	0	0	5.106.10	Grading and Paving for Surface Water Control
	2	2	A5.103.1	Community Connectivity
			A5.103.2	Brownfield or Greyfield Infill Development
			A5.104.1	Reduce development footprint and optimize open space
			A5.105.1	Deconstruction and Reuse of Existing Structures
		0	A5.106.2	Storm water design
			A5.106.3	Low Impact Development
		1	A5.106.4	Bicycle parking and changing rooms
	0	0	A5.106.5.1	Designated Parking
			A5.106.5.3	Electric vehicle charging.
			A5.106.6	Reduce parking capacity.
			A5.106.7	Exterior wall shading.
			A5.106.9	Building orientation.
	0	0	A5.106.11	Heat island effect.

0	5	12		Energy Efficiency
P	P	P	5.201.1	Meet California Energy Code, CCR Title 24, Part 6.
	5	5	A5.203.1.1	Tier 1 Energy efficiency
		7	A5.203.1.2	Tier 2 Energy efficiency
			A5.211.1	On-site renewable Energy
			A5.211.3	Green Power
			A5.211.4	Pre-wiring for future solar.
			A5.212.1	Elevators and escalators
			A5.213.1	Steel Framing

1	3	5		Water Efficiency and Conservation
P	P	P	5.303.1	Water Meters and Submeters
P	P	P	5.303.2	Indoor Water Use Efficiency - 20% reduction
0	0	0	5.303.4	Wastewater Reduction
0	0	0	5.303.6	Plumbing Fixtures and Fittings
0	0	0	5.304.1	Exterior Water Budget
1	1	1	5.304.2	Outdoor Potable Water Metering
0	0	0	5.304.3	Irrigation Design
	2	2	A5.303.2.1	Indoor Water Use Tier 1 – 30% Savings.
		1	A5.303.2.2	Indoor Water Use Tier 2 – 35% Savings.
			A5.303.2.2	Indoor Water Use -- 40% Savings.
		0	A5.303.3	Appliances
			A5.303.5	Dual Plumbing
			A5.304.2.1	Outdoor Potable Water Use (meters)
	P	P	A5.304.4.1	Exterior Potable water reduction. Tier 1: 40% reduction
	0	0	A5.304.4.2	Exterior Potable water reduction. Tier 2: 45% reduction
		1	A5.304.4.4	Exterior Potable water reduction. 50% reduction
			A5.304.5	Potable water elimination.
		0	A5.304.6	Restoration of areas disturbed by construction.
			A5.304.7	Restore or protect 50% of the site area
			A5.304.8	Graywater Irrigation System.

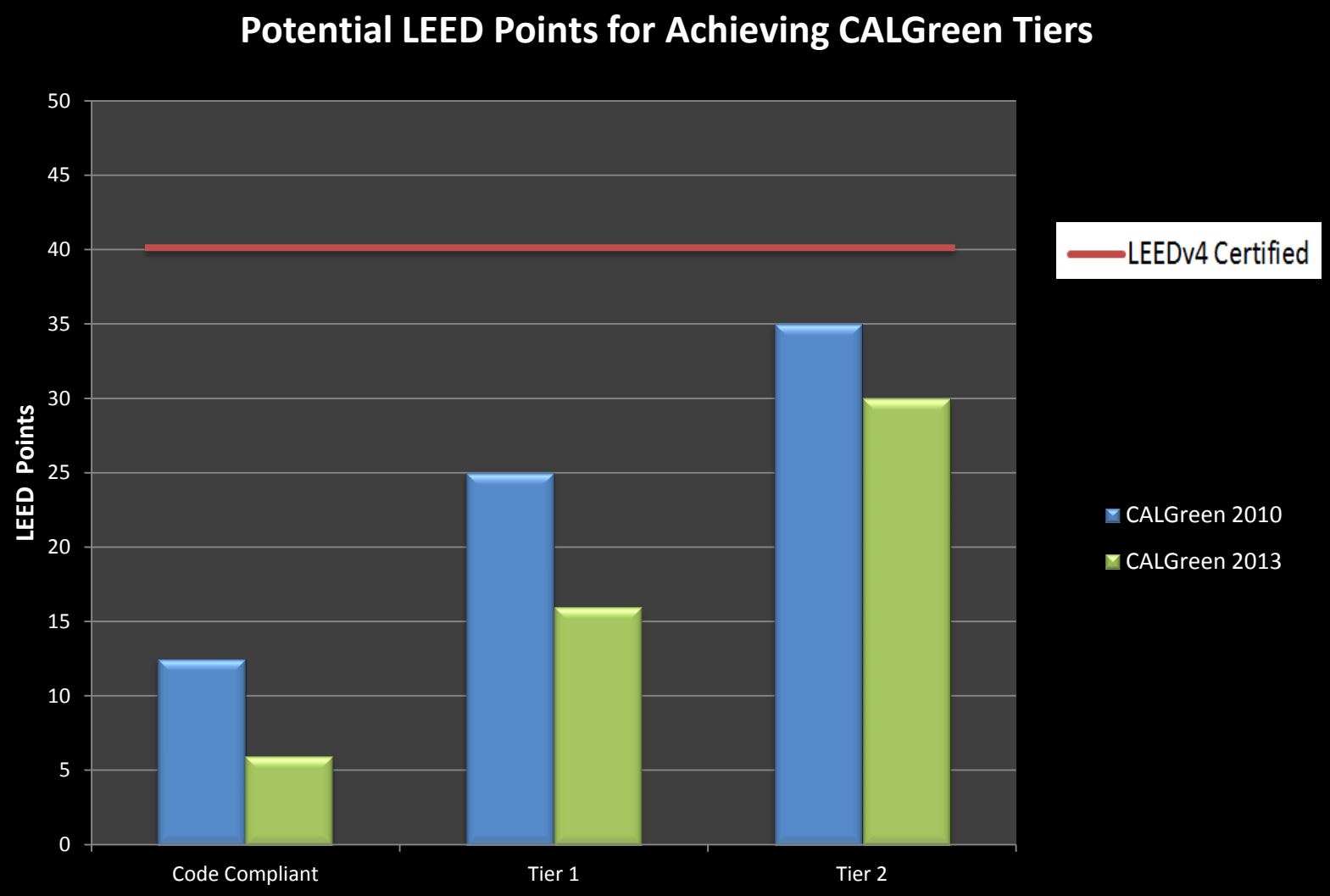
1	2	4		Material Conservation and Resource Efficiency
0	0	0	5.407	Water Resistance and Moisture Control
P	P	P	5.408.2	Construction Waste Management Plan
1	1	1	5.408.3	Construction Waste Reduction
0	0	0	5.408.4	100% Diversion of Soil and Land Clearing Debris
P	P	P	5.410.1	Occupant Recycling
0	0	0	5.410.2	Commissioning
0	0	0	5.410.3	Testing and Adjusting
			A5.404	Efficient Framing Techniques
	1	1	A5.405.1	Regional materials
			A5.405.2.1	Certified wood
			A5.405.2.2	Rapidly renewable
			A5.405.3	Reused Materials
	0	0	A5.405.4	Recycled content, Tier 1 10%
		1	A5.405.4.1	Recycled content, Tier 2 15%
			A5.405.5	Cement and Concrete
			A5.406	Enhanced durability and reduced maintenance.
		0	A5.407.3	Weather protection
		0	A5.407.4	Moisture control
	0	0	A5.408.3.1	Enhanced construction waste reduction, Tier 1: 65%
		1	A5.408.3.2	Enhanced construction waste reduction, Tier 2: 80%
			A5.409.1	Lifecycle cost assessment of Materials and system assemblies

3	3	5		Environmental Quality
0	0	0	5.503.1	Fireplaces
0	0	0	5.503.1.3	Temporary Ventilation
0	0	0	5.504.3	Protect HVAC system and equipment during construction
3	3	3	5.504.4	Finish Material Pollutant Control
0	0	1	5.504.5.3	MERV 8 Filters
P	P	P	5.504.7	Environmental Tobacco Smoke
0	0	0	5.505.1	Indoor Moisture Control
0	0	0	5.506.1	Outside Air Delivery
0	0	0	5.506.2	CO2 Monitoring
0	0	0	5.507.4	Acoustical Control
0	0	0	5.508.1	Ozone Depletion and GHG Reduction
0	0	0	5.508.2	Supermarket refrigerant leak reduction
	0	0	A5.504.1	IAQ during construction
		0	A5.504.2	IAQ Post-construction
	0	0	A5.504.4.7	Resilient flooring systems, Tier 1 80%
		0	A5.504.4.7.1	Resilient flooring systems, Tier 2 90%
	0	0	A5.504.4.8	Thermal insulation, Tier 1
		0	A5.504.4.8.1	Thermal insulation, Tier 2 Install No-Added Formaldehyde
			A5.504.4.9	Acoustical ceilings and wall panels
			A5.504.5	Hazardous particulates and chemical pollutants
			A5.504.8	Finish material pollutant control
			A5.507.1	Lighting and thermal comfort controls
			A5.507.2	Daylight
			A5.507.3	Views
			A5.507.5	Acoustical control.
		1	A5.508.1.3	Hydrochlorofluorocarbons
			A5.508.1.4	Hydrofluorocarbons

0	0	0		Installer and Special Inspector Qualifications
0	0	0	5.303.1	Special Inspections

* Points reflect likely LEED v4 for New Construction points based on hypothetical CALGreen compliant building scenarios
P = LEED Prerequisite
Mandatory Base Code Measure
Mandatory Tier Measure
Grey Measure not pursued in hypothetical project scenario

September 2013, StopWaste.Org of Alameda County
Prepared by DNV GL - Energy



Analysis indicates a widening gap between CALGreen Tiers and LEED point scores from 2010 to 2013. The blue bars compare relative LEED scores for projects achieving CALGreen 2010 under the LEED 2009 rating system. The green bars compare CALGreen 2013 and LEEDv4 on a hypothetical project. The widening gap is attributable to the trajectory of LEEDv4 which has led to new credits in the rating system and a redefining of green building criteria. While CALGreen 2013 has a much larger pool of covered projects than its 2010 version, there have only been minor changes to the green building criteria, thus the resulting lower scores in comparison to LEEDv4.

CALGreen 2013 Tier Comparison to LEED v4

The following is a comparative analysis between the "2013 California Green Building Code" (CALGreen or CG-2013) and the third party rating system "Leadership in Energy and Environmental Design - Building Design & Construction, New Construction version 4" (LEED v4). The analysis compares CALGreen 2013 code mandatory & voluntary tier measures against LEED v4 prerequisites & credits with parallel intent. The purpose of the comparison is to identify the difficulty of achieving LEED credits when meeting the requirements of all CALGreen 2013 code mandatory, tier 1 and tier 2 measures respectively. In other words, if a project has met the requirements of the CALGreen measures listed, the colors below indicate how much additional effort is needed to comply with related LEED credits.

The comparison text and point allocations represent assumed results determined by industry-leading Green Building experts. Actual LEED v4 points achieved may vary depending on a multitude of project specific circumstances. The following comparison should only be used as a reference for evaluation purposes. All applicable CALGreen Mandatory and Tier Sub-Measures were evaluated in this comparison, although not all are listed below for legibility.

KEY

	CALGreen Mandatory Measure		LEED credit points can easily be achieved by meeting CALGreen measures.
	LEED Credit or Prerequisite		LEED credit(s) can be achieved with minimal changes. LEED standards are slightly different than CALGreen.
	CALGreen Tier 1 or 2 Measure		LEED credit(s) can be achieved with major changes. LEED standards are significantly different than CALGreen.
	CALGreen Measures for which there is no LEED overlap.		

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.103.1	Community Connectivity	For this voluntary measure, CALGreen requires projects to be located on a previously developed site within a 1/2 radius of ten basic services. LEED LTc2 has two options, but Option 1 is applicable for the comparison. Under Option 1, projects can achieve 1 pt by locating their development footprint on a previously developed site. LEED LTc4 also has two options and projects can get up to 5 total possible points if both Options 1&2 are completed, but if only option is pursued, 2-3pts for are available for Option 1 (surrounding density); or 1-2pts for Option 2 (Diverse uses within a 1/2 mile radius; 4-7 uses = 1 pt & 8 or more uses = 2 pts.) LEED LTc4 also has additional compliance requirements beyond the CALGreen Community Connectivity requirements listed above.			
LEEDv4	LTc2	Sensitive land protection				
	LTc4	Surrounding density and diverse uses				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.103.2	Brownfield or greyfield site redevelopment or infill area	CALGreen requires projects to be located on either a Brownfield, greyfield redevelopment or infill area development site. LEED LTc3 has 3 options. Under Option 1, projects can achieve 1 pt by locating the project on an infill location in a historic district. Option 2 is for a priority designation such as the EPA's National Priorities List which is not applicable to CALGreen. Choosing Option 3, projects can achieve 2pts by locating the project on a brownfield site and conducting remediation.			
LEEDv4	LTc3	High Priority Site: Location				
		High Priority Site: Remediation (option 3)				
CG-2013	A5.104.1	Reduce development footprint and optimize open space	CALGreen has different requirements depending on the zoning conditions for the project location. If local zoning requirements exist, projects must exceed the zoning's open space requirement for vegetated open space on the site by 25 percent. If no local zoning requirements exist, projects must provide vegetated open space area adjacent to the building equal to the building footprint area. If zoning exists but there is no open space requirement, projects must provide vegetated open space equal to 20 percent of the total project site area. LEED SSc3 Requires outdoor space for >/= 30% total site are (including building footprint). Minimum of 25% of that outdoor space must be vegetated or overhead vegetated canopy.			
LEEDv4	SSc3	Open Space				
CG-2013	A5.105.1	Deconstruction and Reuse of Existing Structures	For the reuse of the existing structure under CALGreen, projects must maintain 75% of structural floor, roof decking and envelop. For the existing interior nonstructural elements, projects must reuse 50% of the walls, doors, floor coverings and ceiling systems. Projects must salvage other items in good condition and document the weight or quantity. LEED MRc1 offers 4 Options, but Option 3: Building and Material Reuse is comparable. Projects can achieve 2-4 points (25%, 50%, 75%) by reusing on-site or off-site materials. Must include structural, enclosure and permanently installed interior elements.			
LEEDv4	MRc1	Building life-cycle impact reduction				
CG-2013	5.106.1	Storm Water Soil Loss Prevention Plan	CALGreen and LEED have identical requirements.			
LEEDv4	SSp1	Construction Activity Pollution Prevention				
CG-2013	A5.106.2	Storm water design	CALGreen requires the development and implementation of a Storm Water Management Plan resulting in no net increase in rate and quantity. For storm water quality, use treatment control BMP's to mitigate 85% of runoff in the 24-hour runoff event. For LID's, employ at least two of the referenced methods or other BMP's. LEED SSc4 has two Options with multiple paths and Option 1, Path 1 (2pts) & 2 (3pts) require runoff mitigation to the 95th and 98th percentile 24-hour runoff event, respectively, by employing LID and green infrastructure strategies.			
	A5.106.2.1	Storm water runoff rate and quantity				
	A5.106.2.2	Storm water runoff quality				
	A5.106.3	Low impact development (LID)				
LEEDv4	SSc4	Rainwater management				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.106.4	Short-Term bicycle parking	CALGreen mandatory measure requires permanently anchored bicycle parking and secure bike parking within 200 feet of entrance for 5% of both new visitor (one two-bike rack minimum) and tenant vehicular parking spaces (one space minimum). LEED requires secure bike storage within 100 feet of main entrance for 2.5% of all peak visitors (short-term) and 100 feet of any building entrance for 5% of non-residential FTE (long-term) and 30% of residential occupants. CALGreen Tiers requires buildings with over 10 tenant occupants to provide showers/changing room facilities with 2-tier personal effects lockers in accordance with the referenced table in the code. For 100-200 FTE, provide 1 shower stall per gender and 4 2-tier lockers. LEED requires at least one shower and changing facility for first 100 FTE and one additional shower for every 150 FTE occupants thereafter, CALGreen does not. LEED requires secure bike storage locations to be within walking (200 yds) or cycling distance of a bicycle network that connects to various defined destinations that are located with a 3-mile cycling distance of the project boundary.			
		Long-Term bicycle parking				
	A5.106.4.3	Changing Rooms				
LEEDv4	LTc6	Bicycle Facilities				
CG-2013	A5.106.5.1.1	Designated Parking for fuel-efficient vehicles: Tier 1 - 10%	Designated Parking: CALGreen Mandatory Measure requires designated parking for any combination of low-emitting, fuel efficient, or carpool/van pool vehicles as referenced in table A5.106.5.1.1. The Mandatory Tiers require designated parking for 10% (Tier 1) and 12% (Tier 2) of total parking as referenced in the table in the code. Electric Vehicle Charging Stations: CALGreen Tier 1 & 2 require supporting future electric vehicle charging stations for at least 3% and 5% of total parking spaces, respectively. LEED LTc7 requires 5% designated carpool parking above and beyond the parking reduction requirements for any off street parking. LEED LTc8 has a mandatory "Preferred Parking" element (carpool/vanpool not included). LEED also gives options for EV Charging Stations, and Liquid, gas, or battery facilities (one must be chosen) which CALGreen mandatory measures do not address. Key Differences: 1. The percentage of stalls preferred parking (7% LEED; 8% CALGreen Mandatory; 10% & 12% CALGreen Tiers 1 & 2). (LEED has defined vehicle types) 2. The criteria for low-emitting and fuel efficient vehicles ("clean air/vanpool/ev" is not an accepted terminology in LEED). Carpools/vanpools and clean air vehicles fall under separate credits under LEED. 3. Labeling requirements for preferred parking stalls (LEED requires signs, CALGreen requires painted stalls). 4. LEED requires preferred parking to be located near entrances; CALGreen has no such restrictions.			
	A5.106.5.1.2	Designated Parking for fuel-efficient vehicles: Tier 2 - 12%				
	5.106.5.2	Designated Parking				
	A5.106.5.3	Electric vehicle charging				
	A5.106.5.3.1	Single charging space requirements				
	A5.106.5.3.2	Multiple charging space requirements				
	A5.106.5.3.3	Tier 1 - 3% of total spaces (1 minimum)				
	A5.106.5.3.4	Tier 2 - 5% of total spaces (2 minimum)				
	A5.106.5.3.4	Labeling Requirement				
LEEDv4	LTc7	Reduced Parking Footprint				
	LTc8	Green Vehicles				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.106.6	Parking capacity	CALGreen requires projects to meet but not exceed local zoning requirements and allows for an option of reduced parking capacity via on street parking and programs aimed to reduce single occupant vehicle travel. LEED requires that projects do not exceed the minimum local code requirements for parking capacity and comply with either case 1 or case 2. <u>Case 1. Baseline Location</u> Projects that have not earned points under LTc4 Surrounding Density and Diverse Uses or LTc5 Access to Quality Transit must achieve a 20% (1 point) or 40% (2 points ID&C) reduction from the base ratios. <u>Case 2. Dense and/or Transit-Served Location</u> Projects earning 1 or more points under either LTc4 Surrounding Density and Diverse Uses or LTc5 Access to Quality Transit much achieve a 40% (1 point) or 60% (2 points) reduction from the base ratios. <u>For All Projects:</u> The credit calculations must include all existing and new off-street parking spaces that are leased or owned by the project, including parking that is outside the project boundary but is used by the project. On-street parking in public rights-of-way is excluded from these calculations. For projects that use pooled parking, calculate compliance using the project's share of the pooled parking. There are other requirements for this LEED credit which compare to other CALGreen Measures already referenced.			
LEEDv4	LTc7	Reduced Parking Footprint				
CG-2013	A5.106.7	Exterior wall shading	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				
CG-2013	5.106.8	Light Pollution Reduction	CALGreen uses IESNA 2011 BUG Ratings measure how much light is going toward uplighting, backlighting and glare on new construction projects only. LEED also allows BUG Ratings for compliance with its uplight and light trespass requirements.			
LEEDv4	SSc6	Light Pollution Reduction				
CG-2013	A5.106.9	Building Orientation	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				
CG-2013	5.106.10	Grading and Paving	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under: Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.106.11	Heat island effect	CALGreen requires heat island reduction for both nonroof (hardscape alternatives for 50% of site or 50% of parking underground) and roof (cool/vegetative roofs with minimum aged SRI and thermal emittance in compliance with Tables A5.106.11.2.1-A5-106.11.2.3). LEED SSc5 offers two Options. Option 1 requires both nonroof and roof strategies where the compliance percentage/sqf area is based off a calculation where area of nonroof measures (+) area of roof measure (+) area of vegetated roof is >- Total Site paving area (+) Total Roof Area. Credit includes a compliance based reference table for aged SRI. Option 2 requires a minimum of 75% of parking to be located under cover with: (1) 3 yr aged SRI of at least 32 or initial installation SRI of 39, (2) vegetative roof or (3) covered by PV, Solar thermal and wind turbines.			
LEEDv4	SSc5	Heat island reduction				
CG-2013	5.201.1	Energy Efficiency	CALGreen Mandatory Measure requires projects to meet the 2013 California Energy Code (Title 24, Part 6, effective January 1, 2014). Tier 1 and Tier 2 have additional requirements for reduced outdoor lighting power and service water heating in restaurants. For building projects that include indoor lighting or mechanical systems, but not both, the calculated energy consumption must be no greater than 95% and 90% (Tier 1 and Tier 2, respectively) than a code compliant Title 24-2013 energy budget. For projects that include indoor lighting and mechanical systems the requirement is for 90% and 85% respectively. LEED requires a 5% energy cost reduction compared to ASHRAE 90.1-2010. Optional LEED credit allows for "whole building energy simulation modeling" to increase reduction percentages (1 point for 6%, up to 18 points for 50%).	18 points are available but 2-5 should be most easily achievable.		
	A5.203.1.1	Performance Approach: Energy Efficiency				
	A5.203.1.1.1	Outdoor lighting				
	A5.203.1.1.2	Service water heating in restaurants				
	A5.203.1.1.3	Functional areas where compliance with				
	A5.203.1.2.1	Tier 1: < 95% or 90% T-24 Energy Budget for				
	A5.203.1.2.2	Tier 2: < 90% or 85% T-24 Energy Budget for				
LEEDv4	EAp2	Minimum Energy Performance				
	*EAc1	*Optimize Energy Performance				
CG-2013	A5.211.1	On-site renewable energy	CALGreen requires on-site renewable energy for at least 1% of the electric power or 1kW, in addition to the electrical demand required to meet 1% of the natural gas and propane use. LEED EAc5 requires renewable energy to offset the buildings annual energy cost for 1%, 5% & 10% (1, 2, 3 pts respectively).			
LEEDv4	EAc5	Renewable Energy Production				
CG-2013	A5.211.3	Green Power	CALGreen requires projects to participate in local utility providers renewable energy portfolio program for 50% of the buildings electrical power. LEED EAc7 requires projects to engage in a minimum 5 year contract from qualified resources to provide at least 50% (1 pt) or 100% (2 pts) of the projects energy from green power, carbon offsets, or renewable energy certificates. Percent reduction is based on quantity of energy consumed, not cost.			
LEEDv4	EAc7	Green Power and Carbon Offsets				
CG-2013	A5.211.4	Prewiring for future rooftop solar	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				
CG-2013	A5.212.1	Elevators and escalators	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				
CG-2013	A5.213.1	Energy Efficient Steel framing	No overlapping LEED Credit exists for comparison.	N/A		
LEEDv4	N/A	N/A				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.303.1	5.303.1.1- Meters	CALGreen requires water submetering on buildings over 50,000 square feet or where consumption is projected to be more than 1,000 gal/day. LEED WEp3 requires permanent water meters that measure the total potable water use for the building and associated grounds. Meter data must be compiled into monthly and annual summaries; meter readings can be manual or automated. Whole project water usage data must be shared with the USGBC for a five year period. LEED WEc4 requires permanent water meters for at least two of the following water subsystems, as applicable to the project: 1. Irrigation. 2. Indoor plumbing fixtures and fittings. 3. Domestic Hot Water. 4. Boiler(s). 5. Reclaimed water. 6. Other process water.			
		5.303.1.2- Excessive Consumption				
LEEDv4	WEp3	Building Level Water Metering				
	WEc4	Water Metering				
CG-2013	A5.303.2.3.1	Water Reduction: Tier 1 - 30% savings	CALGreen sets maximum prescriptive flow rates for kitchen faucets, wash fountains, metering faucets and metering faucets for wash fountains. Further, CALGreen and LEED require 20% water use reduction on all applicable water use fixtures compared to basecase water consumption calculations. However, CALGreen builds off the 2013 California Plumbing Code updates which results in some baseline fixture flow rates are now more stringent in CALGreen than in LEED. CALGreen is more stringent than LEED at a fixture level in some cases, but LEED is a performance based calculation and projects could meet or exceed the reduction rates of CALGreen prescriptive rates on the following fixtures: - CALGreen water closet flush rate (1.28 gpf) < LEED (1.6 gpf) - CALGreen urinal flush rate (0.5 gpf) < LEED (1.0 gpf) - CALGreen showerhead flow rates (2.0 gpm) < LEED (2.5 gpm). CALGreen limits the total flow from multiple showerheads in a single shower enclosure. CALGreen allows for water conserving wastewater conveyance systems and/or utilization of nonpotable water systems/sources. LEEDv4 has combined the previously known as "innovative wastewater treatment" credit into WEc2 Indoor Water Use Reduction.			
	A5.303.2.3.2	Water Reduction: Tier 2 - 35% savings				
	A5.303.2.3.3	Water Reduction: 40% savings				
	A5.303.2.3.4	Nonpotable water systems for indoor use				
	A5.303.3	Appliances and fixtures for commercial application				
	A5.303.5	Dual plumbing				
	5.303.2	Water Reduction				
	5.303.3	Water conserving plumbing fixtures and fittings				
	5.303.4	Wastewater Reduction				
	5.303.6	Standards for Plumbing Fixtures and Fittings				
LEEDv4	WEp2	Prerequisite: Indoor Water Use Reduction				
	WEc2	Indoor Water Use Reduction 25%-50%				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.304.1	Water budget	<u>Outdoor Water - Irrigation Reduction</u> Water consumption in landscape irrigation must meet local water efficient landscape ordinance or CA Model Water Efficient Landscape Ordinance (WELO or MLO). CALGreen requires at least a 20% reduction in water use, where LEED requires at least 30% reduction. Except where local ordinances may be more stringent, LEED requires deeper water conservation than CALGreen. CALGreen also requires an audit report to be filed from a certified landscape irrigation auditor. LEED's additional credit (WEc1) gives two options: Option 1. No Irrigation Required. Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period. OR Option 2. Reduced Irrigation. Reduce the project's landscape water requirement by at least 50% (WEc1) from the calculated baseline for the site's peak watering month. Reductions must be achieved through plant species selection and irrigation system efficiency, as calculated by the EPA WaterSense Water Budget Tool. <u>Irrigation Meters</u> Under CALGreen, landscaped areas of at least 1000 square feet but not more than 5000 square feet (the level at which Water Code §535 applies), require separate submeters to be installed for outdoor potable water use. LEED WEc4 requires permanent water meters for two or more water subsystems, of which irrigation is an option. No points are tallied here as they are reflected elsewhere. <u>Irrigation Controllers</u> New building sites with at least 1000 but not more than 2500 square feet of cumulative landscaped area (the level at which the MLO applies), install irrigation controllers and sensors. Controllers must be weather, or soil moisture-based controlled. Weather based controllers must include a rain sensor in the system. The LEED calculations for irrigation water use do not require controllers, but projects that seek the LEED credit and install a CALGreen compliant controller can meet the CALGreen requirement.			
	5.304.2	Outdoor Potable Water Use				
	5.304.3	Irrigation Design				
	A5.304.2.1	Outdoor potable water use				
	A5.304.4	Potable water reduction				
	A5.304.4.1	Tier 1: < 60% reduction				
	A5.304.4.2	Tier 2: < 55% reduction				
	A5.304.5	Potable water elimination				
	A5.304.8	Graywater irrigation system				
	A5.305.1	Nonpotable water systems				
	A5.305.2	Irrigation systems				
LEEDv4	WEp1	Prerequisite: Outdoor Water Use Reduction				
	WEc1	Outdoor Water Use Reduction				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.304.6	Restoration of areas disturbed by construction	CALGreen requires local adaptive and/or noninvasive vegetation to be planted where construction has disturbed the site. Previously developed or graded sites require at least 50% of the site area (excluding the building footprint) to be restored or protected with adaptive and/or noninvasive vegetation. Projects complying with A5.106.3, Item 3 may apply vegetative roof surface to this calculation if the roof plants meet the definition of adaptive or noninvasive. LEED has two Options, but only Option 1 - On-site restoration (2pts) is applicable for this comparison. Restore 30% of the previously developed site (including the building footprint) using native or adaptive vegetation. Projects with a 1.5 floor-area ratio may include vegetated roof surfaces in this calculation if the plants are native or adapted, provide habitat, and promote biodiversity. There are multiple criteria requirements associated with Soils (imported, in-situ, topsoils, soil blends) in order to be properly restored. CALGreen and LEED are similar, but LEED is more stringent and involves more defined restoration criteria, although CALGreen requires a greater site area to be restored.			
	A5.304.7	Previously developed sites				
LEEDv4	SSc2	Site Development, Protect or Restore Habitat				
CG-2013	A5.404	Efficient Framing Techniques	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under: Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.405.1	Regional materials	CALGreen offers many options for material sourcing measures. Those options (none of which by themselves are likely to achieve LEED points) are as follows: - Regional: Harvested & Manufactured in California or 500 mile radius of project, low embodied energy, 10% of project cost based, based on localized weight for assemblies with non-compliant items - Bio-Based: At least 50% content - Certified Wood: No designation of certification standard established, but related to Bio-Based - Rapidly Renewable: 2.5% of total materials value - Reused: Minimum 5% of total value based on estimated cost - Recycled Content Tier 1 & Tier 2: 10% and 15% RCV of total materials cost calculated based on the simplified or detail calculation methodologies referenced in the code. - Alternative Method for Concrete: RCV is calculated based on the cost of the cementitious materials - Cement: Various specification requirements for different types - Concrete: Must contain one or more SCMs conforming to various standards referenced in the code, which must comply with codes mixture design equation. Additional means of compliance: Cement and Concrete specifications and manufacturing processes as referenced in the code. LEED - MRc2 has two options (1 pt each): Option 1, EPD's and Option 2, Multi-attribute optimization. LEED - MRc3 has two options (1 pt each): Option 1: Raw material source and extraction reporting and Option 2: Leadership extraction practices. LEED - MRc4 has three options (1 pt each, up to 2 pts): Option 1: Material ingredient reporting, Option 2: Material ingredient optimization, and Option 3: Product manufacturer supply chain optimization			
	A5.405.2	Bio-based materials				
	A5.405.2.1	Certified wood				
	A5.405.2.2	Rapidly renewable material				
	A5.405.3	Reused material				
	A5.405.4	Recycled Content: Tier 1 - 10%				
	A5.405.4	Recycled Content: Tier 2 - 15%				
	A5.405.4.1	Total Material Cost (simplified or detailed)				
	A5.405.5	Cement and Concrete				
LEEDv4	MRc2	Building Product Disclosure & Optimization: Environmental Product Declarations				
	MRc3	Building Product Disclosure & Optimization: Sourcing				
	MRc4	Building Product Disclosure & Optimization: Ingredients				
CG-2013	A5.406	Enhanced Durability and Reduced	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				
CG-2013	5.407.1	Weather Protection	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				
CG-2013	5.407.2	Moisture Control	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.408.1	Construction Waste Management	Both CALGreen and LEED require Construction and Demolition Waste Management Plan to be developed, but CALGreen requires the plan to identify a 50% Diversion goal, where LEED MRp2 requires an estimate. CALGreen requires the use of a waste management company to provide verifiable documentation and LEED does not. LEED MRc5 has two options. Option 1 Diversion - Path 1 minimum requirement, where 50% Diversion and Three Material Streams (1pt) must be achieved. For Path 2, 75% Diversion and Four Material Streams (2pts) must be achieved. CALGreen's diversion rates for Tiers are 65% and 85% for Tier 1 and Tier 2 respectively. Excavated soil, land clearing debris and alternative daily cover (ADC) must be excluded from diversion calculations for both CALGreen and LEED. Please note that in many cases, local recycling requirements are more stringent than both CALGreen and LEED. Both CALGreen 5.408.1.3 and LEED MRc5 Option 2 provide an alternative waste reduction strategy that allows the project to comply by not generating more than 2 lbs or 2.5 lbs of construction waste per square foot of building's floor area respectively.			
	A5.408.3.1	Enhanced construction waste reduction: Tier 1 - 65%				
	A5.408.3.1.1	Enhanced construction waste reduction: Tier 2 - 80%				
LEEDv4	MRp2	Construction and Demolition Waste Management Planning				
	MRc5	Construction and Demolition Waste Management				
CG-2013	A5.409.1	Life Cycle Assessment	For A5.409.1, CALGreen requires Life Cycle Assessments (LCA) to be ISO 14044 compliant and the building and materials to have a minimum 60 year service life. Whole Building LCA option (including operating energy and referenced building components) must prove a 10% improvement or LCA based for 50% of Materials and systems assemblies for at least three of the referenced impact categories (one must be Climate Change and compared to a similar conventional building). LEED MRc1 Option 4: Whole- Building life-cycle assessment (3 points) Requires LCA to be ISO 14044 compliant, a minimum 60 year service life, a 10% reduction compared to the baseline building and at least three of the referenced impact categories for reduction.			
	A5.409.2	Whole building life cycle assessment				
	A5.409.3	Materials and systems assembly				
	A5.409.4	Substitution for prescriptive standards				
	A5.409.5	Verification of compliance				
LEEDv4	MRc1	Building Life Cycle Impact Reduction				
CG-2013	5.410.1	Recycling by occupants	CALGreen and LEED have identical recycling requirements, but LEED also requires that projects take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste.			
LEEDv4	MRp1	Storage and Collection of Recyclables				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.410.2	Commissioning (Cx)	Both CALGreen and LEED require commissioning of all energy-related systems. CALGreen requires that irrigation systems be commissioned. LEED requires that the OPR, BOD and peer review address the exterior envelope. Further, CALGreen requires: 1) a systems manual, and 2) training on systems being commissioned. So long as these two requirements and irrigation systems are included in the LEED project commissioning scope of work, CALGreen requirements have been met. Additionally, LEED specifies that the Commissioning Agent (CxA) be well qualified, and, for projects >20,000 s.f., the CxA must be independent of the design team. CALGreen has more relaxed requirements for qualified commissioning agents and only requires independence on projects >50,000 s.f.			
	5.410.2.1	Owner's Project Requirements (OPR)				
	5.410.2.2	Basis of Design (BOD)				
	5.410.2.3	Cx Plan				
	5.410.2.4	Functional Performance Testing				
	5.410.2.5	Documentation and Training				
	5.410.2.6	Cx Report				
LEEDv4	EAp1	Fundamental Commissioning				
	EAc1	Enhanced Commissioning				
CG-2013	5.410.4	Testing and Adjusting	LEED requires commissioning (not just Testing and Adjusting) of all energy-related systems in all projects regardless of size, therefore is more stringent than CALGreen's testing and adjusting measure requirements. However, CALGreen requires testing and adjusting irrigation systems which are unaddressed under LEED.			
LEEDv4	EAp1	Fundamental Commissioning				
CG-2013	5.503.1	Fireplaces	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				
CG-2013	A5.504.1	Indoor air quality (IAQ) during construction	CALGreen voluntary measures give credit for temporary ventilation during construction of at least three air changes per hour. Both LEED and CALGreen require MERV 8 filters on all return air grille for temporary ventilation and duct opening coverage/mechanical equipment protection during construction. LEED's requirements include limiting tobacco use during construction. Both CALGreen and LEED reference Control Measures for SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.			
	5.504.3	Covering of duct openings & protection of mechanical equipment during construction				
LEEDv4	EQc3	Construction Indoor Air Quality Management Plan - During Construction				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.504.2	IAQ post-construction	CALGreen requires continual building flushout (after all interior finishes are installed) from all Air Handling Units at maximum outdoor air rate and all supply fans at their maximum positions for at least 14 days. IAQ Testing is an alternative option, but protocols must follow US EPA standards and allowable concentrations, HVAC operational duration, sampling locations and corrective action steps for noncomplying building areas must meet references in A5.504.2.1. LEED EQc4 Option 1 has two paths, one for Flushout Before Occupancy and one for Flushout During Occupancy. Install new filtration media and conduct flushout by providing 14,000 cubic feet of outdoor air per square foot of gross floor area. Temperatures no lower than 60, no higher than 80 degrees F and relative humidity no higher than 60%. LEED EQc4 Option 2 - Air Testing (2pts) = protocols allow for a variety of standards (US EPA compendium methods, ASTM method and ISO method) and allowable concentrations, HVAC operational duration, sampling locations and corrective action steps for noncomplying building areas must meet references in LEED Table and protocol procedures.			
LEEDv4	EQc4	IAQ Assessment				
CG-2013	5.504.4.1	Adhesives, sealants and caulks	The requirements of CALGreen and LEED are nearly identical for all products covered by this measure.			
LEEDv4	EQc2	Low-Emitting Materials				
CG-2013	5.504.4.3	Paints and Coatings	The reference standards in CALGreen and LEED are the same			
LEEDv4	EQc2	Low-Emitting Materials				
CG-2013	5.504.4.4	Carpet Systems	While CALGreen allows for multiple compliant certifications, the acceptable certification for LEED is one of the CALGreen criteria and are therefore compliant.			
LEEDv4	EQc2	Low-Emitting Materials				
CG-2013	5.504.4.5	Composite wood products	The reference standards in CALGreen and LEED are the same. No points are tallied herein, as there is a maximum of 3 points in this category all of which are counted elsewhere.			
LEEDv4	EQc2	Low-Emitting Materials				
CG-2013	A5.504.4.7	Resilient flooring systems: Tier 1 - 90%	LEED requires 100% of resilient flooring to comply compared with only 80% for CALGreen's mandatory measure and 90% and 100% for Tier 1 and Tier 2 respectively. CALGreen allows multiple VOC emission standards to comply, where LEED requirements follow only the California Department of Public Health Standard Method v1.1–2010.			
	A5.504.4.7.1	Resilient flooring systems: Tier 2 - 100%				
	A5.504.4.7.2	Verification of compliance				
	5.504.4.6	Resilient flooring systems				
LEEDv4	EQc2	Low-Emitting Materials				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under: Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.504.4.8	Thermal insulation: Tier 1	CALGreen Tier 1 requires thermal insulation to comply with three separate emissions standards: - Chapters 12-13 of Title 24 Part 12, - the VOC emission limits defined in 2009 CHPS High Performance Products Database criteria, and - California Department of Public Health 2010 Standard Method for Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Versions 1.1 February 2010. CALGreen Tier 2 requires Tier 1 compliance plus no-added formaldehyde, which LEED EQc2 does not specifically prohibit for insulation. LEED EQc2 requirements follow only the same California Department of Public Health Standard as listed above. No LEED points are tallied herein, as there is a maximum of 3 points in this category.			
	A5.504.4.8.1	Thermal insulation: Tier 2 - formaldehyde free				
LEEDv4	EQc2	Low-Emitting Materials				
CG-2013	A5.504.4.9	Acoustical ceiling and wall panels (VOC)	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				
CG-2013	A5.504.5	Hazardous particulates and chemical pollutants	CALGreen's mandatory measure requires MERV 8 or an ASHRAE 10% to 15 % efficiency filter compliant HVAC units as referenced in the code. CALGreen Tier 1 and Tier 2 require MERV 11 and MERV 13 respectively. CALGreen voluntary measures give credit for six foot permanent entryway systems and isolation of pollutant sources. LEED's MERV 13 requirement exceeds CALGreen's MERV 8 and MERV 11 requirements and the isolation of pollutant sources is more stringent and comprehensive than CALGreen. LEED projects that achieve EQc1 comply with the CALGreen requirement for filter efficiency.			
	A5.504.5.1	Entryway systems				
	A5.504.5.2	Isolation of pollutant sources				
	5.504.5.3	Filters				
	A5.504.5.3.1	Filters - Tier 1 (MERV 11)				
	A5.504.5.3.2	Filters - Tier 2 (MERV 13)				
LEEDv4	EQc1	Enhanced IAQ Strategies				
CG-2013	5.504.7	Environmental Tobacco Smoke (ETS) Control	CALGreen and LEED have nearly identical requirements.			
LEEDv4	EQp2					
CG-2013	5.505.1	Indoor moisture control	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				
CG-2013	5.506.1	Outside air delivery	While the reference standard within LEED (ASHRAE) and CALGreen (Title 24 Energy Code) differ, they are largely similar and have the same intent. For most projects the LEED requirements are slightly more restrictive because the ASHRAE 62.1-2010 Ventilation Rate Procedure takes into account air distribution effectiveness and ventilation efficiency. Both calculations are performed on a space-by-space basis and not universally consistent; however many of space types the ASHRAE (LEED) ventilation requirements are more stringent than CALGreen.			
LEEDv4	EQp1	Minimum Indoor Air Quality Performance				
CG-2013	5.506.2	Carbon dioxide (CO2) monitoring	CALGreen and LEED have nearly identical requirements.			
LEEDv4	EQc1	Enhanced IAQ Strategies				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	A5.507.1	Lighting and thermal comfort controls	In single occupant spaces, CALGreen voluntary measures include: - lighting controls in compliance with California Energy Code, - individual task (day)lighting controls for 90% of building occupants and - thermal controls for 50% of building occupants. For multi-occupant spaces, lighting and thermal comfort controls must be provided for all shared spaces. LEED EQc5 Thermal Comfort (1 pt) - Requires both thermal comfort design and controls and has two options for the design requirement, Option 1 - ASHRAE Standard 55-2010 and Option 2 - ISO and CEN Standards. LEED requires 50% of single occupant spaces to have controls and all shared spaces to have controls. LEED EQc6 Interior Lighting (up to 2 pts) - Option 1 - Lighting Controls (1 pt) requires at least 90% of individual occupant spaces to have 3 level control options (on, off, midlevel) with midlevel at 30%-70% of maximum illumination levels with other referenced requirements. Option 2 - Lighting Quality (1 pt) requires projects to meet four of the referenced quality based strategies, none of which are addressed in CALGreen.			
	A5.507.1.1	Single occupant spaces				
	A5.507.1.1.1	Lighting				
	A5.507.1.1.2	Thermal Comfort				
	A5.507.1.2	Multi-occupant spaces				
LEEDv4	EQc5	Thermal Comfort				
	EQc6	Interior Lighting				
CG-2013	A5.507.2	Daylight	CALGreen requires daylit spaces for toplighting and sidelighting as referenced in the California Energy Code and encourages the consideration of the following: 1. Light shelves and reflective room surfaces to maximize daylight penetration 2. Elimination of glare and direct sun light, including through skylights 3. Use of photosensors to turn off electric lighting when daylight is sufficient 4. Not using diffuse daylighting glazing where views are desired LEED EQc7 has three options: Option 1. Simulation: Spatial Daylight Autonomy (2–3 pts) Option 2. Simulation: Illuminance Calculations (1–2 pts) Option 3. Measurement (2-3 pts) Options 1 & 2 require computer simulation modeling for either (Option 1) spatial daylight autonomy (55%, 75%, or 90%) or (Option 2) illuminance Calculations. Option 3 requires field measurements.			
LEEDv4	EQc7	Daylight				
CG-2013	A5.507.3	Views	CALGreen and LEED are very similar, but CALGreen requires 90% of regularly occupied space (ROS) to have direct line of sight to outdoor spaces compared to LEED's 75% of ROS. LEED also has additional multi-layered requirements that need to be met addition to just meeting the percentage threshold.			
	A5.507.3.1	Interior office spaces				
	A5.507.3.2	Multi-occupant spaces				
LEEDv4	EQc8	Quality Views				

CALGreen 2013 Tier Comparison to LEED v4

Code/ Rating System	Reference Number	Measure / Credit Name	Comparison Results	Difficulty of achieving LEED points under:		
				Mandatory CALGreen Measures	CALGreen Tier 1 Measures	CALGreen Tier 2 Measures
CG-2013	5.507.4	Acoustical Control	CALGreen focuses on the exterior noise control, site based mitigation and interior sound transmission primarily from the perspective of building materials. LEED addresses HVAC background noise, reverberation and interior sound transmission. The interior sound transmission thresholds in LEED are more stringent than those required by CALGreen.			
LEEDv4	EQc9	Acoustic Performance				
CG-2013	5.508.1	Ozone depletion and greenhouse gas reductions	The CALGreen mandatory measure (5.508.1) and LEED prerequisite and credit are very similar, although CALGreen does not allow new Halon based refrigerants. CALGreen voluntary measures give credit for not having HCFCs but allows global warming potential of 150 for HFCs. The LEED calculation methodology under EAc4 Enhanced Refrigerant Management weighs the refrigerants' global warming potential with the total ozone depletion potential and therefore is much more intensive and bans HFCs and HCFCs. LEED also allows for a phase-out plan for major renovation projects where CFC equipment is not being replaced as a part of the project scope.			
	A5.508.1.3	Hydrochlorofluorocarbons (HCFCs)				
	A5.508.1.4	Hydrofluorocarbons (HFCs)				
LEEDv4	EAp3	Fundamental Refrigerant Management				
	EAc4	Enhanced Refrigerant Management				
CG-2013	5.508.2	Supermarket refrigerant leak reduction	No overlapping LEED Credit exists for comparison	N/A		
LEEDv4	N/A	N/A				