

City of Burlingame

Climate Action Plan



June 2009

City of Burlingame
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Acknowledgments

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The following individuals and organizations contributed to the completion of the Burlingame Climate Action Plan and provided valuable input and important information:

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Association of Bay Area Governments (ABAG), ICLEI/Cities for Climate Protection, Joint Venture Silicon Valley, Bay Area Air Quality Management District (BAAQMD), Intergovernmental Panel on Climate Change (IPCC), Rethinkwaste.org, Pacific Gas and Electric, Metropolitan Transportation Commission, Stopwaste.org, California Climate Action Team (CAT), Recycleworks.org and the City/County Association of Governments (C/CAG)

Jeanne Dewey (Cover photo and selected photos throughout document)

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Executive Summary

The City of Burlingame's Climate Action Plan serves as a guiding document to identify methods that the City and community can implement to significantly reduce greenhouse gas (GHG) emissions. It is an important first step toward meeting the requirements mandated by new California legislation, known as Assembly Bill 32, California's Global Warming Solutions Act of 2006, which requires emissions to be reduced 15% below current levels (as measured in 2005) by the year 2020 and to be reduced by 80% by the year 2050.¹

Burlingame's City Council signed the United States Mayors Climate Protection Agreement in August 2007 and joined 670 other cities that pledged to reduce emissions within their jurisdiction. During 2007, the Green Ribbon Task Force convened and the City of Burlingame joined ICLEI (now called Local Governments for Sustainability) to share best practices with other cities.

In January 2009 the City Council directed the Green Ribbon Task Force to develop a Climate Action Plan for Burlingame with assistance from CSG Consultants. Palo Alto, Menlo Park, San Mateo, Foster City, San Carlos, Belmont, Rohnert Park, San Francisco, San Jose, Santa Monica, Berkeley and Oakland are among the cities that have completed a Climate Action Plan.² The Green Ribbon Task Force began the Climate Action Plan development process by considering the most cost-effective and feasible GHG reduction programs for implementation in Burlingame. Meetings were also held with Burlingame staff members to discuss the draft recommendations and receive feedback. Burlingame's Task Force held a Burlingame Climate Action Plan Community Workshop in March 2009 to receive community stakeholder feedback. Community Workshop attendees showed significant interest in the Climate Action Plan development and in the expansion of sustainable efforts by the City of Burlingame and community.

Burlingame's Climate Action Plan provides a comprehensive document that creates a baseline of emissions, sets achievable targets as stipulated by AB 32, and recommends steps to be taken to reduce emissions, increase sustainability and improve quality of life. The report includes the following components:

- ✧ Climate change impacts on Burlingame and recent legislation regarding climate change;
- ✧ Major sources and quantities of Burlingame's emissions which constitute a baseline inventory;
- ✧ Burlingame's emissions reduction target, which is based on AB 32, California's Global Warming Solutions Act of 2006;
- ✧ Program and policy recommendations to assist Burlingame in meeting the GHG reduction goal in two phases: one phase for high-impact, near-term program recommendations to be implemented prior to 2012 and a second phase for program implementation from 2012 to 2020;
- ✧ State and regional initiatives that will assist Burlingame in reducing greenhouse gas emissions;

¹ California Air Resources Board (www.arb.ca.gov)

² Joint Venture Silicon Valley www.jointventure.org/programs-initiatives

- ✧ Implementation, funding and recommended next steps;
- ✧ Recommendations for adaptation to climate change.

The Climate Action Plan establishes a framework of action that the City and community can implement and provides a statement of intent for priorities and policies for the short and long term. However, the plan is not binding on the City Council or the community. Once the Council adopts the Climate Action Plan, the individual recommendations within the plan will be developed by staff and/or consultants and presented for the Council's consideration before they are implemented.

Climate Action Plan Process

The method used by most cities to develop a Climate Action Plan is by following the Five Milestone Process established by ICLEI (Local Governments for Sustainability). Figure 1 explains how the process works.

Figure 1: Climate Action Plan Development Process



How Climate Change Impacts Burlingame

The Intergovernmental Panel on Climate Change (IPCC), a panel of the world's leading experts on climate change,³ has reported that global warming presents catastrophic threats and poses severe environmental, economic, health and social consequences for the global community. Threats to Burlingame and other Bay Area cities include:

- ✧ Rising sea and San Francisco Bay levels and resulting threats to coastal infrastructure (including San Francisco International Airport), due to increasing rates of polar snow and ice melt. Research estimates that the sea level rise could inundate the entire area east of the Bayshore Freeway by 2099;⁴
- ✧ Significant water shortages in the Bay Area's primary water supply from Hetch Hetchy Reservoir, due to a shrinking Sierra Nevada snowpack;
- ✧ Negative impacts on wildlife, including significant species loss;
- ✧ Increased heat waves, flooding, extreme weather patterns and increased incidence of large wildfires;
- ✧ Serious public health threats for elderly and young due to intensified heat waves, exacerbated local air pollution, a significant increase in "Spare the Air" days and an expanded range for infectious diseases.

Burlingame and other jurisdictions have control over several important decisions that impact emissions, including green building, energy efficiency, renewable energy, and expansion of recycling and composting programs, transportation and land use issues. Burlingame's Climate Action Plan can be the framework for the City and community to begin implementing emission reduction programs and policies.

How a Climate Action Plan Benefits Burlingame

Benefits from the development of a Climate Action Plan go beyond the science of climate change and provide additional economic, public health, quality of life and environmental benefits. The following are a few examples of how the Burlingame community benefits from climate protection programs.

Economic Benefits

- ✧ Recent economic analyses from Florida and California demonstrate that policies addressing climate change also yield tangible economic benefits and job growth. These reports demonstrate that climate solutions can be a major engine of economic revitalization in difficult economic times.⁵
- ✧ Energy and water efficiency programs can provide homeowners and businesses with 20% to 40% cost savings.

³ Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and the United Nations in 1988. It is comprised of the world's leading climate change experts and Nobel Prize winners who develop the most recent climate science findings every 5-7 years and present them to the world's political leaders.

⁴ Fifth Annual California Climate Change Conference Sept. 2008.

⁵ <http://www.edf.org/article.cfm?contentID=8722>

- ✧ An economic analysis by Governor Schwarzenegger's Climate Action Team found that meeting GHG targets will create \$4 billion in additional income and 83,000 new jobs for Californians by 2020. As demand for clean, renewable energy continues to grow, cities that tap into this increasing demand will have a competitive economic advantage.⁶
- ✧ Residential, commercial and municipal green building provides reduced operating costs, increases productivity and improves indoor air quality. Recent reports show that green buildings have increased real estate value and hold or rise in value versus traditional buildings.⁷
- ✧ Energy and water efficiency improvements can save the City significant operating costs (an estimated 10% to 15% improvement).

Public Health and Quality of Life Benefits

- ✧ Elderly and young Burlingame residents will see serious public health consequences due to intensified heat waves and exacerbated local air pollution. Climate protection programs improve air quality and can decrease negative health impacts such as asthma.
- ✧ Climate protection programs can provide more healthy lifestyles for the community by providing more public transportation, bicycling and walking opportunities. The American Public Transportation Association reported in March 2009 that public transportation ridership had reached its highest level in 52 years.⁸
- ✧ Climate protection programs provide co-benefits such as bicycle friendly and walkable neighborhoods that create vibrant communities.

Community Greenhouse Gas Emissions Inventory

Burlingame's Community Greenhouse Gas Inventory was developed using the Clean Air and Climate Protection (CACCP) software developed by Local Governments for Sustainability (ICLEI), which uses data on electricity and natural gas consumption, vehicle miles traveled (VMTs) and solid waste tonnage and converts it into carbon dioxide equivalents (CO₂e), using specific coefficients according to fuel or waste types. The CACP software determines emissions using specific factors (or coefficients) according to the type of fuel used.

Converting all greenhouse gas emissions to CO₂e units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is 21 times more powerful than carbon dioxide on a per-weight basis in its capacity to trap heat, so the software converts one metric ton of methane emissions to 21 metric tons of carbon dioxide equivalents.

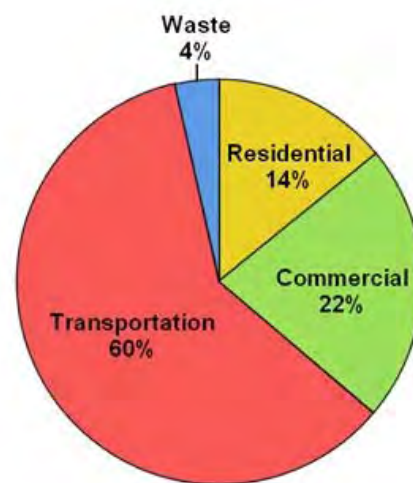


Figure 2: 2005 Community GHG Emissions by Sector

⁶ Renewable energy technologies (e.g., wind, solar) generate more jobs in construction, manufacturing and installation than fossil fuel based energy technologies, www.iclei.us.org

⁷ RICS Research March 2009, Berkeley, Calif.

⁸ <http://www.washingtonpost.com/wp-dyn/content/article/2009/03/08/AR2009030801960.html>

Burlingame’s community emissions inventory provides a baseline of emission levels against which future reductions can be measured. The analysis showed that the community of Burlingame released 336,944 metric tons of CO₂e in the base year of 2005. The transportation sector accounted for 60% of the emissions and the commercial sector accounted for 22%. These two sectors were the largest sources of emissions from the Burlingame community. Emissions from the residential sector accounted for 14%, and the waste sector accounted for 4% of the emissions.

As with other San Francisco Bay area cities, transportation (vehicle miles traveled) contributes a significant percentage of Burlingame’s emissions. Sixty percent of total emissions were a result of transportation within the City’s borders. For Burlingame, more than 70% percent of the emissions in the transportation sector are a result of highway travel because Burlingame has heavily traveled Highways (280, 101 and 82) that fall within its borders. Nearly 30% of Burlingame’s emissions in the transportation sector came from travel on city roads.

The community GHG inventory provides an understanding of where the highest percentages of emissions originate in Burlingame and enabled the Task Force to consider emission reduction programs focused on higher GHG reduction impact, cost-effectiveness and feasibility of implementation.

Greenhouse Gas Reduction Target

To maintain consistency with the AB 32 emission reduction targets, the Task Force recommended that Burlingame reduce emissions by 15% below the base year by 2020 and 80% by the year 2050. Burlingame’s 2005 base year emissions were 336,944 metric tons of carbon dioxide equivalent (CO₂e). To reduce emissions to 15% below 2005 baseline levels by 2020, the community would need to reduce emissions by 50,542 metric tons to 286,402 metric tons during that period. But that estimate assumes that emissions are not expected to increase beyond the 2005 baseline levels.

Figure 3: Burlingame’s “Business as Usual” Emissions Forecast for 2020

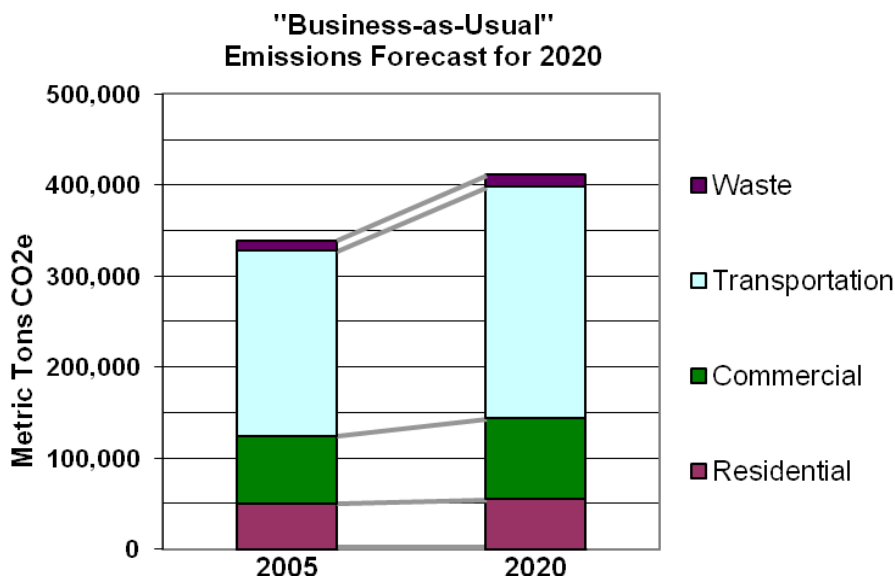


Figure 3 provides Burlingame’s baseline inventory and forecasts for population, transportation and commercial activity growth, as provided by the Association of Bay Area Governments (ABAG) in its “business-as-usual” emissions forecast for the year 2020. This forecast revealed projected emissions levels 21.3% higher than 2005 levels. If Burlingame continues with the 2005 pattern of energy consumption, waste production and transportation use, annual emissions are estimated to increase from 336,944 to 408,780 metric tons by 2020. Therefore, the percent change from “business as usual” in 2020 to 15% below 2005 levels is 29.9%.

Table 1 identifies the 2005 base year emissions, the target year reduction and the estimated annual required emissions to meet the 2020 reduction target. A total of 50,542 metric tons is the minimum reduction needed for Burlingame to meet the 2020 target and the needed reduction in tons could be as high as 122,378 metrics tons if Burlingame consumption trends continue. The estimated annual reduction is in the range of 5,054 tons to 12,238 tons per year to meet the target year. These reductions are challenging but are in line with the goals of many Bay Area cities.

Table 1: Burlingame GHG Emissions

	2005 Base Year	2020 “Business-as-Usual” ⁹
2005 Base Year Emissions (metric tons CO₂e)	336,944	408,780
2020 Target Year Reduction (15% below 2005 levels)	286,402	286,402
Emissions Reductions Necessary to Meet Target	(50,542)	(122,378)
Required Percentage Emissions Reduction	15.0%	29.9%
Required Annual Emissions Reductions (2010-2020)	(5,054)	(12,238)

Development of GHG Reduction Recommendations

In this document, the GHG reduction recommendations are organized in separate program categories:

- ✧ Energy efficiency and green building
- ✧ Transportation and land use
- ✧ Waste reduction and recycling
- ✧ Education and promotion
- ✧ Municipal operations

These recommendations were developed in a collaborative process by the Green Ribbon Task Force with input from community members and City staff over several months. The final recommendations were selected because they focus on the high-impact GHG reduction programs that can cost-effectively reduce emissions in Burlingame. In developing these recommendations, the Task Force was keenly aware of the challenges facing the City due to the economic downturn and consequent budget cuts and staff reductions that Burlingame and other cities are currently experiencing. For this reason, the Task Force recommends a phased approach to implementation. It developed *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012* to provide the City with recommendations that can be

⁹ Association of Bay Area Government (ABAG) 2020 Projections

implemented in the near term to begin the necessary reductions in emissions. The second phase, *Phase 2: GHG Reduction Programs for Implementation 2012 to 2020*, has been developed for implementation beyond 2012. The Task Force recommends that the City begin Phase 1 implementation as soon as possible because it will be easier to reach state-mandated goals if programs are introduced gradually, with a voluntary compliance period. Essential steps for program implementation and funding opportunities are discussed in the Implementation, Funding and Next Steps section of this document.

Many of the recommendations are best practices of other cities that have already implemented such programs. Leveraging the work of other jurisdictions with their permission will save Burlingame time and money.

Summary of Greenhouse Gas Reduction Recommendations

Burlingame's Climate Action Plan is designed to focus on near- and medium-term solutions to reduce its emissions. These program and policy recommendations were developed after careful consideration of the unique characteristics and demographics of the Burlingame community and the major sources of emissions from Burlingame's Community Greenhouse Inventory. The Green Ribbon Task Force reviewed the best practices of GHG reduction strategies and narrowed them to 29 recommendations based on GHG reduction impact, cost-effectiveness, feasibility of implementation, staff feedback and community feedback from the Burlingame Community Climate Action Workshop.

The Task Force approved five major focus areas: energy use/green building, transportation/land use, solid waste, education/outreach and municipal programs. A phased approach was recommended to focus on the near- and mid-term recommendations and two stages of program implementation were developed. Recommendations for Phase 1 were selected because they provide higher-impact GHG reductions, are lower in cost, leverage regional resources and focus on Burlingame's major emission sectors. Phase 1 recommendations also provide essential education and promotion program components to allow sufficient time for community and staff training prior to consideration of mandatory requirements.

Phase 1: GHG Reduction Recommendations for Implementation Before 2012

The following is a summary of the programs recommended for implementation prior to 2012:

Energy Efficiency and Green Building Recommendations

Energy efficiency and green building programs are considered the "low hanging fruit" of Climate Action Plans because they provide the fastest and most economical means to reduce emissions. Burlingame's GHG inventory showed that energy consumption by the commercial (22%) and residential (14%) sectors is the second largest contributor (36%) of Burlingame's emissions. The energy efficiency and green building programs in Phase 1 are recommended because they reduce emissions cost effectively and efficiently. Approximately 90% of Burlingame homes were built prior to the State of California energy codes and have significant potential to increase energy efficiency and water conservation. Typically, homes can increase energy efficiency 30% to 40%,¹⁰ and Burlingame residents can realize significant cost savings. Similarly, most businesses spend approximately 30% of their operating budget on energy

¹⁰ California Public Utilities Commission 2008 Strategic Plan

consumption and providing businesses with energy efficiency resources can help businesses save on an estimated 20-30% in utility costs. Recommendations are:

1. Adopt a Water Efficient Landscape Ordinance as required by AB 1881¹¹ and consider inclusion of more stringent water conservation requirements.
2. Adopt a Residential Energy Conservation Policy (voluntary) to provide professional energy audits for residents at a reduced cost. The Policy also includes promotion of a *Residential Energy and Water Efficiency Checklist* for properties sold or for “transfer of title” that encourage upgrades in energy efficiency and water conservation.
3. Research and consider implementation of a Solar and Energy Efficiency Financing Program for residents and small businesses.
4. Adopt a Residential Green Building Ordinance to require a minimum amount of green measures in new residential construction (follows the current voluntary green building program in place since January 2009).
5. Adopt a Commercial Green Building Ordinance (after a voluntary period of 12 to 18 months) to require major new commercial construction properties to meet the minimum Leadership in Energy and Environmental Design (LEED) standard.
6. Develop a Commercial Energy Efficiency Policy (voluntary). Implement an Incentive and Recognition Program. Expand participation in Bay Area Green Business Program.

Transportation and Land Use Recommendations

The transportation sector is the largest contributor to Burlingame’s emissions (60%). Most of the emissions (70%) are from vehicles traveling on Highway 101, Highway 280 and Highway 82 (El Camino Real), while the remainder (30%) is due to travel on Burlingame roads. Achieving a 15% reduction from the 2005 baseline levels involves policy and program implementation outside of the control of Burlingame decision makers. However, approximately 50% of driving trips are less than five miles and Burlingame can help reduce emissions by promoting alternatives other than single-occupancy vehicles, such as promotion and use of alternative-fuel vehicles, expanding public transportation, and providing safe and convenient bicycling and walking routes.

Land use is closely linked to transportation because it is the orientation of destinations that require us to travel. For this reason, land use and transportation are included in the same group of recommendations. The City has already completed several significant steps in transportation and land use decisions that will reduce greenhouse gas emissions. These steps include adoption of a Bicycle Transportation Plan, installation of bicycle route signs and bicycle racks, providing shuttle service and promotion of public transportation. An important achievement was the adoption of the North Burlingame/Rollins Road Specific Plan, which encourages mixed-use and high-density residential development within one-half mile of BART/Caltrain intermodal station. A Downtown Specific Plan with similar transit-friendly provisions is due to be adopted during 2009. The Green Ribbon Task Force also recommends that the City:

7. Establish a policy that requires Transportation Demand Management (TDM) strategies for new development of large commercial properties, and provide TDM guidelines in the permit packet for all new commercial developments.

¹¹ www.owue.water.ca.gov

8. Adopt a policy to provide prioritized parking for hybrid or alternative-fuel cars on city streets, garages and lots. Expand this policy as technology advances to increase accommodation of hybrids and or alternatively fueled vehicles.
9. Incorporate bicycle friendly intersections and pathways into street design and modifications. Ensure new developments provide safe and convenient travel by walking, bicycling or public transportation.
10. Research methods to increase ridership and expand shuttle service and partner with local groups to increase public transportation alternatives.

Waste Reduction and Recycling Recommendations

Burlingame disposed of 29,779 tons of waste to landfill in 2008, and Burlingame's GHG inventory showed that approximately 4% of emissions were from solid waste. Though this percentage of emissions may seem like a small percentage, the actual emissions from waste decomposing at landfills are significantly more potent than carbon dioxide. As waste from landfills decomposes, methane gas is released, which is 21 times more potent than carbon dioxide (CO₂). For this reason, the solid waste sector has strong potential to provide GHG reductions, especially as new and expanded recycling and composting programs become available to Burlingame residents and businesses. The Task Force recommends:

11. Upgrade residential and commercial recycling service to:
 - ✧ "Single stream" recycling collection service for residential and commercial
 - ✧ Weekly collection of "single stream" recycling for residential
 - ✧ Weekly collection of organics/food collection for residential
12. Adopt a Commercial Recycling Ordinance that requires businesses to divert recyclable organics, containers, cardboard and paper.

Promotion and Education Program Recommendations

A Climate Action Plan is more effective if the community is aware of its goals and policies. Resident participation is essential for many of the Climate Action Programs if Burlingame is to achieve the AB 32 GHG reduction targets. Burlingame can benefit from the development or expansion of climate change resources, including part-time staff and programs. It can leverage resources from several regional efforts that are under way in the Bay Area. Recommendations are:

13. Encourage development of a community group to expand promotion and education of climate action programs.
14. Dedicate a contracted, part-time (.50 FTE) Sustainability Coordinator to implement and coordinate climate action programs. This position is an essential component to program implementation.

Municipal Program Recommendations

The City of Burlingame's Public Works staff members are to be commended for the work they have already completed in energy efficiency. This work includes participation in the Energy Watch Program, Pacific Gas and Electric's Demand Response Program and the conversion of traffic signals to LEDs. The goal is to expand this energy efficiency and water conservation efforts for city operations that can provide the City with additional cost savings and reduce emissions. The Task Force recommends:

15. Develop a “City Green Team” composed of City staff to promote and expand sustainable programs within the City. City departments (Public Works, Parks & Recreation, Community Development, Finance and Library) would include sustainable goals as part of their department’s annual goals. The City Green Team (Public Works) would also prioritize and implement energy and water efficiency upgrades for city facilities.¹² The City can achieve reduced operating costs and be a leader for public and private sector in energy savings and water efficiency.

Phase 2: GHG Reduction Recommendations for Implementation from 2012 to 2020

The following programs are a summary of the recommended policies for implementation from 2012 to 2020. These programs are provided as a successive phase to Phase 1 and involve an expansion of requirements from the education and promotion period of Phase 2.

Energy Efficiency and Green Building Recommendations

1. Expand solar and renewable energy generation for residential and commercial. Further streamline the permit process and provide a renewable incentive program.
2. Adopt Commercial Energy Conservation Policy (voluntary) to encourage inclusion of an Energy and Water Efficiency Checklist for commercial properties sold to comply with minimum energy efficiency and water conservation standards.
3. Adopt mandatory Commercial Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion).
4. Adopt mandatory Residential Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion).

Transportation and Land Use Recommendations

5. Research additional methods to expand and enhance shuttle and public transportation services to increase shuttle ridership and public transportation alternatives.
6. Encourage mixed-use, infill and higher-density development.

Waste Reduction and Recycling Recommendations

7. Evaluate current Construction and Demolition (C&D) policy and consider increasing the current required diversion rate.
8. Require recycling at major public events in Burlingame (of cardboard, containers and food/organics).
9. Adopt a policy to achieve city-wide diversion rate of 75% measured diversion by 2015.



¹² City of Burlingame’s Waste Water Treatment Plant listed as #186 in Bay Area Air Quality Management District Report “2007 Bay Area Major (Top 200) GHG Emitting Facilities”

Municipal Program Recommendations

10. Adopt a Civic Green Building Policy that requires a “Leadership in Energy and Environmental Design” (LEED) green building standard for new municipal construction.
11. Consider establishing a Sustainability Commission that can provide a focused effort on sustainable issues for the City and the community to meet Burlingame’s greenhouse gas reduction target.
12. Complete feasibility study to install solar or other renewable energy at select City facilities (such as the wastewater treatment plant) and install where feasible.
13. Adopt Sustainable Purchasing Policy with two mandatory requirements: City fleet purchases must require hybrid or alternative fueled vehicles (with some exceptions) and paper product purchases must include a minimum of 30% recycled content.
14. Retain Sustainability Coordinator to function as the central person to coordinate programs, write grants and leverage resources for the City. The Coordinator is an essential component to program implementation.

Estimated GHG Reduction from Phase 1 and Phase 2: GHG Reduction Recommendations

The program recommendations in Phase 1 and Phase 2 have been analyzed to determine their GHG reduction potential, using the Climate and Air Pollution Planning Assistant¹³ (CAPPA) software developed by ICLEI. Burlingame’s emission reduction target is 15% below the 2005 base year by the year 2020 and 80% below the base year by 2050. Burlingame’s base year emissions are 336,944 metric tons of carbon dioxide equivalent (CO₂e) and the 2020 emissions target is a minimum of 286,402, or an estimated 50,542 to 122,378 tons to be reduced by 2020, depending on Burlingame’s consumption trends. Annual emission reductions are estimated at 5,054 to 12,238 depending on Burlingame’s consumption trends, to meet the 2020 reduction target.

By implementing the programs recommended in Phase 1, Burlingame would begin to realize GHG emission reductions that total an estimated 9,201 tons per year, which is in the range of necessary GHG reductions for Burlingame to meet the year 2020 target. By implementation of the programs recommended in Phase 2, Burlingame would begin to achieve GHG emission reductions that total an estimated 3,783 tons.

¹³ This tool provides local governments with assistance in developing plans to reduce emissions and uses Burlingame-specific data to determine greenhouse gas reduction estimates.

Achieving AB 32 Greenhouse Gas Reduction Target

Table 2 shows Burlingame's GHG emission reductions resulting from the implementation of the programs recommended in Phase 1 and Phase 2.

Table 2: Burlingame's GHG Reduction Target Analysis Under Phase 1 and Phase 2 Recommendations

	Metric Tons CO ₂ e
2020 "Business-as-Usual" Emissions	408,780
2020 Reduction Target (15% below 2005 levels)	286,402
Total Emissions Reductions Necessary to Meet Target	(122,378)
Required Annual Emissions Reductions (2010-2020)	(12,238)
Annual Reductions from Phase 1 Recommendations	(9,201)
Annual Reductions from Phase 2 Recommendations	(3,783)
Total Phase 1 and Phase 2 Annual Reductions	(12,984)

There are additional outside factors to consider that are beyond Burlingame's control in meeting the emission reduction target. Burlingame has limited ability to control decisions that impact a significant portion of their emissions, most notably the transportation sector, which is responsible for 60% of emissions and, to a lesser extent, energy generation in the state. There are current state initiatives and programs such as SB 375 that focus on transportation and energy generation that will reduce emissions and assist Burlingame in meeting AB 32 reduction targets. These state initiatives are discussed in the "Achieving AB 32 Greenhouse Gas Reduction Target" section of this document.

By implementation of the programs and policies in Phase 1 and Phase 2 of the Climate Action Plan, the current analysis shows that Burlingame would be within the necessary range of emissions reductions to meet the 2020 reduction target of 15% below 2005 levels by 2020. See Appendix C for a full explanation of the assumptions on which this analysis is based.

Implementation and Funding

Burlingame's Climate Action Plan should be considered as a starting point to reduce greenhouse gas emissions by 15% below 2005 levels by 2020 and by 80% below 2005 levels by 2050. The Plan establishes a framework of action that the City and community can implement and provides a statement of intent for priorities and policies but the Plan is not binding on the City Council or the community. Once the Council adopts the Climate Action Plan, the individual recommendations within the plan will be developed by staff and/or contractors and presented for the Council's consideration before they are implemented.

The Climate Action Plan recommendations focus on cost-effectively reducing greenhouse gas emissions in the near term. In developing these recommendations, the Task Force was keenly aware of the challenges facing the City due to the economic downturn and consequent budget cuts and staff reductions that Burlingame and other cities are currently experiencing. For this reason, a phased approach is used for implementation. *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012* identifies the "low hanging fruit" that provides significant emission reductions for Burlingame with low initial costs in the near term. This phase

also provides the essential education and promotion component and involves several voluntary compliance measures. *Phase 2: GHG Reduction Programs for Implementation 2012 to 2020* has been developed for implementation beyond 2012. Several of the Phase 2 recommendations involve mandatory requirements and capitalize on the voluntary compliance period of Phase 1 programs. Recommendations for Phase 2 were selected because they can provide increased greenhouse gas reductions, have an increased number of mandatory requirements and continue to focus on Burlingame's major emission sectors.

One of the major barriers to implementing climate action programs is lack of available funds and staff resources. Currently, there are multiple grant and loan programs through federal, state and regional programs that can fund emission reduction programs. One example is the "Energy Efficiency and Conservation Grant" federal program from the U.S. Department of Energy¹⁴ (American Recovery and Reinvestment Act of 2009). With the approval of the Climate Action Plan by the City Council, Burlingame is in an advantageous position to apply for grant funding from the "Energy Efficiency and Conservation Grant" program and or other grant programs.

To implement the programs, the City could use a combination of grant funds, a portion of current staff resources and leverage regional resources to begin reducing emissions in the near term. The Task Force recommends that the City continue to explore methods to incorporate climate protection programs into existing workloads and systems. The development of the "City Green Team" (composed of City department head staff) can begin to expand sustainable programs within the City and assist in the promotion and education of sustainable programs for the community. Additionally, the inclusion of annual sustainable goals for city departments will assist with monitoring the progression of emission reductions. It is recommended that the promotion and education of sustainable programs be enhanced at city departments where feasible

An essential element of the Climate Action Plan is the dedication of a part-time staff member or Sustainability Coordinator that would provide the critical function of implementation of programs, coordination with City staff, monitoring of greenhouse gas reduction progress and promotion and education. The funding of the Sustainability Coordinator could potentially be funded through grant funds.

Timely adoption of the Climate Action Plan will allow the city to be ready to apply for grants that are likely to be available as soon as this summer because climate action plan can be an important element in most energy efficiency grant applications. One large grant program requires jurisdictions to complete all programs and payment of programs by April 30, 2012. This timeline is a major reason why the Climate Action Plan Phase 1 recommendations are recommended to be implemented before 2012.

Once program implementation begins, an essential component is monitoring Burlingame's progress toward the 2020 target. Progress should be reassessed every two to three years using Burlingame's community GHG inventory to ensure that Burlingame is on track to meet the year 2020 and 2050 targets. Interim GHG reduction targets are recommended for use as internal mechanisms to track progress toward the 2020 goal.

¹⁴ www.energy.ca.gov/recovery

The interim targets are as follows:

Table 3: Interim GHG Reduction Targets

	Percentage Emission Reduction from Base Year	Target Emissions (Metric Tons CO ₂ e)
2005 Base Year	- - -	336,944
2012 Target Year	7%	313,358
2015 Target Year	12%	296,511
2020 Target Year	15%	286,402

It is also recommended that the approved Climate Action Plan program and policies are included Burlingame’s General Plan Element updates. The approved Climate Action Plan policies should be made consistent in the associated Elements of the General Plan.

It has become clear from recent reports from the International Panel on Climate Change (IPCC) that climate change is occurring now and that the current goal is to first slow and then reverse emissions to avert more serious threats in the future. It is recommended that the City of Burlingame prepare itself for the increasing challenges that climate change will inevitably bring that include shrinking water supplies, rising temperatures, rising bay levels and increased public health issues for the elderly and young. It is recommended that the City participate in regional efforts for climate change adaptation. Additionally, the City should include climate change mitigation and adaptation measures and policies in the General Plan updates.

Involvement and support from the Burlingame Council, staff and community will be essential for the success of the GHG reduction programs. The City cannot complete all the work that will be needed to educate, promote and implement the climate protection programs without outside assistance. For this reason, it is recommended that the City encourage a volunteer community group similar to the sustainable community organizations that have begun in Menlo Park, Redwood City and Los Altos Hills. The Burlingame community group can organize education and promotion campaigns using the excellent models and resources developed by other communities at no cost to the City.

In addition, the Task Force recommends that annual reports on progress toward the 2020 target be submitted to the City Council and posted on the City’s Web site. Burlingame’s Climate Action Plan programs should be revised as new technologies emerge and additional opportunities arise and as new regional, state and federal policies evolve.

I. Introduction

The City of Burlingame recognizes that climate change poses several challenges to our community and has taken several significant actions to address the issue. Burlingame's City Council signed the United States Mayors Climate Protection Agreement in August 2007, and, in January 2009 the City Council directed the Burlingame Green Ribbon Task Force to develop a Climate Action Plan for Burlingame. The City also joined ICLEI (Local Governments for Sustainability), and participated with 20 other cities in San Mateo and Santa Clara counties in a regional effort to conduct a municipal GHG inventory. The City will use the municipal GHG inventory and the community GHG inventory to measure progress toward the GHG reduction target established by Assembly Bill 32, California's Global Warming Solutions Act of 2006, which requires emissions to be reduced 15% below current levels (2005 levels) by the year 2020 and to be reduced by 80% the year 2050.

The Burlingame Green Ribbon Task Force began the Climate Action Plan development process by considering the GHG reduction target established under AB 32. The Task Force recommended that Burlingame's GHG reduction target be consistent with the AB 32 target and meet the GHG emission reduction target of 15% below current levels (2005 levels) by the year 2020 and an 80% reduction target by the year 2050.

The City of Burlingame has taken several steps to reduce emissions that include adoption of a Bicycle Transportation Plan, adoption of the North Burlingame/Rollins Road Specific Plan with mixed-use and high-density development opportunities close to the BART/Caltrain intermodal station, participation in the Energy Watch Program,¹⁵ participation in Pacific Gas and Electric's Demand Response Program and traffic signal retrofits to more energy-efficient LEDs. However, much work remains to meet the challenging emissions reduction targets established under AB 32.

This Climate Action Plan serves as a guiding document to identify methods that the City and Community can implement to significantly reduce emissions. Once the Council adopts the Climate Action Plan, the individual recommendations and their related technical documents will be developed by staff and/or consultants and presented for the City Council's consideration before they are implemented.

Climate Change

The world's leading climate experts on the Intergovernmental Panel on Climate Change¹⁶ concluded that human activities are increasing GHG concentrations in the atmosphere that increase the earth's temperature and cause climate change. In response to the threat of climate change, nations worldwide began to address GHG emission reductions, most notably through the Kyoto Protocol, an international environmental treaty designed to stabilize greenhouse gases.

¹⁵ Association of Bay Area Government program that provides energy-efficiency audits for municipal buildings

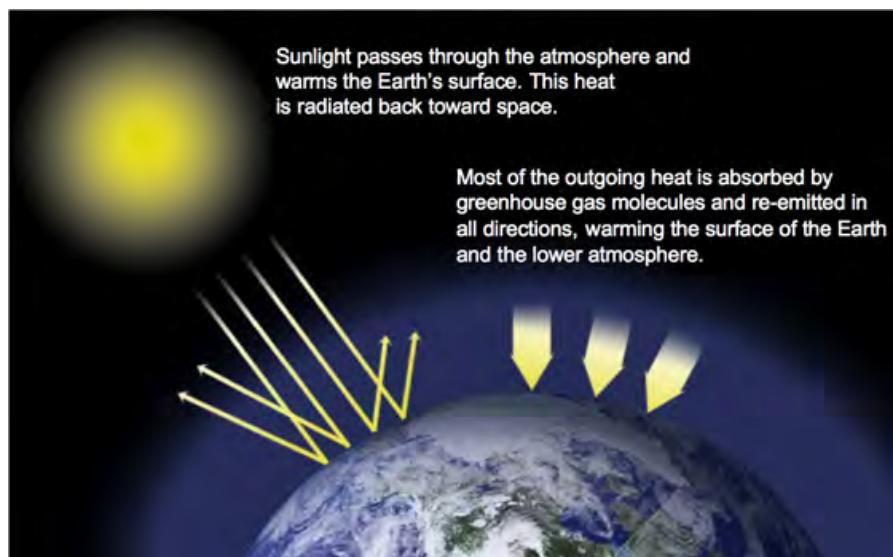
¹⁶ The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and the United Nations in 1988, comprised of the world's leading climate change experts and Nobel Prize winners who develop the most recent climate science findings every five to seven years and present them to the world's political leaders.

The Kyoto Protocol was developed at the United Nations Conference in 1997, and more than 37 industrialized nations ratified the protocol. The largest emitters of greenhouse gases, the United States, China and India, did not ratify the treaty. In the absence of federal leadership in climate change, United States cities began to respond locally by signing the United States Mayors Climate Protection Agreement, which states local governments will take responsibility for reducing emissions at the local level. Burlingame and other jurisdictions have the ability to reduce emissions and make important decisions related to green building, energy policies for residential and commercial properties, land use and transportation, waste reduction and recycling. For this reason, cities are developing Climate Action Plans to respond to climate change.

Climate Change Impacts

During the past 100 years, average temperatures have risen more than 1 degree Fahrenheit worldwide. A 1 degree change is unusual in the earth's history because the global average temperature is stable over long periods of time. Small changes in temperature correspond to enormous changes in the environment. For example, at the end of the last ice age, when the United States was covered by more than 3,000 feet of ice, average global temperatures were only 5 to 9 degrees cooler than today.¹⁷ Twelve of the last 13 years have been the hottest since recording began in 1850, and the existing and anticipated effects of climate change are hard to ignore.

Figure 4: The Greenhouse Effect



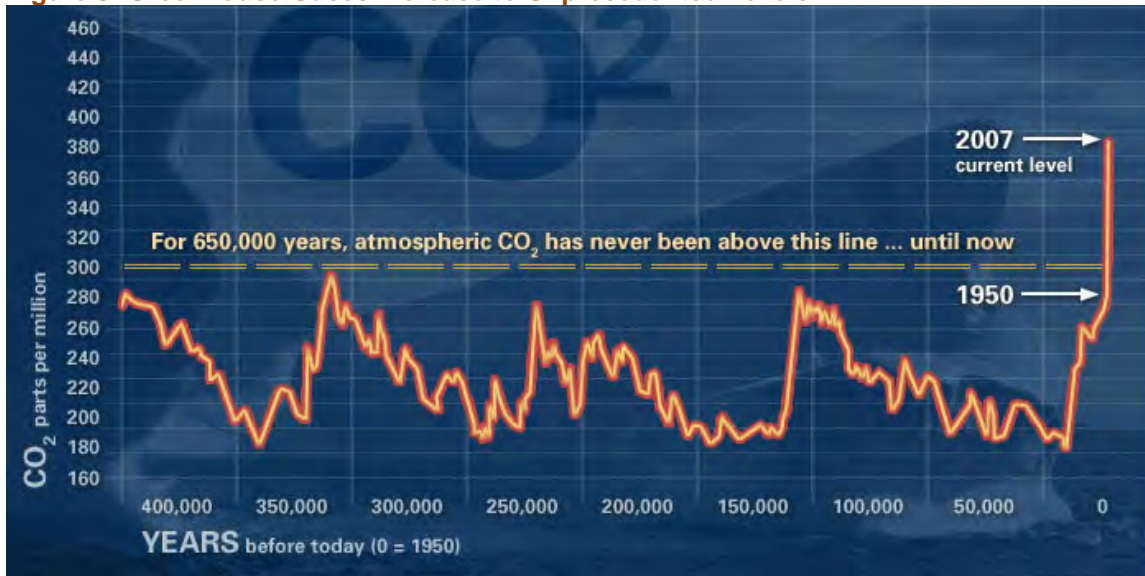
Source: NASA

The primary causes of climate change are the burning of fossil fuels to drive cars and generate electricity in our homes and businesses; these release carbon dioxide (CO₂) and other gases into the atmosphere. This activity disrupts the balance in the “thermal blanket” of gases that exist naturally in the atmosphere and enable the earth to support life. These additional

¹⁷ Summary for Policymakers, Intergovernmental Panel on Climate Change 2007 Synthesis report, www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

“greenhouse” gases trap in heat that would otherwise escape into space. Importantly, once in the earth’s atmosphere, these heat-trapping emissions persist for about 100 years.

Figure 5: Greenhouse Gases Increase to Unprecedented Levels

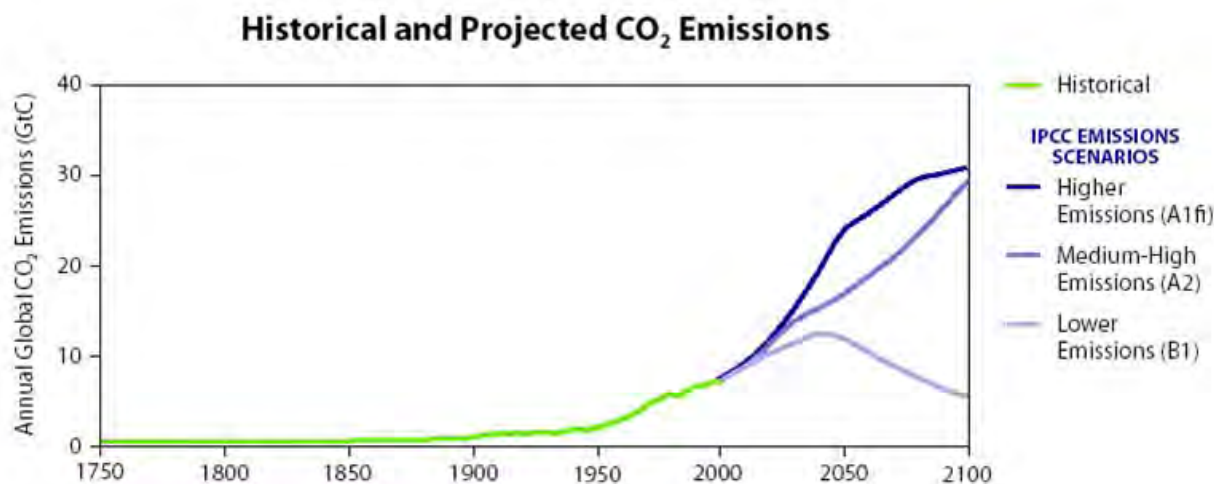


Source: NOAA

Figure 5 shows that carbon dioxide level increases have never been as high as they have reached in 2007 in the past 650,000 years. The most notable increase shows a remarkable increase in CO₂ levels since the early 1900s. A concentration of greenhouse gases (CO₂) in the atmosphere has increased more than 30 percent above pre-industrial levels and by 70 percent between 1970 and 2004.¹⁸ If left unchecked, by the end of the century CO₂ concentrations could reach levels three times higher than pre-industrial times, causing climate change that threatens public health, the economy, and the environment.¹⁹

¹⁸ Summary for Policymakers, Intergovernmental Panel on Climate Change 2007 Synthesis report, www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

¹⁹ Our Changing Climate: Assessing the Risks to California, www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF

Figure 6: Worldwide Historical and Projected CO₂ Emissions

Source: Intergovernmental Panel on Climate Change 2007

“Climate change” refers to all aspects of climate, including disruptions to weather patterns that include shrinking of glaciers, accelerated sea level rise, more intense heat waves, shifts in animal and plant ranges, and changes in the timing of plant reproduction.²⁰ In California and western North America, a changing climate is evident. During the past 50 years, the region has experienced warmer winter and spring temperatures, reduced spring snow levels in mountains and earlier snowpack melt.

Burlingame and Climate Change

Burlingame and other California cities will see an estimated increase of 3.0 to 10.5 degrees Fahrenheit by the end of the century. This climate change will have widespread economic, social and environmental consequences for Burlingame that includes:

Rising Sea Levels. Sea levels could rise up to three feet by the end of the century and could inundate the entire area east of the Bayshore Freeway by 2099 if levees are not built or existing flood control structures are comprised.²¹ Sea-level rise could inundate the Bay Area’s transportation infrastructure, including San Francisco International Airport and neighboring communities. A sea-level rise of 1 foot would result in “100-year” flood events occurring on average every 10 years.²²

Extreme Weather Patterns. Burlingame will experience intensification of heat waves and extreme weather conditions which pose serious health risks. The heat wave that occurred in

²⁰ National Aeronautics and Space Administration, climate.jpl.nasa.gov/effects/. May 2009.

²¹ Knowles, Noah. “Protecting Vulnerability to Inundation Due to Sea Level Rise in the San Francisco Bay and Delta.” Fifth Annual California Climate Change Conference. Sept, 2008. www.climatechange.ca.gov/events/2008_conference/presentations/2008-09-09/Noah_Knowles.pdf

²² Our Changing Climate: Assessing the Risks to California, www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF

California in July 2006 was the longest on record since 1948 and resulted in approximately 140 heat-related deaths.²³

Deteriorating Public Health. Burlingame would see an expansion in the range of infectious diseases, increased wildfires and increased air pollution in the Bay Area that will impact the elderly and young.

Decreasing Fresh Water Supply. Rising temperatures compounded by decreases in precipitation could severely reduce spring snowpack in the Sierra Nevada. The Sierra Nevada snowpack is projected to be reduced by at least 25 percent by 2050²⁴ and will pose severe water supply challenges for California, including the Hetch-Hetchy system on which Burlingame relies.

Additionally, Burlingame will see longer droughts and decreased groundwater levels. Higher frequency and severity of extreme flooding is also expected. Water supplies are also at risk from rising sea levels and saltwater intrusion, which will degrade groundwater aquifers and wetlands.

Changes to the Food Supply. Numerous stresses on California's \$30 billion dollar agriculture industry are expected that include crop growth changes and pest and disease outbreaks which will reduce the quantity and quality of agricultural products available.

Reductions in Hydropower Generation. Even if California's population remains unchanged, high temperatures will likely increase electricity demand by an estimated 20 percent. At the same time, diminished snow melt flowing will decrease the potential for hydropower production, which comprises about 15 percent of California's electricity production. An earlier snowmelt and increased precipitation in the form of rain rather than snow will also stress the system by necessitating greater spillage from high elevation from hydropower reservoirs and creating a mismatch between energy supply and demand.

Impacts on Future Generations. Because most greenhouse gas emissions persist in the atmosphere for decades or centuries, decisions made today will greatly influence the climate of future generations and the quality of life they experience will depend on how rapidly we act to reduce these emissions.²⁵

Initiatives to Reduce Climate Change

The increasing severity of climate change impacts illustrates the importance of reducing emissions to limit further climate change. California continues to show leadership in confronting the problem of climate change. The following are recent initiatives to reduce emissions:

Executive Order S-05-05. In June 2005, Executive Order S-05-05 was signed by Governor Schwarzenegger to establish progressive GHG emission reduction targets for California and to require biennial science assessment reports on climate change impacts. The Order established the following goals of reducing emissions to:

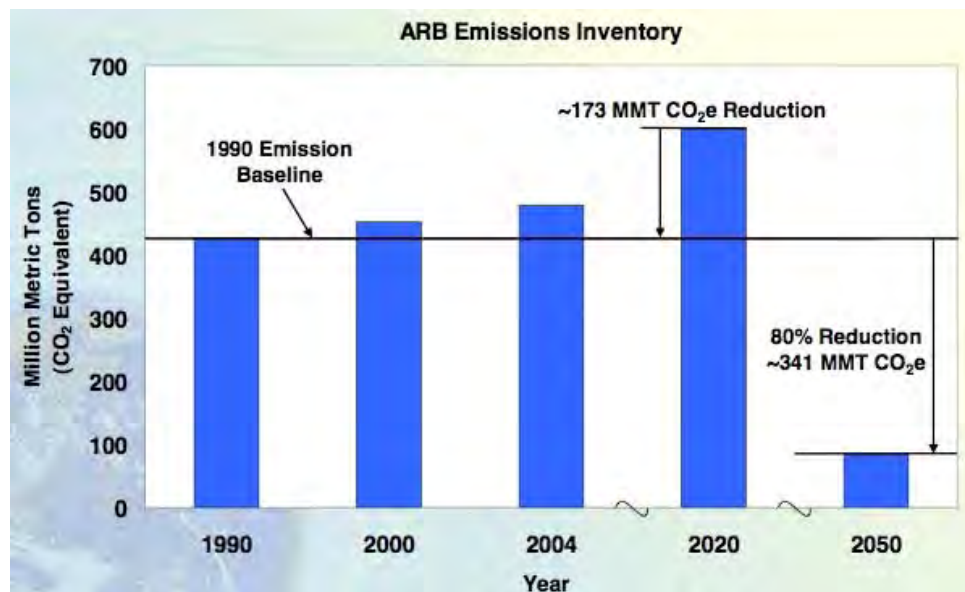
²³ Climate Action Team, Draft Biennial Report, March 2009, www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF. May 2009.

²⁴ Scenarios of Climate Change in California: An Overview. Final report from California Energy Commission, Public Interest Energy Research (PIER) Program, California Climate Change Center, publication No. CEC-500-2005-186-SF, posted: February 27, 2006

²⁵ Our Changing Climate: Assessing the Risks to California, www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF

- ✧ 2000 levels by 2010
- ✧ 1990 levels by 2020 (approximately 15 percent below today's levels)
- ✧ 80% below 1990 levels by 2050

Figure 7: California's Emissions Inventory



Source: California Air Resources Board

Assembly Bill 32. The California legislature adopted the California Global Warming Solutions Act of 2006 (AB 32) and the California Air Resources Board (CARB) was tasked as the lead agency to develop regulatory and market mechanisms to reduce emissions. CARB's Scoping Plan, approved in December 2008, provides a comprehensive set of actions designed to reduce overall emissions, improve the environment, reduce California's dependence on oil, diversify its energy sources, save energy, create new jobs and enhance public health. The reduction measures in the Scoping Plan will be further developed over the next couple of years and be in place by 2012.

California Attorney General Litigation. In 2007 the State of California filed a lawsuit against San Bernardino County, claiming that the county's 2007 update of its general plan violated the California Environmental Quality Act (CEQA) by failing to evaluate and disclose "the reasonably foreseeable effects" of the General Plan update on global warming, air quality and other state resources. The county's settlement with the state is significant because it requires a California agency for the first time to inventory historical, current and projected emissions, and to develop an emissions reduction target and reduction measures.²⁶

In September 2008 the state Attorney General reached a similar settlement agreement with the City of Stockton and the Sierra Club under which Stockton will adopt a Climate Action Plan designed to reduce sprawl and increase infill development, promote public transit and encourage more energy-efficient buildings.

²⁶ California Office of the Attorney General, "California Environmental Quality Act," www.ag.ca.gov/globalwarming/ceqa.php. Accessed May 2008.

Senate Bill 97. In response to the Attorney General's actions and in recognition that AB 32 did not discuss how greenhouse gases should be addressed in CEQA documents, the legislature enacted SB 97 in 2007. SB 97 requires the Governor's Office of Planning and Research to prepare CEQA guidelines for the mitigation of emissions, including effects associated with transportation or energy consumption. The California Air Resources Board must certify and adopt the guidelines by January 1, 2010.

Executive Order S-13-08. Governor Schwarzenegger's 2008 Climate Adaptation and Sea Level Rise Planning Directive included four key actions: 1) initiate California's first statewide climate change adaptation strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable and recommend climate adaptation policies by early 2009; 2) request that the National Academy of Science establish an expert panel to report on sea level rise impacts in California to inform state planning and development efforts; 3) issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects; and 4) initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise.

Senate Bill 375. SB 375, passed in 2008, links transportation funding to land use planning. It requires the California Air Resources Board to set regional GHG reduction targets intended to reduce suburban sprawl and the associated vehicle miles traveled. If regions develop integrated land use, housing and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of the California Environmental Quality Act. The targets apply to the regions in the state covered by the 18 metropolitan planning organizations.

II. Burlingame’s Community Greenhouse Gas Inventory

Burlingame’s Community GHG Emissions Inventory was completed using the tools and methodologies of ICLEI (Local Governments for Sustainability). This initial Emissions Inventory was completed in December of 2008 in coordination with the development of Burlingame’s Climate Action Plan. The purpose of the emissions inventory was to identify levels and sources of emissions in Burlingame for the selected base year of 2005. This information was then used to develop emissions forecast and to select reduction targets and reduction measures focused on the areas where the greatest opportunities for emission reductions exist.

Burlingame’s Community Greenhouse Gas Inventory Results

In the base year 2005, the community of Burlingame emitted approximately 336,944 metric tons of CO₂e. The emissions were distributed among the primary source sectors, as follows:

Table 4: 2005 Community GHG Emissions by Sector

Sector	Metric Tons CO ₂ e	Percent of Total CO ₂ e
Residential	47,523	14.1%
Commercial (including industrial & municipal)	74,466	22.1%
Transportation	203,213	60.3%
Waste	11,742	3.5%
Total	336,944	100%

Figure 8 clearly illustrates that the transportation sector was the largest emitter, contributing 203,213 metric tons or 60% of the total. The commercial and residential sectors were the second and third largest contributors, with a combined total of 36% of emissions. The emissions from waste generated by Burlingame residents and businesses accounted for 3.5% of the City’s total emissions.

Further analysis of the base year Emissions Inventory upon which the Climate Action Plan’s recommended emission reduction measures were based is provided in Appendix B: GHG Inventory Technical Analysis.

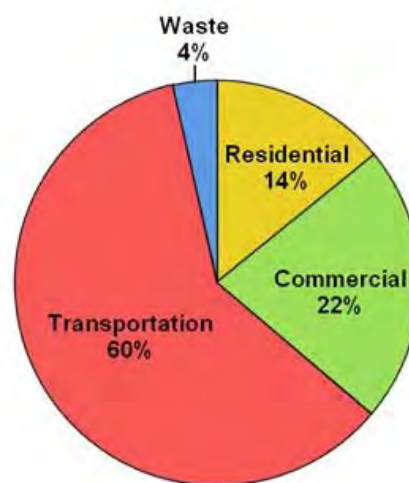


Figure 8: 2005 Community GHG Emissions by Sector

III. Achieving AB 32 Greenhouse Gas Reduction Target

Assembly Bill 32, *California’s Global Warming Solutions Act of 2006*, requires emissions to be reduced 15% below current levels (2005 levels) by the year 2020 and to be reduced by 80% the year 2050²⁷. To maintain consistency with the AB 32 emission reduction targets, the Burlingame Green Ribbon Task Force recommended that Burlingame meet²⁸ the GHG emission reduction target by 15% below the base year by 2020 and 80% by the year 2050. Burlingame’s 2005 base year emissions are 336,944 metric tons of carbon dioxide equivalent (CO₂e). To reduce emissions to 15% below 2005 baseline levels by 2020, the community would need to reduce emissions to 286,402 metric tons or by approximately 50,542 metric tons during that period. But that estimate assumes that emissions are not expected to increase beyond the 2005 baseline levels.

Figure 9: Burlingame’s “Business as Usual” Emissions Forecast for 2020

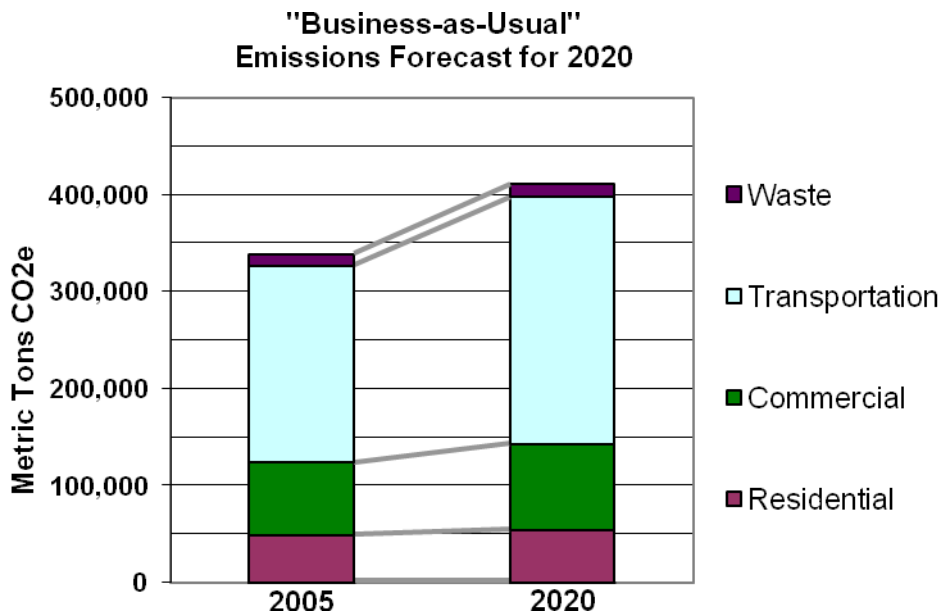


Figure 9 provides Burlingame’s baseline inventory and forecasts for population, transportation and commercial activity growth provided by the Association of Bay Area Governments (ABAG), “business-as-usual” emissions forecast for the year 2020. This forecast revealed projected emissions levels 21.3% higher than 2005 levels. If Burlingame continues with the 2005 pattern of energy consumption, waste production and transportation use, annual emissions are estimated to increase from 336,944 to 408,780 metric tons by 2020. Therefore, the percent change from “business-as usual” in 2020 to 15% below 2005 levels is 29.9%.

Table 5 identifies the 2005 base year emissions, the target year reduction and the estimated annual required emissions to meet the 2020 reduction target. A total of 50,542 metric tons is the

²⁷ California Air Resources Board (www.arb.ca.gov)

²⁸ Some jurisdictions have voted to exceed the AB 32 emissions reductions target

minimum reduction needed for Burlingame to meet the 2020 target, and the needed reduction in tons could be as high as 122,378 metric tons if Burlingame consumption trends continue. The estimated annual reduction is in the range of 5,054 tons to 12,238 tons per year to meet the target year. These reductions are challenging but are in line with the goals of many Bay Area cities.

Table 5: Burlingame GHG Emissions

	2005 Base Year	2020 "Business-as-Usual" ²⁹
2005 Base Year Emissions (metric tons CO₂e)	336,944	408,780
2020 Target Year Reduction (15% below 2005 levels)	286,402	286,402
Emissions Reductions Necessary to Meet Target	(50,542)	(122,378)
Required Percentage Emissions Reduction	15.0%	29.9%
Required Annual Emissions Reductions (2010-2020)	(5,054)	(12,238)

Burlingame's Program Development and Emission Reductions

The Task Force reviewed best GHG reduction strategies of similar communities, considered the most practical and effective measures that would generate significant emissions reductions and evaluated Burlingame's Community GHG Inventory to identify the best strategies. These five major strategies were selected for GHG reduction recommendations:

- ✧ Energy efficiency and green building
- ✧ Transportation and land use
- ✧ Waste reduction and recycling
- ✧ Education and promotion
- ✧ Municipal operations

Recommendations were developed in a collaborative process by the Green Ribbon Task Force with input from community members and City staff over several months. The final recommendations were selected because they focus on the high-impact greenhouse gas reduction programs that can cost-effectively reduce emissions in Burlingame. *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012* provides the City with recommendations that can be implemented in the near term to begin the necessary reductions in emissions. The second phase, *Phase 2: GHG Reduction Programs for Implementation 2012 to 2020*, has been developed for implementation beyond 2012. Program recommendations for both phases include a timeline for implementation, estimated costs, resulting emissions reduction estimates and personnel required for implementation.

Table 6 shows Burlingame's GHG emission reductions resulting from the implementation of the programs recommended in Phase 1. In this phase, Burlingame would realize GHG emission reductions that total an estimated 9,201 tons per year, which is in the mid-range of necessary emission reductions for Burlingame to meet the year 2020 target. The emission reductions from the Phase 2 program recommendations would provide an additional 3,783 tons per year. Therefore, the combination of Phase 1 and Phase 2 programs would reduce emissions by an

²⁹ Association of Bay Area Government (ABAG) 2020 Projections

estimated 12,984 tons per year, which is in the range of emissions reductions necessary to meet the emissions reduction target for the year 2020.

Table 6: Burlingame's GHG Reduction Target Analysis Under Phase 1 and Phase 2 Recommendations

	Metric Tons CO ₂ e
2020 “Business-as-Usual” Emissions	408,780
2020 Reduction Target (15% below 2005 levels)	286,402
Total Emissions Reductions Necessary to Meet Target	(122,378)
Required Annual Emissions Reductions (2010-2020)	(12,238)
Annual Reductions from Phase 1 Recommendations	(9,201)
Annual Reductions from Phase 2 Recommendations	(3,783)
Total Phase 1 and Phase 2 Annual Reductions	(12,984)

Burlingame’s Achievement of the AB 32 Reduction Target

By implementation of the programs and policies in Phase 1 and Phase 2 of the Climate Action Plan, the current analysis shows that Burlingame would be within the necessary range of emissions reductions to meet the 2020 reduction target of 15% below 2005 levels by 2020 as outlined in Table 6.

There are additional outside factors to consider that are beyond Burlingame’s control in meeting the emission reduction target. Burlingame has limited ability to control decisions that impact a significant portion of its emissions, most notably those in the transportation sector, which is responsible for 60% of emissions. Current state initiatives and programs that focus on transportation and energy generation will reduce emissions and assist Burlingame in meeting AB 32 reduction targets. Among them are:

Transportation Initiatives

AB 1493 (Pavley). The California Air Resources Board adopted regulations that created increasingly stringent standards in 2004 to reduce global warming emissions from cars and light trucks between 2009 and 2016. The Environmental Protection Agency is expected to allow California to move forward with these new requirements in 2009 or 2010 as outlined in AB 1493 after being challenged by federal and state courts. The AB 32 Scoping Plan estimated that the state’s emissions will be reduced by an estimated 5.5% by 2020 resulting from AB 1493.

Senate Bill 375. This legislation reduces emissions by linking transportation funding to land use planning. It requires the Metropolitan Planning Organizations to create sustainable communities strategies in their regional transportation plans to reduce vehicle miles traveled and sprawl. If regions develop integrated land use, housing and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of the California Environmental Quality Act. The AB 32 Scoping Plan estimated that the state’s emissions will be reduced by an estimated 1% by 2020 as a result of SB 375.

Energy Initiatives

The State of California's Renewable Energy Portfolio Standard (RPS) requires electricity providers to increase the portion of the energy that comes from renewable sources to 20% by 2010 and by 33% by 2020.

These State and regional initiatives can provide Burlingame with additional reductions in emissions by the year 2020.³⁰ Therefore, it is estimated that the GHG emission reductions from the implementation of Phase 1 and Phase 2 programs in combination with the new state and regional initiatives will enable Burlingame to meet the GHG reduction goal of 15% below 2005 by the year 2020.



³⁰ AB 32 Scoping Plan released December 2008, www.arb.ca.gov

IV. Climate Action Plan Program & Policy Recommendations

In January 2009 the City Council directed the Green Ribbon Task Force to develop a Climate Action Plan for Burlingame. The Task Force reviewed Burlingame's Community Greenhouse Gas Inventory and evaluated the best GHG reduction strategies of similar communities that could result in significant emission reductions for Burlingame to meet the target of 15% below 2005 levels by the year 2020. To guide the program and policy recommendations, these five major strategies were selected:

- ✧ Energy efficiency and green building
- ✧ Transportation and land use
- ✧ Waste reduction and recycling
- ✧ Education and promotion
- ✧ Municipal operations

The Green Ribbon Task Force met over a period of several months and reviewed best practices of GHG reduction strategies that would have the greatest impact on reducing emissions in Burlingame, were feasible to implement in the current economic climate and were cost-effective. After careful consideration, the Task Force narrowed the recommendations down to 29 recommendations based on their ability to reduce emissions, cost-effectiveness, feasibility of implementation and staff feedback. The Task Force held a Community Climate Action Workshop in March 2009 to receive public feedback on the draft recommendations.

The Task Force developed a phased approach for program and policy implementation. Two phases are recommended. The first, *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012*, provides the City with recommendations that can be implemented in the near term to begin the necessary reductions in emissions. The second phase, *Phase 2: GHG Reduction Programs for Implementation 2012 to 2020*, has been developed for implementation beyond 2012. Program recommendations for both phases include a timeline for implementation, estimated costs, resulting emissions reduction estimates and personnel required for implementation.

According to a 2007 survey of Burlingame residents, 67% of respondents supported the following statement: "The City should be involved in green or environmentally friendly measures, such as installing solar panels on City buildings, even if the cost exceeds the projected operational savings over the life of the project."

Source: City of Burlingame Citizen Survey completed 2007 by the National Citizens Survey

This phased approach is recommended because delaying program implementation could increase the cost and difficulty of Burlingame achieving the AB 32 GHG emission reductions target. This approach is also recommended because of the recent notification that federal stimulus funds can be used for climate action programs. The American Recovery and Reinvestment Act of 2009 (ARRA) provides funds for local governments to implement energy efficiency, green building, renewable energy projects and allows use of contracted technical assistance for program implementation. Burlingame can fund climate action programs with these competitive grants. *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012* could be used as the required plan needed for these grant fund applications.

Green Ribbon Task Force Selection of Policies and Programs

The specific program and policy recommendations are described in the following format:

Description and Benefits. A brief description of the program or policy recommendation and a list of the associated benefits and co-benefits.

Components. A list of specific requirements and components recommended for implementation.

Annual Estimated GHG Reduction. The estimated emissions reduction from the recommendation (provided in metric tons of CO₂ equivalent) on an annual basis.

Cost Estimates. An estimate of the initial costs to the City to implement the program and other cost data are included for reference and are based on current research of programs in other jurisdictions and available case studies. The estimates are nonamortized approximations of first-year costs. Most of the costs involve staff time and materials.

Potential Funding Sources. A list of potential funding sources that may be used for implementation of the recommendation.

Responsible Personnel. A list of recommended personnel that could implement the recommendation.

Municipal Examples. A list of other cities that have implemented this recommendation or have included this recommendation in their Climate Action Plan.

Phase 1: High-Impact Greenhouse Gas Reduction Programs for Implementation Prior to 2012

The Task Force developed *Phase 1: High Impact GHG Reduction Programs for Implementation Prior to 2012* to provide the City with recommendations that can be implemented in the near term to begin the necessary reductions in emissions.

Energy Efficiency and Green Building Recommendations

Energy efficiency and green building programs are considered the “low hanging fruit” of Climate Action Plans because they provide the fastest and most economical means to reduce emissions. Burlingame’s GHG inventory showed that energy consumption by the commercial sector (22%) and residential (14%) sector together contribute the second largest portion (36%) of Burlingame’s emissions. The energy-efficiency and green building programs in Phase 1 are recommended because they reduce emissions cost-effectively and efficiently. Most homes in Burlingame were built prior to enactment of state energy codes and have significant potential to increase energy efficiency and water conservation. Typically, homes can increase energy efficiency 30% to 40%³¹ and energy-efficiency programs can begin to help Burlingame residents

³¹ California Public Utilities Commission 2008 Strategic Plan

reduce energy consumption and costs. Similarly, most businesses spend approximately 30% of their operating budget on energy consumption. Providing businesses with energy-efficiency resources can help businesses save on utility costs and reduce emissions.

1 Adopt a Water Efficient Landscape Ordinance as required by AB 1881 and consider inclusion of more stringent water conservation requirements than state's model ordinance.³² (California requires cities to adopt ordinances by January 1, 2010.)

Benefits. Burlingame uses 4.8 million gallons of water each day, and the average lawn uses 326,000 gallons of water per year. Water requires energy for transport, treatment and distribution. A water-efficient landscape ordinance will assist Burlingame with essential water



conservation practices. Consideration of more stringent requirements than the state model can be an effective use of staff time since the State of California requires that all jurisdictions adopt a water conservation ordinance that is at least as stringent as the state's model ordinance. This program is an effective response to the growing concerns of drought and the required long-term reduction in water usage.

Components. The Bay Area Water Supply and Conservation Agency is completing a regional draft model ordinance projected for completion in September 2009. Burlingame's Public Works and Community Development Departments could consider more stringent components that include:

1. Require high-efficiency irrigation systems (low-flow drip, bubblers or low-flow sprinklers) in landscape plans. Ensure that the irrigation system is properly designed for the site.
2. Encourage or require smart (weather-based) controllers.
3. Reduce turf area/high water use area from current requirements.
4. Require 75% of planted areas are California Natives or Mediterranean Species (drought tolerant).
5. Research most recent technologies and policies for gray water systems. Permit gray water systems (dual plumbing from sinks, washers, showers for landscape irrigation) on a pilot basis.

Water Conservation Saves Money and Reduces Emissions

According to the Local Government Commission, "the Town of Windsor is saving about 275 million gallons of drinking water a year by irrigating 400 acres of golf course, vineyard, parks, pasture and fodder croplands with recycled water." An estimated 1,057 tons of CO₂e is avoided each year through this water reclamation and reuse effort.

³² www.owue.water.ca.gov

6. Require 2 inches of compost in the top 6 to 12 inches of soil on non-turf, non-hardscape areas at the time of installation.
7. Require solar hot water systems for new pool installations or renovations.
8. Review Burlingame's current water management practices and consider use of the most current water conservation practices and technologies.

California can save enough energy to power 150,000 homes and cut emissions by a half-million metric tons every year by using recycled water. Local governments can reduce the climate impacts by using the most efficient water system equipment and implementing water efficiency, conservation and reclamation programs to use recycled water for landscaping or other non-potable uses.

Source: California Sustainable Alliance

Annual Estimated GHG Reduction. 272 tons.

Cost Estimates. Costs that include staff time to develop a final ordinance and the required compliance documentation are not included in this cost estimation since the State of California requires a water conservation ordinance. It would cost an estimated \$4,000 in staff time to consider more stringent requirements.

Potential Funding Source. Permit fees.

Responsible Personnel. Public Works, Community Development Department.

Municipal Examples. Menlo Park's Water Efficient Landscaping Ordinance No. 840.³³

2 Adopt a Residential Energy Conservation Policy (voluntary) to provide professional residential energy audits for residents at reduced cost. The policy also includes promotion of a Residential Energy and Water-Efficiency Checklist for properties sold (or undergoing "transfer of title") that encourages upgrades in energy-efficiency and water conservation standards.

Benefits. Most homes in Burlingame were built prior to the State of California's energy code requirements and have strong potential to increase energy efficiency by an estimated 20% to 40%. Residents could save approximately \$800 to \$1,200 per year by taking energy and water saving measures.³⁴ Increasing energy efficiency is the fastest and most economical method to reduce emissions. Home energy audits and retrofits have the highest potential for achieving the greatest amount of emission reductions.³⁵ This recommendation is a best practice recommended by the League of California Cities and the Cities for Climate Protection. The National Association of Home Builders states that home energy audits and retrofits create jobs and tax revenues.³⁶ Additionally, the *Residential Energy and Water*



³³ <http://www.menlopark.org/departments/pln/waterlandord.pdf>

³⁴ Estimates based on 2,000 square foot home and analysis of Bay Area homes that have completed home energy-efficiency audits

³⁵ California Air Resources Board Scoping Plan, December 2008

³⁶ National Association of Home Builders, May 2009 Presentation, "Investing in our Community-Home Energy Retrofit Program"

Efficiency Checklist program highlights easy and low-cost options to increase home energy and water efficiency and can provide residents with reduced energy and water utility bills. Minimal upgrades, such as converting to CFLs, weatherizing, insulating and caulking, can have a significant impact on energy consumption and a significant payback for residents.

Components. Burlingame would provide home energy audits at a reduced cost as an incentive for residents to complete an audit. The City would select a professional home energy audit company and may choose to subsidize a portion of the costs. Burlingame could participate in a regional program or partner with a neighboring city to leverage resources. This voluntary program would be available to all Burlingame residents, including the estimated 6,300 multi-family residences as well as the estimated 6,100 single-family homes. The energy audit team would provide an on-site analysis, complete simple upgrades (such as installation of aerators and conversion to CFLs), as well as a customized report of prioritized upgrades for energy and water that could include installation of weather stripping/caulking, insulation for attics, wrapping the hot water heater, reducing the hot water temperature to 120°F, and installing low-flow toilets for water conservation. An estimated 250 homes per year could participate in the program. The Sustainability Coordinator would provide promotion and education, coordinate the selection of the home energy company and monitor results.



Adoption of the policy would also involve providing *Residential Energy and Water-Efficiency Checklists* on the City of Burlingame Web site and educating community groups about them. There would be no minimum requirements for compliance. The Checklist could include the following:

- ✓ Install minimum R-30 or higher ceiling insulation
- ✓ Install minimum R-12 or higher water heater insulation
- ✓ Install toilets with a maximum of 1.6 gallons per flush, sink aerators with a maximum 2.2 gallons per minute and showerheads with 2.5 gallons per minute
- ✓ Install weather stripping on all exterior doors
- ✓ Install damper or door/closure in fireplaces
- ✓ Install CFLs, LEDs or other high-efficiency lighting in a minimum of 75% of fixtures

Annual Estimated GHG Reduction. 1,315 tons.

Cost Estimates. The estimated cost of \$10,000 would subsidize 25% of home energy audits for 250 participating homes at \$150 per audit. Costs can vary, depending on the selection of the professional home energy audit company and the amount of the subsidized cost. The Sustainability Coordinator would provide promotion and education to the community and would monitor the participants and results of the program. The Sustainability Coordinator would develop the Residential Energy and Water-Efficiency Checklists for inclusion on the City Web site and also would educate real estate professionals about them.

Potential Funding Source. California Energy Commission grant funds.

Responsible Personnel. Sustainability Coordinator and associated staff.

Municipal Examples. Redwood City, Menlo Park, Palo Alto and Boulder, CO.

3 Research and consider a Solar and Energy Efficiency Financing Program for residents and small businesses.

Benefits. New legislation, AB 811, allows cities and counties to allow property owners to finance the up-front costs for solar and energy efficiency improvements through their property tax bill. This program would involve the research and consideration of a new financing program for Burlingame to provide residents and small business owners with a method to install solar and/or energy-efficiency upgrades with a minimal upfront cost. This program can reduce one of the biggest barriers of solar and/or energy efficiency upgrades, as cited by homeowners and small business owners. Burlingame can benefit by participation in a new regional program, the Solar and Energy Efficiency (SEE) District,³⁷ led by the Association of Bay Area Governments (ABAG) in partnership with Pacific Gas and Electric Company (PG&E) that may be available in 2010. Burlingame could benefit from the ability of ABAG to maximize available state and federal subsidies and work with existing PG&E incentives. Burlingame also could benefit from the potential of spreading the administrative and financing costs over a larger market area.

Components. City finance staff could consider participation in the new regional program, the SEE District, led by ABAG in partnership with PG&E. The ABAG program may be available to jurisdictions in 2010. ABAG has provided the SEE District Report for jurisdictions on the current status of the project.



ABAG's deputy executive director has stated that the regional program would build upon the efforts of cities that have already implemented solar and energy financing programs, such as Palm Desert, Sonoma, San Francisco, Solano Beach, Berkeley and San Diego. If Burlingame chooses to participate in the regional program, residents and small businesses could install solar and other energy-efficiency upgrades with minimal upfront costs. Individual property owners would contract directly with qualified installers (e.g., solar installers) for energy and solar projects. The loans could finance permanent fixture energy

efficiency, clean energy projects, solar panel installation, insulation, energy-efficient air conditioning or upgrades to lighting systems. Through the financing program, repayment is made through assessments on participating property owners' annual tax bills over a 20-year period. If the property is sold, the new owner takes over the assessment that continues on the property's tax bill.

Annual Estimated GHG Reduction. No reduction for the first 12 to 18 months; estimated 225 tons after implementation of SEE District program.

Cost Estimates. The estimated costs for this program cannot be estimated at this time, due to the fact that the Solar and Energy Efficiency (SEE) District program development is currently

³⁷ Solar and Energy Efficiency Report to Association of Bay Area Governments Executive Board presented March 2009 <http://www.abag.ca.gov/abag/events/agendas/e031909a-Item%2009.pdf>.

under development. Once the program has been outlined by ABAG, staff time from the Finance Department will be necessary to consider participation in the regional program.

Potential Funding. California Energy Commission grant funds.

Responsible Personnel. Finance Director and finance staff, Sustainability Coordinator.

Municipal Examples. Palm Desert, Sonoma, San Diego, Solano Beach, San Francisco and Berkeley and Boulder, Colo., have implemented solar and energy financing programs.

4 Adopt a Residential Green Building Ordinance for new construction and major remodel projects and require a minimum number of *GreenPoints* using the Build It Green regional program.

Benefits. Green buildings minimize the use of energy, water and other natural resources and provide a healthier indoor environment. “Green Building” is defined as a whole-systems approach to the design and construction of buildings that reduces the environmental impacts of buildings. A green building ordinance can assist Burlingame in meeting water reduction requirements. Additionally, green buildings are typically 30% more energy efficient than non-

City of Palo Alto Requires Residential and Commercial Green Building Standards

As of July 2008, the City of Palo Alto requires Leadership in Energy and Environmental Design (LEED-NC) for commercial buildings. The City also has mandatory requirements for residential new construction through Build It Green, an state-wide organization promoting green building.

green homes and assist Burlingame in reducing the energy load on the grid. Burlingame benefits from its membership in Build It Green, a nonprofit professional organization that has set the standard for quality residential green building in California. The Home Builders Association of Northern California, the Association of Bay Area Governments and the Air Resources Board have endorsed the Build It Green program. In July 2008 the state adopted a new Green Building Standards Code as an addition to its existing Title 24 California Building Standards. The new code increases minimum requirements for energy efficiency, water conservation and recycling of building materials.

The State of California also completed an in-depth analysis of the cost benefits of green building and concluded that green buildings have a financial upside that exceeds the cost by a factor of 10 to one.³⁸ Recent reports show that green buildings have increased real estate value and hold or rise in value versus traditional buildings.³⁹

Components. As a member of Build It Green, the City of Burlingame already has access to model green building ordinances, training and resources that will greatly assist the City in implementing its green building ordinance. Staff and/or consultants can adapt a model green building ordinance developed by neighboring jurisdictions⁴⁰ for use in Burlingame.



³⁸ The Costs and Financial Benefits of Green Building, www.usgbc.org/docs/news/
³⁹ RICS Research, "Doing Well By Doing Good? An Analysis of the Financial Performance of Green Office Buildings in the USA," Piet Eichholtz and Nils Kok, Maastricht University, Netherlands; John Quigley, University of California, Berkeley, United States of America, April 2008. http://repositories.cdlib.org/iber/bphup/working_papers/W08-001/
⁴⁰ www.builditgreen.org

The model ordinance involves requiring residential permit applicants to complete the *GreenPoint Checklist* and include a minimum number of “green points” or green measures to be included in their project. GreenPoint raters or staff could be used as to ensure compliance. The Community Development Department has already developed internal procedures for the current green building program, which requires each residential development to attain one green point. Residents already have access to free green building workshops, green product directories and guidelines on the “Sustainable Burlingame” Web site at www.burlingame.org/sustainable.

Annual Estimated GHG Reduction. 1,051 tons.

Cost Estimates. The costs are estimated at \$12,000 and include the cost of City staff training, staff costs to modify the model green building ordinance and evaluation of potential requirements. Some staff training has already occurred for the current program and green building resources and green building guidelines have already been incorporated into the City Web site. Once the ordinance is adopted, additional staff time will be required for permit plan checks, estimated at \$100 per plan check. These costs can be included in permit application fees, similar to the practices of neighboring jurisdictions who have adopted green building ordinances.

Potential Funding Source. California Energy Commission grants funds and permit application fees.

Responsible Personnel. Community Development Department.

Municipal Examples. Hillsborough, San Mateo County, Brisbane, Los Altos Hills, Sonoma and San Francisco.

5 Adopt a Commercial Green Building Ordinance to require new commercial (greater than 10,000 square feet) construction and major remodels to meet a minimum Leadership in Energy and Environmental Design (LEED) standard.

Benefits. Burlingame’s commercial buildings account for 61% of the built environment’s emissions. Requiring mandatory green building measures will begin to reduce these emissions from new commercial development and major remodel projects. Commercial property owners can realize an estimated 30% cost savings in utility bills from energy and water efficiency, increased employee productivity, improved indoor air quality and increased value from green commercial properties.

Many commercial developers already are building using LEED measures; an October 2008 survey⁴¹ of corporate real estate executives found that two-thirds of corporate real estate executives believe that sustainability is a critical business issue. Commercial developers and major corporations that have adopted specific energy efficiency initiatives do so because of the financial return and reduced operating costs that result from green buildings. The State of

⁴¹ Jones Lang LaSalle and CoreNet Global, “Perspectives on Sustainability: Results of the 2008 Global Survey on Corporate Real Estate and Sustainability,” October 2008. Survey conducted September and October 2008.

California completed an in-depth analysis of the cost benefits of green building and concluded that green buildings have a financial upside that exceeds the cost by a factor of 10 to one.⁴²

Components. Prior to any mandatory requirements, the City could adopt a Commercial Green Building Policy for voluntary compliance similar to the process used for the Residential Green Building Policy adopted by the City Council in 2008. A voluntary period of 12 to 18 months can provide sufficient time for staff and commercial developers to prepare for the mandatory phase. After a sufficient education period, a Commercial Green Building Ordinance could be adopted to require new large-scale commercial construction and major remodeling projects to meet a minimum standard of Leadership in Energy and Environmental Design (LEED). The commercial developers would complete the LEED certification process and provide proof of certification to City staff for compliance with the ordinance.

Annual Estimated GHG Reduction. The voluntary program provides 98 tons of reduction; the mandatory program provides 394 tons of reduction.

Cost Estimates. The estimated cost for both programs is \$17,500. The voluntary phase would require staff time for the development of the Commercial Green Building Policy and include staff time estimated at \$2,000 for adding LEED resources, checklists on the City's Web site and permit documents. The ordinance would include costs for staff training by a LEED Accredited Professional (LEED AP) and staff time for development of new commercial green building ordinance, estimated to be approximately \$13,500. Burlingame staff could reduce preparing time by reviewing commercial green building ordinances that have been adopted by neighboring jurisdictions. The cost of staff time for plan checks is estimated at \$200 per plan check (\$2,000 for 10 plan checks) and could be absorbed by application fees.

Potential Funding Source. California Energy Commission and permit application fees.

Responsible Personnel. Community Development Department.

Municipal Examples. Palo Alto, San Mateo County, San Francisco and San Jose require minimum green building LEED certification for commercial buildings.

6 Develop a Commercial Energy Efficiency Policy to provide energy-efficiency technical assistance to the commercial sector and provide an Incentive and Recognition Program. Encourage commercial businesses applying for new or renewal of businesses licenses to complete a free PG&E energy-efficiency audit. Expand Burlingame's participation in the Bay Area Green Business Program and provide incentives for businesses to achieve Green Business Certification.

Benefits. Most office buildings spend 30% of their operating budget on energy consumption. Business owners often are not aware of resources, rebates and incentives that are available for energy efficiency. Energy-efficiency audits and improvements can reduce energy usage by 30% to 40%.⁴³ Burlingame's commercial buildings account for 61% of the built environment's emissions, and an effective Commercial Energy Efficiency Policy can reduce emissions by providing free resources that educate businesses on low-cost energy and water saving opportunities. Pacific Gas and Electric provides free energy audits that can save significantly on utility



⁴² The Costs and Financial Benefits of Green Building, www.usgbc.org/docs/news/

⁴³ www.pge.com/mybusiness/

costs and benefit the City by reducing emissions and the demand on the grid. This recommendation leverages current resources from the Bay Area Green Business Program, a program in which the City is already participating. Six Burlingame businesses are currently certified as green businesses.

Components. The program would involve the Sustainability Coordinator's promotion and education of free energy audits from Pacific Gas and Electric (PG&E) that provide cost-benefit analysis and/or retrofit service information and rebates.⁴⁴ The coordinator would also expand the City Web site to include commercial energy efficiency and water efficiency resources⁴⁵ and would coordinate the development of an incentive program. This individual would coordinate outreach materials for businesses renewing or applying for new business licenses and would highlight PG&E resources that provide industry-specific recommendations⁴⁶ for energy and water efficiency for hotels, auto dealers, restaurants/food service, office and retail. The Sustainability Coordinator would promote green business certification to ensure that businesses receive timely certification, citing benefits that include:

- ✧ Improved operating efficiencies, saving energy and water
- ✧ Increased recycling
- ✧ Buying recycled
- ✧ Reducing emissions

Annual Estimated GHG Reduction. 1,016 tons.

Cost Estimates. The estimated costs are \$4,500 to cover the cost of promotion and education materials for the Commercial Energy Program, Recognition Program, business license renewable program and the Bay Area Green Business Program.

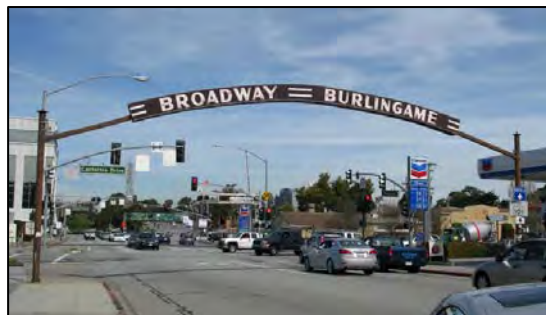
Potential Funding Source. California Energy Commission and San Mateo County program Energy Strategy 2012.

Responsible Personnel. Sustainability Coordinator and related staff.

Municipal Examples. Palo Alto, Menlo Park, Oakland, Berkeley.

Transportation and Land Use Recommendations

The transportation sector is the largest contributor to Burlingame's emissions (60%). Most of the emissions (70%) are from vehicles traveling on Highway 101, Highway 280 and Highway 82 (El Camino Real), and the remainder (30%) is from travel on Burlingame roads. Achieving a 15% reduction from the 2005 baseline levels involves policy and program implementation outside of the control of Burlingame decision makers. However, approximately 50% of driving trips are less than five



⁴⁴ www.fypower.com

⁴⁵ www.bcsfbay.org

⁴⁶ www.energystar.ca.gov

miles and Burlingame can help reduce emissions by promoting the use of alternative fuel vehicles, expanding public transportation, and providing safe and convenient bicycling and walking routes. Land use is closely linked to transportation because it is the orientation of destinations that require us to travel. For this reason, land use and transportation are included in the same group of recommendations. GHG reductions from transportation and land use also provide a higher quality of life, improved safety and better health for the Burlingame community.

The City has already completed several significant steps in transportation and land use decisions that reduce greenhouse gas emissions that include adoption of a Bicycle Transportation Plan, installation of bicycle route signs and bicycle racks, shuttle service and promotion of public transportation. The recently adopted North Burlingame/Rollins Road Specific Plan encourages mixed-use and high-density residential development within one-half mile of the BART/Caltrain intermodal station.

7 Establish a policy that requires new, large commercial properties (greater than 10,000 square feet) to develop Transportation Demand Management (TDM) strategies that encourage the use of shuttles, carpools, bicycles and public transportation. Provide TDM guidelines in the permit packet for all new commercial developments.

Benefits. This policy enables new, large commercial employers to address public transportation, bicycling and walking access to new developments by incorporating Transportation Demand Management (TDM) strategies. Many commercial developers in the Bay Area are already familiar with these requirements since several surrounding cities already require them. The City staff has already used these strategies as part of the construction plan for Peninsula Hospital, whose TDM program requires installation of bike lockers and racks, showers and changing rooms for employees, a contribution to the Peninsula Congestion Relief Alliance, shuttle service to Caltrain and BART, and a dedicated shuttle service between other Mills Peninsula facilities.



Components. Conditions of approval would require that new large-scale commercial developers address transit, bicycling and walking access to the location. The staff would provide TDM guidelines for new commercial development applicants. Requirements could include providing a transportation allowance to carpoolers, transit users and bicyclists; offering preferred parking for electric, or alternatives fuel vehicles; providing shuttle services; installing bicycle lockers or racks; and policies that encourage telecommuting.

Annual Estimated GHG Reduction. 371 tons.

Cost Estimates. The estimated cost of staff time for policy development, developing and coordinating guidelines, and incorporation into requirements is \$6,000.

Potential Funding Source. Permit fees.

Responsible Personnel. Community Development Department.

Municipal Examples. Palo Alto, Menlo Park.

8 Adopt a policy to provide prioritized parking for hybrid or alternative-fuel cars on city streets, garages and lots. Expand the policy as technology advances to increase accommodation of hybrids and or alternative-fuel vehicles.

Benefits. Providing prioritized parking for hybrid or alternative-fuel vehicles can promote the purchase of more fuel-efficient cars and thus reduce emissions. These parking spaces can be incorporated in a number of new parking lots, structures and plans that are coming online throughout key areas of Burlingame’s downtown and commercial areas.

Components. Select parking spaces in convenient public locations can be designated as “green” spaces reserved for hybrid, electric or other alternative-fuel cars (similar to handicapped spaces). Parking would be enforced. Consider increasing parking fees for non-green spaces to reduce congestion and increase the revenue stream for the City.

Annual Estimated GHG Reduction. 164 tons.

Cost Estimates. Costs depend on the number of designated “green” spaces. The program would require Public Works to designate spaces and the Police Department to provide parking enforcement.

Potential Funding Source. Bay Area Air Quality Management District or parking fees.

Responsible Personnel. Public Works, Parking Enforcement.

Municipal Examples. Mountain View; the City of San Mateo includes in its Climate Action Plan).

9 Incorporate bicycle-friendly intersections in street design and modifications. Ensure new developments provide safe and convenient travel by walking, bicycling or public transportation.

Benefits. Providing safe and convenient routes for bicycles and pedestrians can improve quality of life and increase safety for Burlingame residents. Approximately 50% of driving trips are less than five miles, and promoting alternatives other than single-occupancy vehicles can reduce emissions. Burlingame has already adopted a Bicycle Transportation Plan and an element of the General Plan that encourages bicycle use. The Bicycle and Pedestrian Advisory Committee and the City have installed lighted crosswalks at critical intersections, placed bicycle route signs on residential routes through Burlingame and added bicycle racks. Bicycle-friendly accommodations are already a City priority for Burlingame. Expansion of a safe and convenient bicycle network can reduce the amount of single-occupancy vehicles that travel on City roads in Burlingame.



Components. Staff would review plans for new street design and modifications to ensure that bicycle-friendly intersections are included. Staff would review plans for new developments and ensure that these plans provide safe and convenient methods to travel by bicycle, walking or public transportation. The City could consider working toward a connected network of bike

routes to schools and to downtown and installing “BikeLink” lockers for safe storage of bikes downtown and at Caltrain stations.

Annual Estimated GHG Reduction. 87 tons.

Cost Estimates. Staff time to incorporate bicycle-friendly intersections in street design and modifications. Staff to ensure new developments provide safe and convenient travel by walking, bicycling or public transportation. Estimated costs are to be determined.

Potential Funding Source. Metropolitan Transportation Commission grant program for bicycle, pedestrian and public transportation oriented improvements.

Responsible Personnel. Community Development Department

Municipal Examples. Sonoma, Rohnert Park, Berkeley, San Francisco.

10 Research methods to increase ridership and expand shuttle service and partner with local groups to increase public transportation alternatives.

Benefits. Providing residents with convenient alternatives to single-occupancy vehicles can further reduce Burlingame’s greenhouse gas emissions resulting from travel on Burlingame roads. Expanding shuttle service and ridership and other forms of public transportation can also improve the quality of life for residents, reduce pollution, provide a higher level of safety in streets, improve health from increased exercise and reduce congestion. The City has been commended for its shuttle services and public transportation services. Residents and visitors benefit from three shuttles that connect BART, Caltrain and major employment and shopping areas.



Components. The staff would continue to work with transit and regional organizations and seek grant funds to expand shuttle services. The City could consider funding shuttle expansion by requesting funding from major commercial users. It might add bicycle racks to shuttles to expand ridership. Staff would continue to seek additional methods to promote and educate the public about transportation alternatives.

Annual Estimated GHG Reduction. Reductions in emissions to be determined based on shuttle service modifications.

Cost Estimates. The costs of this program are to be determined.

Potential Funding Source. Grant funds, general funds and/or parking fees.

Responsible Personnel. Public Works.

Municipal Examples. Palo Alto, Menlo Park, San Jose, Sunnyvale, Mountain View.

Waste Reduction and Recycling

Burlingame disposed of 29,779 tons of waste to landfill in 2008, and Burlingame’s community GHG inventory showed that approximately 4% of emissions were from solid waste. Though this percentage of emissions may seem like a small percentage, the actual emissions from waste decomposing at landfills are significantly more potent than carbon dioxide. As waste from landfills decomposes, methane gas is released, which is 21 times more potent than carbon dioxide (CO₂). Burlingame has direct control over solid waste, recycling and composting decisions, and can consider new and expanded recycling and composting programs as they become available to Burlingame residents and businesses. For this reason, the solid waste sector has strong potential to provide GHG emission reductions for Burlingame.

- 11 Provide new residential and commercial recycling service that includes:**
- a) “Single stream” recycling collection service for residential and commercial
 - b) Weekly collection of single stream recycling for residential
 - c) Weekly collection of organics/food collection for residential

Benefits. The new recycling programs that will become available to Burlingame residents and businesses in January 2011 provide an effective method to significantly reduce emissions. The analysis provided by the solid waste joint powers authority, the South Bayside Waste Management Authority, showed that the new single stream recycling program can increase diversion of this sector by an estimated 30%, and analysis also showed that the new food and organics collection program can increase diversion of this sector by 20%. Studies show that increasing convenience of recycling for residents and business can significantly increase diversion rates and can assist residents and businesses in reducing the garbage generated to landfill. Many Burlingame residents at the Climate Action Plan Community Workshop were very supportive of these new recycling and diversion programs.

Components. New upgraded services include providing “single stream recycling” in which all paper, containers, cardboard and plastic recyclables go into one container and don’t require any sorting by residents or businesses. New wheeled containers are provided to residents for easier movement and placement at the curbside. Additional services include an “organics collection” that allows all food discards to be added to the current yard waste collection program. Burlingame residents and businesses, as a member of the South Bayside Waste Management Authority, would receive the outreach and education campaign materials as part of the new services provided. The costs of the recycling and solid waste services are paid by the residential and commercial ratepayers.

Annual Estimated GHG Reduction. 3,164 tons.

Cost Estimates. No costs to the City, as new services are included in the ratepayers’ garbage fees.

Potential Funding Source. Garbage fees.

Responsible Personnel. City Council, City Manager and Finance Director.

Municipal Examples. Most Bay Area cities have single stream recycling services. San Francisco and San Carlos have food and organics collection.

12 Adopt a Commercial Recycling Ordinance that requires businesses to divert recyclable organics, containers, cardboard, and paper.

Benefits. Burlingame’s commercial businesses recycled only 18%⁴⁷ of their garbage in 2008, and the percentage of recycling has remained relatively flat for the past several years. An effective commercial recycling ordinance can increase commercial diversion by requiring that recyclables be diverted from landfill. Burlingame businesses benefit because recycling is provided at no additional cost. Other cities that have implemented commercial recycling ordinances have reported a 21% increase in commercial diversion.⁴⁸

Components. The Sustainability Coordinator and finance staff can consider the model commercial recycling ordinance and data provided⁴⁹ by the South Bayside Waste Management Authority. The development of the ordinance could involve requiring businesses that dispose of more than 50 cubic yards of waste per month to be covered under the ordinance. The Sustainability Coordinator and finance staff could consider coordinating outreach efforts on the largest solid waste generators and could require that the hauler provide quarterly reports on progress in reducing solid waste from these generators.

Annual Estimated GHG Reduction. 793 tons.

Cost Estimates. The cost of staff time is estimated at \$3,500 to modify the model ordinance that has already been developed by the recycling and solid waste authority and to coordinate the program with the recycling and solid waste provider.

Potential Funding Source. Garbage fees.

Responsible Personnel. Finance Director or finance staff and Sustainability Coordinator.

Municipal Examples. Sacramento, Citrus Heights, San Jose.

Promotion and Education Programs

A Climate Action Plan is more effective if the community is aware of its goals and policies. Resident participation is essential for many of the Climate Action Programs if Burlingame is to achieve the AB 32 GHG reduction targets. Burlingame can benefit from the development of a community group that can leverage resources from several regional promotion and education efforts that are under way in the Bay Area.

⁴⁷ Allied Waste Systems Report, 2008

⁴⁸ City of Sacramento

⁴⁹ Model Commercial Recycling Ordinance, South Bayside Waste Management Authority Members, October 2008. www.rethinkwaste.org

13 Encourage the development of a community group (“Burlingame Green”) to promote and educate the community about climate action programs.

Benefits. The City of Burlingame will need participation and involvement from all sectors of the community to achieve the AB 32 GHG reduction targets. An effective community group in Burlingame can provide focused promotion and education campaigns that can be modeled after other successful community groups.

Components. This recommendation does not require funds or staff from the City staff. The community group could choose to complete a variety of projects, including:

- ✧ Green@Home Campaign
- ✧ DriveLess Campaign
- ✧ Solar Community Discount Program
- ✧ Take the 10-Gallon Challenge Campaign
- ✧ Partner with schools to promote carpooling
- ✧ Campaign to promote buying local foods
- ✧ Grow Your Own Garden
- ✧ Low-Carbon Diet Campaign: How to Lose 5000 Pounds in 30 Days

A pilot program was initiated in fall of 2008 in the City of Davis to challenge local residents to go on a "low-carbon diet." Davis offers a workbook to assist households with measuring emissions and developing individual action plans. Since the residential sector contributes approximately 23% of citywide GHG emissions, the low-carbon diet challenge represents an opportunity to reduce a significant portion of emissions.

Annual Estimated GHG Reduction. Greenhouse gas emission reductions depend on projects selected.

Cost Estimates. No staff time or costs from City.

Potential Funding Source. N/A.

Responsible Personnel. Community group.

Municipal Examples. Menlo Park, Los Altos Hills, Portola Valley, Redwood City.

14 Dedicate a part-time (0.50 FTE) Sustainability Coordinator to implement and coordinate climate action programs.

Benefits. The Sustainability Coordinator fills the essential role of implementing the climate action programs that the City staff does not have time to supervise. This person would coordinate projects with City staff, community groups and commercial organizations and would provide the City Council and community with progress reports on program implementation and progress toward GHG emission reductions. This individual could save the City money by leveraging regional programs that benefit Burlingame and by identifying grant opportunities.

Components. It is envisioned that the position of the Sustainability Coordinator would be funded by the grants from the California Energy Commission that are anticipated to be available in fall 2009. The California Energy Commission has provided preliminary guidelines for jurisdictions and additional details will become available in July or August of 2009 regarding specific funding levels. With these grant funds the Sustainability Coordinator would develop the Phase 1 of the Climate Action Plan as approved by the Council in coordination with City staff. The programs would include:

- ✧ Professional Home Energy Audit Program
- ✧ Residential Energy and Water Efficiency Checklist
- ✧ Solar and Energy Efficiency Financing Program (promotion and education)
- ✧ Commercial Energy Efficiency Program, Recognition Program and Bay Area Green Business Program
- ✧ Commercial Recycling Program and Commercial Ordinance
- ✧ Community group coordination
- ✧ Burlingame City Green Team (energy and water efficiency for city operations)

City Green Teams Save City Energy Costs

Berkeley completed energy retrofits to all city-owned buildings. Through this effort, it is now saving 2.1 million kilowatt hours of electricity, 37,520 therms of natural gas, and \$370,000 of taxpayers' money annually. Completing energy retrofits to city buildings is expected to save about 1,200 tons of CO₂e annually.

Annual Estimated GHG Reduction. Greenhouse gas emission reductions depend on projects selected.

Cost Estimates. The costs for this position are estimated to be \$89,000 per year.

Potential Funding Source. California Energy Commission grant funds.

Responsible Personnel. City Manager. **Municipal Examples.** Redwood City; also proposed in Palo Alto and Menlo Park Climate Action Plans.

Municipal Programs

Burlingame's Public Works staff members are to be commended for the work they have already completed in energy efficiency. The City participates in the Energy Watch Program and Pacific Gas and Electric's Demand Response Program and has completed the conversion of traffic signals to LEDs. The goal of the Climate Action Program is to expand energy efficiency and water conservation efforts for city operations that can provide the City with additional cost savings and reduce emissions.

15

Develop "City Green Team" composed of City staff to promote and expand sustainable programs within the City and community.

Benefits. City departments (Public Works, Parks & Recreation, Community Development, Finance and Library) can include sustainable goals as part of their department’s annual goals to assist the City in meeting emission reduction targets. The City Green Team (composed of Public Works and others) could also prioritize and implement energy and water efficiency upgrades for city facilities.⁵⁰ The City can achieve reduced operating costs and be a leader for public and private sector in energy savings and water efficiency. The City has already implemented effective energy saving projects and this program would expand on these efforts.

Components. City departments can meet to discuss implementation of best sustainable practices within the City and for the community. The City Green Team can be assisted by the Sustainable Coordinator to leverage the resources of several regional organizations to save staff time and resources. Providing resources to increase energy efficiency and water conservation by municipal operations can provide a good return on invested time and resources for the City. The California Energy Commission (CEC) is dedicating \$26 million for low-interest loans for municipal and public facilities for energy-efficiency measures. The CEC grants loans of up to \$3 million per project with no minimum loan amount. Loans can cover up to 100% of the project. The Sustainability Coordinator can assist the City Public Works staff or the “City Green Team” by providing research, writing grants and coordinating energy and water efficiency improvements. This individual can assist City staff in completing and expanding projects with ABAG and the CEC that include Energy Watch and energy and water efficiency improvements in city operations, such as boiler replacements. The CEC is dedicating \$26 million to low-interest loans for municipal and public facilities for energy-efficiency measures. The CEC grants up to \$3 million per project, with no minimum loan amount. Loans can cover up to 100% of a project. The Green Team could consider the use of an Energy Service Contractor that provides energy audits of existing operations to identify energy upgrades on a contract basis, with the stipulation that the money spent on upgrades will be repaid through resulting savings.

City Green Teams identify opportunities for energy and water efficiency and coordinate free energy audits for municipal facilities. Information collected during energy audits can help prioritize a plan for action to reduce energy usage and develop a road map for continuous improvement.

The California Energy Commission’s Energy Partnership Program provides technical assistance to cities to conduct energy audits and identify cost-effective energy-saving opportunities for local government facilities.

Annual Estimated GHG Reduction. 349 tons.

Cost Estimates. The cost of City staff time is estimated at \$12,000.

Potential Funding Source. California Energy Commission grant funds.

Responsible Personnel. Public Works, Sustainability Coordinator.

Municipal Examples. San Jose and Menlo Park.⁵¹

⁵⁰ City of Burlingame’s Waste Water Treatment Plant listed as #186 in Bay Area Air Quality Management District Report “2007 Bay Area Major (Top 200) GHG Emitting Facilities”

Summary of Phase 1: Recommendations for Implementation Prior to 2012

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs
1	Adopt Water Efficient Landscape Ordinance, as required by AB 1881.	272	\$4,000
2	Adopt a Residential Energy Conservation Policy (voluntary) to provide professional residential energy-efficiency and water-efficiency audits for residents at reduced cost. Promote the <i>Residential Energy and Water Efficiency Checklist</i> .	1,315	\$10,000
3	Research and Consider Solar and Energy Efficiency Financing Program for residents and commercial.	225	Costs TBD (ABAG has regional program development under way)
4	Adopt Green Building Ordinance for residential new construction/ major remodel projects.	1,051	\$12,000
5	Adopt Commercial Green Building Ordinance (after voluntary period of 12 to 18 months) to require major new commercial construction properties (greater than 10,000 square feet) and major remodels to meet minimum Leadership in Energy and Environmental Design (LEED) standards.	394	\$17,500
6	Develop Commercial Energy Efficiency Policy: provide energy efficiency technical assistance, Incentive/ Recognition Program. Encourage commercial businesses applying for new/ renewal of businesses licenses to complete PG&E energy efficiency audit. Expand Burlingame's participation in Bay Area Green Business Program.	1,016	\$4,500
7	Policy that requires Transportation Demand Management (TDM) strategies for new development of large commercial properties that encourage shuttle use, carpool, bicycle and transit. Provide TDM guidelines in permit packet for all new developments.	371	\$6,000
8	Adopt policy to provide prioritized parking for hybrid, rideshare or alternative-fuel cars in city streets, garages, lots. Modify policy as technology advances to increase accommodation of hybrids/ alternative-fuel vehicles.	164	Costs TBD by number of prioritized spaces.
9	Incorporate bicycle-friendly intersections in street design and modifications. Ensure new developments provide safe/convenient travel by walking, bicycling or public transportation.	87	Estimated costs TBD
10	Research methods to increase ridership and expand shuttle service and partner with local groups to increase public transportation alternatives.	TBD	Estimated costs TBD

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs
11	Upgrade residential/commercial recycling service to: a) "Single stream" recycling collection service for residential and commercial b) Weekly collection of single stream recycling for residential c) Weekly collection of organics/food collection for residential	3,164	No costs to City, funded by garbage ratepayers.
12	Adopt Commercial Recycling Ordinance that requires businesses to divert recyclables organics, cardboard, paper.	793	\$3,500
13	Encourage development of community group ("Burlingame Green") to expand promotion and education of climate action programs.	Dependent on campaigns selected	No costs to City.
14	Dedicate part-time (.50 FTE) Sustainability Coordinator.	Dependent on actions implemented	\$89,000
15	Develop "City Green Team" (Public Works staff, other) to prioritize and implement energy-efficiency/water-efficiency upgrades for city facilities.	349	\$12,000
	TOTAL	9,201 tons	\$158,500

Phase 2: GHG Reduction Programs for Implementation 2012 to 2020

The second phase of program recommendations is *Phase 2: GHG Reduction Programs for Implementation 2012 to 2020*. Several of the recommendations in Phase 2 include mandatory requirements and capitalize on the voluntary compliance period of Phase 1 programs. Recommendations for Phase 2 were selected because they can provide increased greenhouse gas reductions, have an increased number of requirements and continue to focus on Burlingame’s major emission sectors. The following is a summary of the recommended programs for implementation from 2012 to 2020.

Energy Efficiency and Green Building Recommendations

- 1 Identify and implement methods to expand solar and renewable-energy generation for residential and commercial. Streamline the permit process for solar and other renewable energy and provide a Renewable Energy Incentive Program.**

Benefits. The City Council recently took a significant step to promote solar photovoltaic installations by eliminating the solar permit fees for residents in December 2008. However, Burlingame continues to have one of the lowest numbers of kilowatts of installed solar capacity in the county. Burlingame has 149 kilowatts of installed solar capacity in comparison to Menlo Park with 687 kilowatts, Woodside with 552 kilowatts and San Carlos with 426 kilowatts.⁵² Solar energy provides significant benefits to the City, residents and businesses, and the new 2009

⁵² California Energy Commission and California Public Utilities Commission, December 31, 2008

federal tax credit of 30% in addition to state incentives have made the installation of solar more cost-effective than ever before. The benefits of solar include lower energy bills, insulation from increasing energy costs and an increased value of homes or businesses.⁵³ Solar energy is clean and nonpolluting and has no negative by-products. A typical solar installation on a three-bedroom home saves 82,000 pounds of greenhouse gas emissions over 15 years. The California Energy Commission provides rebates for the installation of renewable energy systems in homes and includes rebates for small wind turbine generation systems. The current rebate is \$4.50 per watt or 50% of the system cost, whichever is less. New technological advances in wind technology have made wind generation very cost-effective.

Components. A recent report⁵⁴ showed that many cities are streamlining their solar permit process, and some cities are providing solar permits over the counter without delays. Staff could research cities that have implemented streamlined permit processes, such as Saratoga or San Jose, and might consider implementing a more streamlined process. City staff could also provide a one-day solar training workshop to familiarize inspectors with new solar technology. Additionally, new advances in wind technology have made wind generation very cost-effective. Staff and/or contractors can identify and eliminate barriers to the installation of small wind turbines for residential and commercial, such as permitting complications, and ensure that zoning regulations allow wind turbines. A new Recognition Program could be implemented to promote solar and/or other renewable energy installations for residents and businesses that would be highlighted on the City’s Web site.

Go Solar California

The California Solar Initiative provides information on rebates, tax credits and incentives for solar energy systems in California. The CSI program provides additional assistance to local governments that cannot take advantage of the federal solar investment tax credit (ITC).

Annual Estimated GHG Reduction. 380 tons.

Cost Estimates. The costs are estimated at \$7,900 and include staff training for solar workshops for inspectors, staff time to evaluate and streamline the solar permit process, and time to modify regulations to allow and/or encourage renewable energy generation.

Potential Funding Source. Permit application fees.

Responsible Personnel. Community Development Department.

Municipal Examples. Saratoga, Mill Valley, San Jose, Walnut Creek.

2 Adopt Commercial Energy Conservation Policy (voluntary) to encourage inclusion of Energy and Water-Efficiency Checklist for commercial properties sold to comply with minimum energy-efficiency and water-conservation standards.

Benefits. Most businesses spend 30% of their operating budget on energy consumption. Business owners are in particular need of energy-efficiency education as they often are not aware of resources, rebates and incentives that are available. This program calls for a simple Energy and Water-Efficiency Checklist that provides cost-effective and easy methods to

⁵³ Appraisal Institute Survey

⁵⁴ http://lomapieta.sierraclub.org/global_warming/pv_permit_study.htm#Recommendations

increase energy and water efficiency. Burlingame’s commercial buildings account for 61% of the built environment’s greenhouse gas emissions, and this education program can reduce emissions cost effectively. This program is voluntary and would provide the necessary promotion and education period of an estimated 12 to 18 months prior to mandatory compliance.

Components. The program would involve staff or a Sustainability Coordinator using the model Energy and Water-Efficiency Checklist, placing it on the City’s Web site, and promoting and educating people about it, including commercial developers, owners and commercial real estate stakeholders. The Checklist includes energy-efficient lighting, low-flow plumbing fixtures, ensuring that HVAC thermostats function properly, that air duct leaks are repaired and water pipes are insulated to R-values in accordance with Title 24.

Annual Estimated GHG Reduction. 305 tons.

Cost Estimates. The estimated costs for this program are \$3,400 to cover costs of modifying the Energy and Water-Efficiency Checklist, placing it on the City’s Web site and developing policy.

Potential Funding Source. Permit fees or CEC grant funds.

Responsible Personnel. Sustainability Coordinator.

Municipal Examples. San Francisco, Berkeley.

3 Adopt a mandatory Commercial Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water-conservation standards in the Energy and Water-Efficiency Checklist for commercial properties sold or with “transfer of title.”

Benefits. Burlingame’s commercial buildings account for 61% of the built environment’s emissions. This program would focus on requiring commercial properties with transfer of title to meet minimum standards of energy and water efficiency using the Energy and Water-Efficiency Checklist. This mandatory program would follow the 12 to 18 months voluntary period of compliance.

Components. The program would involve staff or a Sustainability Coordinator using the model Commercial Energy Conservation Ordinance and modifying the ordinance to suit the City’s requirements. The coordinator would modify the Energy and Water-Efficiency Checklist accordingly. The ordinance would require that the seller (or buyer) of a commercial property to meet minimum energy and water-efficiency standards at the time of sale or transfer of title of a property. The City could choose to develop the ordinance, checklist, guidelines and certification process using the model program that other Bay Area cities have developed or develop its own ordinance. The ordinance could require that the property meet or exceed Title 24 energy requirements. The City could promote the Building Owners and



Managers Association (BOMA)⁵⁵ program that offers commercial building owners high-rise training on energy efficiency. Sample measures from the model “Energy and Water-Efficiency Checklist” include energy-efficient lighting, low-flow plumbing fixtures, ensuring that HVAC thermostats function properly, air duct leaks are repaired and water pipes are insulated to R-values in accordance with Title 24. The ordinance could limit the costs of the energy and water improvements to .5% or 1% of the sale price.

Annual Estimated GHG Reduction. 652 tons.

Cost Estimates. The estimated costs for this program are \$30,600 to cover the cost of modifying the model Commercial Energy Conservation Ordinance and Energy and Water-Efficiency Checklist, staff training, compliance procedure establishment and certification process, and additional outreach and education.

Potential Funding Source. Permit fees or CEC grant funds.

Responsible Personnel. Sustainability Coordinator and Community Development staff.

Municipal Examples. San Francisco, Berkeley.⁵⁶

4 Adopt mandatory Residential Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water-conservation standards in the Energy and Water-Efficiency Checklist for residential properties sold or with “transfer of title.”

Benefits. Most homes in Burlingame were built prior to enactment of state energy codes and could increase energy efficiency by an estimated 20% to 40%. Participating residents could save approximately \$800 to \$1,200 per year in energy and water savings.⁵⁷ Increasing energy efficiency is the fastest and most economical method to reduce emissions. This ordinance would follow a 12- to 18-month voluntary compliance period (Phase 1 program) that promoted the Residential Energy and Water-Efficiency Checklist. The ordinance can provide residents with more energy and water-efficient homes and can significantly reduce emissions in the City due to the large number of residences that were built prior to Title 24 (energy efficiency requirements). The City can use the model ordinance used by other Bay Area cities to reduce staff time and resources. The requirement of minimal upgrades can have a significant impact on energy consumption (e.g., converting to CFLs, weatherizing, insulating and caulking).



Components. Staff or the Sustainability Coordinator could choose to use the model ordinance that neighboring cities have adopted and

⁵⁵ www.boma.org/TrainingAndEducation/BEEP/

⁵⁶ Commercial Energy Compliance Ordinance (CECO)6176 N.S. Municipal code 19.72 April 1994
www.ci.berkeley.ca.us

⁵⁷ Estimates based on 2,000 square foot home and analysis of Bay Area homes that have completed home energy efficiency audits

modify it to suit the City's needs. The ordinance would require that residential properties that are sold or have transferred title meet minimum energy and water conservation requirements using the Residential Energy and Water-Efficiency Checklist. The City could use the model ordinance, Checklist, resources, certification process and guidelines that have been developed by other Bay Area cities to reduce staff time and resources. The ordinance could require that the property meet or exceed Title 24 energy requirements. The City could require that the ordinance limit the costs of the energy and water improvements to .5% or 1% of the sale price. The Checklist could include these requirements:

- ✓ Install minimum R-30 or higher ceiling insulation
- ✓ Install minimum R-12 or higher water heater insulation
- ✓ Install toilets with a maximum of 1.6 gallons per flush, sink aerators with a maximum 2.2 gallons per minute and showerheads with 2.5 gallons per minute
- ✓ Install weather stripping on all exterior doors
- ✓ Install damper or door/closure on fireplaces
- ✓ Install CFLs, LEDs or other high-efficiency lighting in a minimum of 75% of fixtures

Annual Estimated GHG Reduction. 1,879 tons.

Cost Estimates. The program would involve costs for staff and/or a Sustainability Coordinator to modify the ordinance and Energy and Water Efficiency Checklist, resources and guidelines, and certification process used by other Bay Area cities. The cost is estimated at \$38,100.

Potential Funding Source. Permit fees, CEC grant funds.

Responsible Personnel. Sustainability Coordinator and Community Development Department staff.

Municipal Examples. San Francisco, Berkeley.

Transportation and Land Use Recommendations

The transportation sector is the largest contributor to Burlingame's emissions (60%). Most of the emissions (70%) are from vehicles traveling on Highway 101, Highway 280 and Highway 82 (El Camino Real), and the remainder (30%) is from travel on Burlingame roads. Achieving a 15% reduction from the 2005 baseline levels involves policy and program implementation outside of the control of Burlingame decision makers. However, approximately 50% of driving trips are less than five miles, and Burlingame can reduce emissions by promoting alternatives other than single-occupancy vehicles, such alternative-fuel vehicles, expanded public transportation, and safe and convenient bicycling and walking routes. Land use is closely linked to transportation because it is the orientation of destinations that requires us to travel. For this reason, land use and transportation are included in the same group of recommendations. Transportation and land use measures that reduce greenhouse gas emissions also provide a higher quality of life, improved safety and better health for the Burlingame community.



The City has already completed several significant steps in transportation and land use decisions that reduce greenhouse gas emissions. It has adopted a Bicycle Transportation Plan, installed bicycle route signs and bicycle racks, provides shuttle service and promotes public transportation. The City also has adopted the North Burlingame/Rollins Road Specific Plan, and which encourages mixed-use and high-density residential development within one-half mile of BART/Caltrain intermodal station. The City Council will consider adoption of a Downtown Specific Plan with similar incentives during 2009.

5 Research methods to expand and enhance shuttles and public transportation services to increase shuttle ridership and public transportation alternatives.

Benefits. Providing residents with convenient alternatives to single-occupancy vehicles can further reduce Burlingame’s greenhouse gas emissions resulting from travel on Burlingame roads. Expanding shuttle service and ridership and other forms of public transportation can also improve the quality of life for residents, reduce pollution, provide a higher level of safety in streets, improve health from increased exercise and reduce congestion. The City has been commended for its shuttle services and public transportation services. Residents and visitors benefit from three shuttles that connect BART, Caltrain and major employment and shopping areas.



Components. The staff would continue to work with transit and regional organizations and seek grant funds to expand shuttle services. The City could consider funding shuttle expansion by requesting funding from major commercial users. It might add bicycle racks to shuttles to expand ridership. Staff would continue to seek additional methods to promote and educate the public about transportation alternatives.

Annual Estimated GHG Reduction. 96 tons.

Cost Estimates. The cost of staff time for promotion and education and coordination with regional public transportation organizations is estimated at \$8,500.

Potential Funding Source. Grant funds, general funds and/or parking fees.

Responsible Personnel. Public Works.

Municipal Examples. Palo Alto, Menlo Park, San Jose, Sunnyvale, Mountain View.

6 Encourage development that is mixed use, infill and higher density.

Benefits. The North Burlingame/Rollins Road Specific Plan and soon-to-be-adopted Downtown Specific Plan are excellent examples of forward-thinking planning that encourages mixed-use and high-density residential development close to public transportation. These land use

decisions, known as “smart growth,” lead to decreased vehicle miles traveled and increased neighborhood vitality, better health and lower infrastructure costs.

Components. The city staff would write code revisions to encourage mixed use, infill and higher density requirements for new development. The staff has already incorporated these requirements in the North Burlingame/Rollins Road Specific Plan and the Burlingame Downtown Specific Plan. The City’s recently updated Housing Element encourages mixed-use, high-density development near transit as well.

Annual Estimated GHG Reduction. Greenhouse gas emissions cannot be determined at this time due to unknown number of development projects that will be built.

Cost Estimates. Costs would include staff time to encourage mixed use, infill and higher density requirements for new developments.

Potential Funding Source. Permit fee.

Responsible Personnel. Community Development Department.

Municipal Examples. San Mateo, San Carlos, Menlo Park, Sunnyvale, San Jose and most Bay area cities.

Waste Reduction and Recycling

Burlingame disposed of 29,779 tons of waste to landfill in 2008, and Burlingame’s community GHG inventory showed that approximately 4% of emissions were from solid waste. Though this percentage of emissions may seem like a small percentage, the actual emissions from waste decomposing at landfills are significantly more potent than carbon dioxide. As waste from landfills decomposes, methane gas is released, which is 21 times more potent than carbon dioxide (CO₂). Burlingame has direct control over solid waste, recycling and composting decisions and can take advantage of new recycling and composting programs becoming available to Burlingame residents and businesses. For this reason, the solid waste sector has strong potential to provide GHG emission reductions for Burlingame.

7 Evaluate the current Construction and Demolition (C&D) Ordinance and consider an increase to the current required diversion rate.

Benefits. The recent downturn in the economy has impacted Burlingame’s tax revenues, but there has been less impact on local construction project-related fees. The current Construction and Demolition (C&D) Ordinance requires that projects divert a minimum of 60% of waste generated from landfills. Increasing the diversion requirement can reduce waste to landfill and can be implemented with relatively minor modifications. A neighboring city is achieving a diversion rate of over 80% from construction projects; Burlingame could benefit from an increased diversion requirement. Burlingame disposed of 29,779 tons of waste to landfill in 2008, and Burlingame’s community GHG inventory showed that approximately 4% of emissions were from solid waste. An evaluation of Burlingame’s current Construction and Demolition Ordinance by the South Bayside Waste Management Authority in 2008 provided Burlingame

with specific recommendations. City staff could use this analysis, which has already been completed at no cost to Burlingame, and consider modifying the current ordinance.

Components. The City already has a recycling specialist that monitors and enforces the current ordinance. The recycling specialist could review the Construction and Demolition Ordinance Report completed by the South Bayside Waste Management Authority in 2008, meet with department heads to review ordinance modifications and recommend modifications to the City Council. The work would not increase the staff time of the recycling specialist since the monitoring and enforcement procedures are already in place.



Annual Estimated GHG Reduction. Greenhouse gas emission reductions can be determined once the City selects the new diversion rate for the Construction and Demolition (C&D) Ordinance.

Cost Estimates. The estimated cost of \$4,500 includes staff time to review the Burlingame report that was provided by the South Bayside Waste Management Authority and time to modify the ordinance and associated documents.

Potential Funding Source. Permit fees.

Responsible Personnel. Community Development Department.

Municipal Examples. Hillsborough, Sonoma, Rohnert Park.

8 Require recycling at major public events in Burlingame (of cardboard, paper, containers and food/organics).

Benefits. Small and large public events produce a significant amount of cardboard, aluminum cans, plastic bottles and food/organics. Requiring recycling at these public events diverts waste from landfills, reduces costs to the event holder and responds to the public's interest in recycling while away from home. Increased recycling provides a significant decrease in emissions because methane is released from waste decomposing at landfills and is significantly more potent than carbon dioxide. As waste from landfills decomposes, methane gas is released, which is 21 times more potent than carbon dioxide (CO₂). Also, a new law, AB 2176, now requires operators of large venues and events to develop a waste reduction plan and report the results to the agency. This requirement can be accomplished at no cost to the City since the recycling services are provided at no additional charge by the recycling and garbage hauler. Many Burlingame residents at the Climate Action Plan Community Workshop were very supportive of increasing recycling throughout the City.

Components. The City would require recycling and composting as a condition of approval for public events. It could consider requiring a specific percentage of waste to be recycled at the public events.

Estimated GHG Reduction. 377 tons.

Cost Estimates. The cost, estimated at \$2,500, includes time to train staff and additional staff time to inform and monitor this program.

Potential Funding Source. Permit fees.

Responsible Personnel. Sustainability Coordinator.

Municipal Examples. San Carlos, San Francisco, San Jose.

9 Adopt a Recycling Policy to achieve a citywide diversion rate of 75% measured diversion by 2015.

Benefits. Burlingame has direct control over solid waste, recycling and composting decisions and can take advantage of the new and expanded recycling and composting programs as they become available to Burlingame residents and businesses. The new recycling programs and policies in the Climate Action Plan can greatly reduce waste to landfill, save energy and air pollution and extend the life of the landfill that saves the City in long-term solid waste costs. The Climate Action Plan recycling recommendations include:

- a) “Single stream” recycling collection service for residential and commercial;
- b) Weekly collection of single stream recycling for residential;
- c) Weekly collection of organics/food collection for residential;
- d) Mandatory commercial recycling;
- e) Required recycling at major public events.

These programs in combination with the 75% Recycling Policy can provide the City with significant greenhouse gas emission reductions and save residents and businesses money.

Components. The Sustainability Coordinator and finance staff can consider the model 75% Recycling Policy adopted by other jurisdictions and determine a recommended percentage and target year. They could meet quarterly to determine additional methods that could be implemented to meet the 75% goal.



Annual Estimated GHG Reduction. Emission reductions cannot be determined at this time.

Cost Estimates. Staff time for policy development coordination with the recycling and solid waste provider is estimated to cost \$4,500.

Potential Funding Source. Garbage fees.

Responsible Personnel. Finance Director or finance staff and Sustainability Coordinator.

Municipal Examples. All Alameda County Cities (75% by 2010), Palo Alto (73% by 2011), San Jose (75% by 2013).

Municipal Programs

The City of Burlingame Public Works Department is to be commended for the work already completed in energy efficiency. The City participates in the Energy Watch Program and Pacific Gas and Electric's Demand Response Program and has completed the conversion of traffic signals to LEDs. The goal of the Climate Action Program is to expand these municipal energy-efficiency and water conservation efforts to provide the City additional cost savings.

10 Adopt a Civic Green Building Policy that requires "Leadership in Energy and Environmental Design" (LEED) a green building standard for new municipal construction and major remodels.

Benefits. Many cities are adopting Civic Green Building policies to reduce operating costs and be a leader for the public and private sector in green building. The California Energy Commission (CEC) is dedicating grant funds for municipal and public facilities for green building and energy-efficiency measures. Green buildings provide improved air quality, reduced solid waste and improved employee productivity, and they minimize strain on the local infrastructure. A recent State of California study showed that green buildings have a financial upside that exceeds the cost by a factor of 10 to one.⁵⁸

Components. Prior to mandatory requirements, Public Work staff can attend Leadership in Energy and Environmental Design (LEED) training. After sufficient training, staff can use the model Civic Green Building Policy used by neighboring jurisdictions and modify it to suit the City's needs. Staff would determine the specific level of LEED that would be required for new construction and major renovation projects of city facilities. There are four increasing levels of LEED certification: Certified, Silver, Gold and Platinum. The LEED "New Construction/Major Renovations v 2.2 Project Checklist" and associated guidelines would be used by City staff. LEED also provides additional resources to United States Green Building Council (USGBC) members. In addition to requiring a specific LEED level, City staff could choose to implement requirements such as shading for all City-owned parking lots, maximizing use of permeable surfaces where feasible and expanding projects using recycled water. The Sustainability Coordinator can assist the Public Works staff with this project.



Annual Estimated GHG Reduction. 94 tons.

Cost Estimates. The estimated cost of \$17,000 includes staff time for LEED Accredited Professional (LEED AP) training, staff time for policy development and policy coordination, LEED guidelines and compliance certification.

Potential Funding Source. California Energy Commission grant funds.

Responsible Personnel. Public Works, Sustainability Coordinator.

⁵⁸ The Costs and Financial Benefits of Green Buildings, www.usgbc.org/Docs/News/News477.pdf

Municipal Examples. Hillsborough, San Jose, Menlo Park.⁵⁹

11 Consider establishing a Sustainable Commission.

Benefits. The City of Burlingame will need the participation and engagement from all sectors of the community to achieve the AB 32 GHG reduction targets. A City Commission dedicated to sustainable issues could provide the needed focus by the City and the community to meet Burlingame’s greenhouse gas reduction target.

Components. A Commission could be formed to provide leadership and coordination of City sustainability efforts.

Annual Estimated GHG Reduction. The greenhouse gas emission reductions cannot be determined at this time.

Cost Estimates. The greenhouse gas emission reductions cannot be determined.

Potential Funding Source. City funds.

Responsible Personnel. Community Development Department.

Municipal Examples. Santa Monica, Berkeley.

12 Complete a feasibility study on the installation of solar or other renewable energy projects at select City facilities (such as the wastewater treatment plant) and install where feasible.

Benefits. The new 2009 federal tax credit of 30% in addition to state incentives have made the installation of solar more cost-effective than ever before. With solar, the City will reduce its operating costs and be insulated from future energy rate increases. The City can lead by example by installing solar that generates clean and nonpolluting energy and has no negative by-products. The California Energy Commission provides rebates for the installation of renewable energy systems and wind turbine generation systems. New technological advances in wind technology have made wind generation very cost-effective.

South San Francisco and San Bruno are considering wind and solar installations at the Water Quality Control Plant in South San Francisco to save \$4 million over 20 years. City engineers in these cities created a multi-phased plan to use solar and wind and developed funding sources that include grant funds and increasing city fees.

Components. City staff or contracted staff can develop a feasibility study for renewable energy applications for City facilities and research funding and grant opportunities. Staff would complete the feasibility study and evaluate potential installation sites. The California Energy Commission is dedicating \$26 million for low-interest municipal/public facilities for renewable

and energy-efficiency measures, and City staff can expand research into these grant fund opportunities.

Annual Estimated GHG Reduction. Depends on buildings selected to generate clean energy.

Cost Estimates. The cost for the feasibility study is estimated at \$10,000. Additional costs include staff time to evaluate installation sites.

Potential Funding Source. California Energy Commission grant funds.

Responsible Personnel. Public Works.

Municipal Examples. San Carlos, San Jose, San Francisco.

13 Adopt a Sustainable Purchasing Policy with two mandatory requirements: City fleet purchases must require hybrid or alternative-fuel vehicles (with some exceptions), and paper products purchased must have a minimum of 30% recycled content.



Benefits. The City adopted an Environmental Purchasing Policy in March 2009 that encourages the purchase of sustainable products that minimize environmental impacts. As part of the new policy education, City staff members were provided with resources to learn where to purchase more green or sustainable products. They were given information on products with recycled content, those that have no or low toxicity (found in janitorial products) and products that conserve energy and water. Buying

sustainable products saves energy and conserves water, thereby reducing the City’s contributions to greenhouse gas emissions. This new policy recommendation follows the voluntary policy and requires two specific actions:

- ✧ City fleet purchases must require hybrid or alternative-fuel vehicles (with some exceptions).
- ✧ Paper products purchased must have a minimum of 30% recycled content.

Components. City staff or consultants can modify the current policy to include mandatory requirements and provide additional promotion and resources to City staff. City staff could also encourage expanding sustainable purchases into areas such as carpets or landscape materials.

The Green Vehicle Guide found at www.epa.gov/greenvehicles is for cities considering the purchase of new vehicles. The guide is updated annually, and City staff receives fuel economy and emissions data for all new vehicles. The www.coolfleets.com Web site provides a cost/value analysis to assist in determining the "best value" for vehicle selection decisions.

Annual Estimated GHG Reduction. Greenhouse gas emissions cannot be determined at this time.

Cost Estimates. The estimated cost of \$2,500 includes staff time to modify the current policy and provide additional education materials for City staff.

Potential Funding Source. City funds.

Responsible Personnel. Public Works.

Municipal Examples. San Carlos, San Jose, San Francisco.

14 Dedicate a part-time (0.50 FTE) Sustainability Coordinator to implement and coordinate climate action programs.

Benefits. The Sustainability Coordinator provides an essential role in implementing climate action programs. This individual coordinates many City programs that staff members do not have the resources to complete. The Sustainability Coordinator functions as the central person to coordinate Climate Action Plan programs with City staff, community groups and commercial organizations and provides the City Council and community with progress reports on program implementation and progress toward GHG emission reductions. This person can leverage regional programs and help locate grant funding to benefit Burlingame.

Components. It is envisioned that the position of the Sustainability Coordinator would be funded by grant funds. The Sustainability Coordinator would develop the Phase 1 and Phase 2 programs of the Climate Action Plan as approved by the Council in coordination with City staff. This individual can also research additional grant opportunities and leverage regional resources for Burlingame. The Coordinator could provide program implementation that could provide the City, residents and the commercial sector energy and water cost savings. The Coordinator would monitor results and provide progress reports for the City Council and the community.

Annual Estimated GHG Reduction. Depends on projects selected.

Cost Estimates. The estimated cost for this position is \$89,000.

Potential Funding Source. Grant funds.

Responsible Personnel. City Manager.

Municipal Examples. Redwood City; proposed in Palo Alto and Menlo Park Climate Action Plans.

Summary of Phase 2: Recommendations for Implementation 2012 to 2020

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs
1	Identify and implement methods to expand solar and renewable energy generation for residential and commercial. Streamline the permit process for solar and other renewable energy and provide a Renewable Energy Incentive Program.	380	\$7,900
2	Adopt Commercial Energy Conservation Policy (voluntary) to encourage inclusion of Energy and Water Efficiency Checklist for commercial properties sold to comply with minimum energy-efficiency and water conservation requirements.	305	\$3,400
3	Adopt a mandatory Commercial Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water conservation standards in the Energy and Water Efficiency Checklist for commercial properties sold or when title is transferred.	652	\$30,600
4	Adopt mandatory Residential Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water conservation standards in the Energy and Water Efficiency Checklist for residential properties sold or when title is transferred.	1,879	\$38,100
5	Research methods to expand and enhance shuttles and public transportation services to increase shuttle ridership and public transportation alternatives.	96	\$8,500
6	Encourage development that is mixed use, infill and higher density.	TBD	TBD
7	Evaluate the current Construction and Demolition (C&D) Ordinance and consider an increase to the current required diversion rate.	TBD	\$4,500
8	Require recycling at major public events in Burlingame (of cardboard, paper, containers and food/organics).	377	\$2,500
9	Adopt a policy to achieve city-wide diversion rate of 75% measured diversion by 2015.	TBD	\$4,500
10	Adopt a Civic Green Building Policy that requires a "Leadership in Energy and Environmental Design" (LEED) green building standard for new municipal construction and major remodels	94	\$17,000
11	Consider establishing a Sustainable Commission.	Cannot be quantified at this time	Cannot be quantified at this time
12	Complete a feasibility study to install solar or other renewable energy at select City facilities (such as the wastewater treatment plant) and install where feasible.	Cannot be quantified at this time	\$10,000

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs
13	Adopt Sustainable Purchasing Policy with two mandatory requirements: City fleet purchases must require hybrid or alternative-fuel vehicles (with some exceptions) and paper products purchased must have a minimum of 30% recycled content.	Cannot be quantified at this time	\$2,500
14	Dedicate Sustainability Coordinator	Cannot be quantified at this time	\$89,000
	TOTAL	3,783 tons	\$218,500

Table 7 shows Burlingame’s greenhouse gas emission reductions resulting from the implementation of the programs recommended in Phases 1 and 2. In Phase 1, Burlingame would realize greenhouse gas emission reductions that total an estimated 9,201 tons per year, which is in the mid-range of necessary greenhouse gas reductions for Burlingame to meet the year 2020 target. The greenhouse gas emission reductions from the program recommendations in Phase 2 provide an additional 3,783 tons. The combination of Phase 1 and Phase 2 programs reduce greenhouse gas emissions by an estimated 12,984 tons per year, which is in the necessary range of emissions reductions needed to meet the AB 32 greenhouse gas reduction target for the year 2020.

Table 7: Burlingame's GHG Reduction Target Analysis Under Phase 1 and Phase 2 Recommendations

	Metric Tons CO ₂ e
2020 “Business-as-Usual” Emissions	408,780
2020 Reduction Target (15% below 2005 levels)	286,402
Total Emissions Reductions Necessary to Meet Target	(122,378)
Required Annual Emissions Reductions (2010-2020)	(12,238)
Annual Reductions from Phase 1 Recommendations	(9,201)
Annual Reductions from Phase 2 Recommendations	(3,783)
Total Phase 1 and Phase 2 Annual Reductions	(12,984)

V. Implementation, Funding and Next Steps

Burlingame's Climate Action Plan should be considered as a starting point to reduce greenhouse gas emissions to 15% below 2005 levels by 2020 and to 80% below 2005 levels by 2050. The plan establishes a framework of action that the City and community can implement and provides a statement of intent for priorities and policies, but the plan is not binding on the City Council or the community. Once the Council adopts the Climate Action Plan, the individual recommendations within the plan will be developed by staff and/or consultants and presented for the Council's consideration before they are implemented.

The Climate Action Plan program recommendations focus on reducing greenhouse gas emissions cost-effectively in the near term. In developing these recommendations, the Task Force was keenly aware of the challenges facing the City due to the economic downturn and consequent budget cuts and staff reductions that Burlingame and other cities are currently experiencing. For this reason, a phased approach is used for implementation. *Phase 1: High-Impact GHG Reduction Programs for Implementation Prior to 2012* identifies the "low-hanging fruit" that provides significant emission reductions for Burlingame with low initial costs in the near term. This phase also provides the essential education and promotion component and involves several voluntary compliance measures.

Phase 2: GHG Reduction Programs for Implementation 2012 to 2020 has been developed for implementation beyond 2012. Several of the Phase 2 recommendations involve mandatory requirements and capitalize on the voluntary compliance period of Phase 1 programs. Recommendations for Phase 2 were selected because they can provide increased greenhouse gas reductions, have an increased number of mandatory requirements and continue to focus on Burlingame's major emission sectors.

Implementation Funding

One of the major barriers to implementing climate action programs is the lack of available funds and staff resources. Currently, there are multiple grant and loan programs through federal, state and regional programs that can fund emission reduction programs. The City can benefit from the timely adoption of the Climate Action Plan by using the Plan as a component of a grant application.

The City could use a combination of grant funds, a portion of current staff resources and leverage regional resources to begin reducing emissions in the near term. Using the example of the "Energy Efficiency and Conservation" grant, applications are estimated to be due in fall 2009 and once jurisdictions are awarded the grant funds, jurisdictions must complete all programs and payment of programs by April 30, 2012. This timeline coordinates well with the Climate Action Plan's Phase 1 recommendations which are recommended for implementation prior to 2012.

The commitment from City Council, City staff and the community will be essential to reduce GHG emissions and meet reduction targets. The Task Force recommends that the City continue to explore methods to incorporate climate protection programs into existing workloads and systems. The development of the "City Green Team" (composed of City department head staff) can begin to expand sustainable programs within the City and assist in the promotion and education of sustainable programs for the community. Additionally, the inclusion of annual

sustainable goals for city departments will assist with monitoring the progression of emission reductions. It is recommended that the promotion and education of sustainable programs be enhanced at city departments where feasible. It is also recommended that the ‘Sustainable Burlingame’ website be expanded to include more comprehensive sustainable information, resources and tool for residents, commercial, schools and community groups.

The City can realize cost savings from the implementation of energy and water efficiency programs at city facilities. The City could continue to implement these cost saving programs and potentially use these funds to fund additional sustainable projects in the City.

An essential element of the Climate Action Plan is the dedication of a contracted part-time staff person or Sustainability Coordinator who can provide the critical implementation of programs, coordinate them with City staff, monitor greenhouse gas reduction progress, and promote them and educate the community about them. The funding of the Sustainability Coordinator could be funding through a grant program.

The following table provides a summary of the Phase 1 recommendations that could be funded by the example of the Energy Efficiency and Conservation grant program.

Phase 1: Recommendations for Implementation Prior to 2012 and Grant Funding Potential

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs	CEC Grant Funds
1	Adopt Water-Efficient Landscape Ordinance as required by AB 1881.	272	\$4,000	✓
2	Adopt a Residential Energy Conservation Policy (voluntary) to provide professional residential energy efficiency and water efficiency audits for residents at reduced cost. Promote the Residential Energy and Water-Efficiency Checklist.	1,315	\$10,000	✓
3	Research and Consider Solar and Energy-Efficiency Financing Program for residents and commercial.	225	Costs TBD (ABAG has regional program development underway).	✓
4	Adopt Green Building Ordinance for residential new construction/major remodel projects.	1,051	\$12,000	✓
5	Adopt Commercial Green Building Ordinance (after voluntary period of 12 to 18 months) to require major new commercial construction properties (greater than 10,000 square feet) and major remodels to meet a Leadership in Energy and Environmental Design (LEED) standards.	394	\$17,500	✓

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs	CEC Grant Funds
6	Develop Commercial Energy Efficiency Policy. Provide energy-efficiency technical assistance and Incentive/Recognition Program. Encourage commercial businesses applying for new or renewal of businesses licenses to complete PG&E energy-efficiency audit. Expand Burlingame’s participation in Bay Area Green Business Program.	1,016	\$4,500	✓
7	Establish policy that requires Transportation Demand Management (TDM) strategies for new development of large commercial properties that encourage shuttle use, carpool, bicycle and transit. Provide TDM guidelines in permit packet for all new developments.	371	\$6,000	X
8	Adopt policy to provide prioritized parking for hybrid, rideshare or alternative-fuel cars in city streets, garages, lots. Modify policy as technology advances to increase accommodation of hybrids/alternative-fuel vehicles.	164	Costs TBD by number of prioritized spaces.	X
9	Incorporate bicycle-friendly intersections in street design and modifications. Ensure new developments provide safe/convenient travel by walking, bicycling or public transportation.	87	Estimated costs TBD	X
10	Research methods to increase ridership and expand shuttle service and partner with local groups to increase public transportation alternatives..	TBD	Estimated costs TBD	X
11	Upgrade residential/commercial recycling service to: a) “Single stream” recycling collection service for residential and commercial b) Weekly collection of single stream recycling for residential c) Weekly collection of organics/food collection for residential	3,164	No costs to City, funded by garbage ratepayers.	✓
12	Adopt Commercial Recycling Ordinance that requires businesses to divert recyclables, organics, cardboard, paper.	793	\$3,500	✓
13	Encourage development of community group (“Burlingame Green”) to expand promotion and education of climate action programs.	Dependent on campaigns selected	No costs to City	✓
14	Dedicate part-time (.50) FTE Sustainability Coordinator.	Dependent on actions implemented	\$89,000	✓
15	Develop “City Green Team” (City departments to implement sustainable practices).	349	\$12,000	✓
	TOTAL	9,201 tons	\$158,500	

The following table provides a summary of the Phase 2 recommendations that could also be funded by the example of the Energy Efficiency and Conservation grant program. These programs are recommended for implementation 2012 to 2020 but the City could choose to select one or several of the recommendations to be funded by the Energy Efficiency and Conservation Grant.

Phase 2: Recommendations for Implementation 2012 to 2020 and Grant Funding Potential

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs	CEC Grant Funds
1	Identify and implement methods to expand solar and renewable energy generation for residential and commercial. Streamline the permit process for solar and other renewable energy and provide a Renewable Energy Incentive Program.	380	\$7,900	✓
2	Adopt Commercial Energy Conservation Policy (voluntary) to encourage inclusion of "Energy and Water Efficiency Checklist" for commercial properties sold to comply with minimum energy efficiency and water conservation.	305	\$3,400	✓
3	Adopt a mandatory Commercial Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy efficiency and water conservation standards in the 'Energy and Water Efficiency Checklist' for commercial properties sold or with "transfer of title".	652	\$30,600	✓
4	Adopt mandatory Residential Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy efficiency and water conservation standards in the <i>Energy and Water Efficiency Checklist</i> for residential properties sold or with "transfer of title".	1,879	\$38,100	✓
5	Research methods to expand and enhance shuttle, public transportation services to increase shuttle ridership and public transportation alternatives	96	\$8,500	X
6	Encourage development that is mixed use, infill and higher density	TBD	TBD	X
7	Evaluate the current Construction and Demolition (C&D) Ordinance and consider an increase to the current required diversion rate.	TBD	\$4,500	✓
8	Require recycling at major public events in Burlingame (of cardboard, paper, containers and food/organics).	377	\$2,500	✓
9	Adopt a policy to achieve city-wide diversion rate of 75% measured diversion by 2015	TBD	\$4,500	✓

	GHG Reduction Recommendation	GHG Reduction Tons / Year	Estimated Initial Costs	CEC Grant Funds
10	Adopt a Civic Green Building Policy that requires “Leadership in Energy and Environmental Design” (LEED) green building standard for new municipal construction and major remodels	94	\$17,000	✓
11	Consider establishing a Sustainable Commission	Cannot be quantified at this time	Cannot be quantified at this time	X
12	Complete a feasibility study to install solar or other renewable energy at select City Facilities (e.g., waste water treatment plant) and install where feasible.	Cannot be quantified at this time	\$10,000	✓
13	Adopt Sustainable Purchasing Policy w/ two mandatory requirements: City fleet purchases must require hybrid or alternative fueled vehicles (with some exceptions), and, require a minimum 30% recycled content materials for paper products purchases	Cannot be quantified at this time	\$2,500	✓
14	Dedicate Sustainability Coordinator	Cannot be quantified at this time	\$89,000	✓
	TOTAL	3,783 tons	\$218,500	

Next Steps

With this timeline of grant funding in mind, the following are the recommended next steps:

1. City Council adopts the Burlingame Climate Action Plan.
2. Staff or consultants could write grant applications for funding (e.g. the “Energy Efficiency and Conservation” grant application) and uses the Climate Action Plan Phase 1 as a component of the grant applications. The California Energy Commission stated that the grant applications would likely be due in late summer or fall 2009.
3. Staff and or a Sustainability Coordinator could be secured to coordinate program implementation process using the Climate Action Plan as the guiding framework.
4. Staff and or the Sustainability Coordinator should ensure that the City Council and City Manager receive timely Climate Action Plan progress reports. These progress reports can be posted on the City Web site to educate the community on Burlingame’s progress. Staff and or the Sustainability Coordinator should complete the necessary grant reports due in 2012 as well as seek additional grant opportunities.

It is recommended that the City complete a Community Greenhouse Gas Inventory in 2010 and every two years thereafter to monitor progress toward the 2020 emissions reduction target. Interim GHG reduction targets are recommended for use as internal mechanisms to track progress toward the 2020 goal.

The interim targets are as follows:

Table 8: Interim GHG Reduction Targets

	Percentage Emission Reduction from Base Year	Target Emissions (Metric Tons CO ₂ e)
2005 Base Year	- - -	336,944
2012 Target Year	7%	313,358
2015 Target Year	12%	296,511
2020 Target Year	15%	286,402

In 2012 the City should assess the ability to fund the Sustainability Coordinator using grant funds or as a city-funded position. The City should also evaluate the success of Phase 1 programs, consider expanding or modifying Phase 1 programs, and discuss implementation of Phase 2 programs. Once program implementation begins, an essential component is monitoring the effectiveness of the implemented programs. It is recommended that program effectiveness be reassessed every two to three years.

It is also recommended that the approved Climate Action Plan program and policies are included Burlingame’s General Plan updates. The approved Climate Action Plan policies should be made consistent in the associated elements of the General Plan.

It has become clear from recent reports from the International Panel on Climate Change (IPCC) that climate change is occurring now and that the current goal is to first slow and then reverse emissions to avert the more catastrophic threats in the future. It is recommended that the City of Burlingame prepare itself for the increasing challenges that climate change will inevitably bring that include shrinking water supplies, rising temperatures, rising Bay levels and increased public health issues for the elderly and young. It is recommended that the City participate in regional efforts for climate change adaptation. Additionally, the City should include climate change mitigation and adaptation measures and policies in the General Plan updates.

Involvement and support from the Burlingame Council, staff and community will be essential for the success of the GHG reduction programs. The City cannot complete all the work that will be needed to educate, promote and implement the climate protection programs. For this reason, it is recommended that the City encourage a volunteer community group similar to the sustainable community organizations that have begun in Menlo Park, Redwood City and Los Altos Hills. These community groups can complete education and promotion campaigns using the successful models and resources developed by these communities at no cost to the City.

It is recommended that the City’s Web site be updated periodically to show the progress of the Climate Action Plan program implementation and progress toward the 2020 target. Burlingame’s Climate Action Plan programs should be reviewed and revised every two or three years as new technologies emerge and additional opportunities arise and as new regional, state and federal policies evolve.

VI. Adaptation to Climate Change

As discussed in the introduction, the impacts of climate change in Burlingame include sea level rise, increased risk of wildfires, and drought due to reduced snow pack in the Sierra Nevada Mountains, an increase in unpredictable weather, negative impacts on wildlife and a deterioration of public health. Between 1900 and 2000, the San Francisco Bay rose seven inches. The California Climate Action Team found that the San Francisco Bay could rise an additional five inches to three feet by the end of this century.

It is recommended that the City of Burlingame prepare itself internally for climate change resiliency. Climate change adaptation has become a priority at the state level through Executive Order S-13-08, signed by the Governor in November 2008. The mandate initiates the development of a California Climate Adaptation Strategy (CAS) to be completed in 2009. The CAS will identify climate change vulnerabilities resulting from sea level rise, increased temperatures, shifting precipitation and extreme weather events, and will recommend methods and policies to adapt to these changes. The Order also directs state agencies to analyze existing and planned infrastructure projects that could be at risk to sea level rise.

Local governments are on the front line, both in dealing with the impacts of climate change and in reducing emissions. The Ahwahnee Principles for Climate Principles (www.lgc.org) build on previous principles authored by the Local Government Commission and provide specific guidelines for local governments to follow in addressing this urgent and often overwhelming challenge.

Source: Local Government Commission

Climate change adaptation strategies may be necessary as the climate changes and sea levels rise. Adaptation measures are important in order to allow the Burlingame community to proactively prepare for potential effects of climate change to come. It has become clear that regardless of the efforts to reduce greenhouse gas emissions, not all the effects of climate change can be prevented or reversed. The challenge will be to reduce the effects to the lowest level possible and enable Burlingame to remain healthy and prosperous.

To address these impacts, the following adaptation strategies are recommended:

1. Prepare for sea level rise by cooperating with the San Francisco Bay Conservation and Development Commission (BCDC) and other regional agencies preparing for sea level rise, coastal erosion and peak storm events. Incorporate climate change threats in the City's existing Emergency Incident Plan and Emergency Operations Center (EOC) training for City staff.
2. Evaluate the potential climate change impacts of items being considered by the Planning Commission and City Council. Identify and reassess regional climate change vulnerabilities on a regular basis and work with neighboring cities, counties and regional agencies to establish more uniform approaches to addressing climate change.

Climate change is a serious threat to the Burlingame community with potential economic and social ramifications that could result in fiscal impacts to the City. Consistency with state goals regarding emission reductions could potentially open sources of funding that the City could use to expand or maintain climate programs.

Appendix A: U.S. Mayors Climate Protection Agreement

RESOLUTION NO. 63-2007

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BURLINGAME ENDORING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

RESOLVED, by the City Council of the City of Burlingame:

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading US companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the US to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments throughout the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

- A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
- B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and
- C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:
 - 1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
 - 2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
 - 3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
 - 4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;

5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO₂; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED AS FOLLOWS:

1. That the City Council of the City of Burlingame endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges councils and mayors from around the nation to join this effort.

2. The City of Burlingame will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

3. The City of Burlingame will work as both an organization and a community to seek ways to contribute to this progress.



MAYOR

I, MARY ELLEN KEARNEY, Deputy City Clerk of the City of Burlingame, do hereby certify that the foregoing resolution was introduced at a regular meeting of the City Council held on the _____

20th day of **August**, 2007, and was adopted thereafter by the following vote:

AYES: COUNCILMEMBERS: **BAYLOCK, COHEN, KEIGHRAN, NAGEL, O'MAHONY**
NOES: COUNCILMEMBERS: **NONE**
ABSENT: COUNCILMEMBERS: **NONE**


DEPUTY CITY CLERK

Appendix B: GHG Inventory Technical Analysis

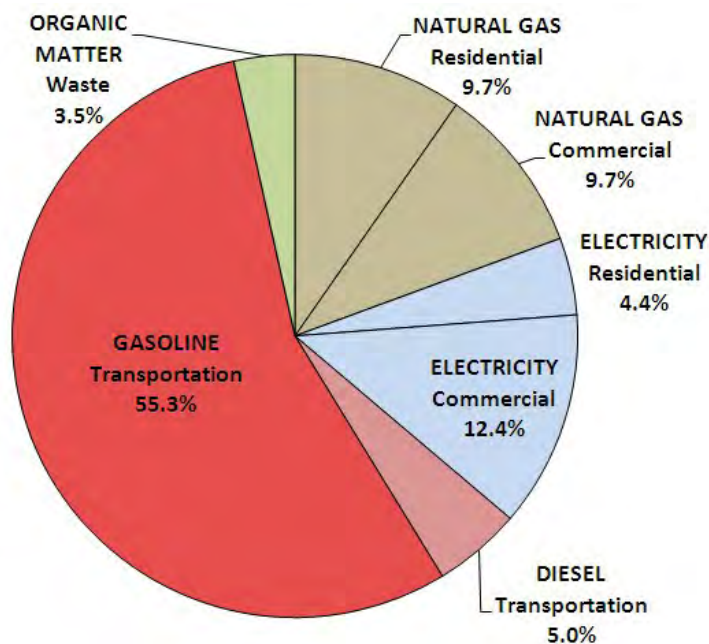
Appendix B: GHG Inventory Technical Analysis provides additional analyses of the sources of Burlingame’s greenhouse gas emissions. This analysis was used in developing the recommended emissions reduction measures.

Emissions Source Analysis

Energy Sources

As illustrated in Figure 10, the burning of gasoline and diesel resulted in 60.3% of emission followed by natural gas and electricity, which accounted for 19.4% and 16.8% of emissions, respectively. Methane and CO₂ generated from organic matter landfilled in the base year constituted 3.5% of emissions.

Figure 10: 2005 GHG Emissions by Fuel Type



Transportation Sector

As with other San Francisco Bay Area cities, travel by motorized vehicle measured by vehicle miles traveled (VMT) are a significant percentage of emissions. A total of 60.3% of total emissions were a result of transportation within Burlingame’s borders. Roughly 30% of the emissions in the transportation sector came from travel on city roads. Because Burlingame has two heavily traveled State Highways (101 and 82) that fall within its borders, more than 70 percent of the emissions in the transportation sector are a result of highway travel. Not included

in the data for this sector were emissions related air and rail travel and fuels other than gasoline or diesel.

Table 9: GHG Emissions by Road Type

Sub-sector	Metric Tonnes CO ₂ e	Percent of Total CO ₂ e
City Vehicle Miles Traveled ⁶⁰	60,935	18.1%
Highway Vehicle Miles Traveled ⁶¹	142,279	42.2%
Total	203,213	60.3%

Residential and Commercial Sectors

The following table indicates the emissions associated with fuel and electricity used in buildings in the residential and commercial sectors. Emissions from all commercial buildings account for approximately 61% of emissions from the City's *built* environment. The commercial sector includes the fuel and electricity use in non-residential buildings, including government and institutional activity (e.g., schools and hospitals) as well as commercial and personal services (retail, finance, business services, etc.) Normally, commercial manufacturing and industrial production are treated as separate emission sources but has been combined for the purposes of this report, given the aggregating of data by PG&E and the relatively small amount of industrial activity in Burlingame. "Direct access" emissions refers to emissions associated with the use of electricity purchased directly from competitive energy suppliers.

Emissions factors for PG&E electricity, direct access electricity and natural gas were provided by the California Climate Action Registry and PG&E, though exact emission factors were not available for electricity purchased through direct access. The grid-average emission factor for California and Nevada was used to estimate emissions from direct access customers. Not included in the inventory were fuel sources not delivered by PG&E (e.g., wood, charcoal, propane, kerosene). Similarly, PFCs, HFCs and SF₆ were not included as they are prohibitively difficult to obtain for the community as a whole.

⁶⁰ Data sources included 2005 Vehicle Miles Traveled (VMT) data by the City and County from the Metropolitan Transportation Commission, based on the Highway Performance Monitoring System (HPMS).

⁶¹ Sections of state highways were visually examined on a map to identify the jurisdictions they pass through. A portion of the total daily vehicle miles traveled for each road segment was allocated to Burlingame and the other cities and counties through which the section traverses.

Table 10: GHG Emissions from the Built Environment

Sub-sector	Metric Tonnes CO ₂ e	Percent of Total CO ₂ e
Residential	47,523	14.1%
Commercial	64,007	19%
Direct Access ⁶²	6,913	2.1%
City Government	1,558	0.5%
County Government	484	0.1%
District	1,504	0.4%
Total	121,989	36.2%

Waste Sector

The emissions from waste generated by Burlingame residents and businesses that was landfilled in other locations in 2005 emitted 11,742 metric tons of CO₂e, accounting for 3.5% of the City's total emissions. Waste characterization studies by the California Integrated Waste Management Board were used to allocate shares of waste types to the total organic waste tonnage in Burlingame's waste stream. Emissions factors were applied to the waste types to determine total emissions from the sector.

The analyzed data did not include potentially significant emissions from the closed Burlingame landfill area, the data for which is currently being acquired and will be included in the government greenhouse gas inventory.

Per Capita Emissions

Per capita emissions can be a useful metric for measuring progress in reducing greenhouse gases and for comparing one community's emissions with neighboring cities and against regional and national averages. Currently it is difficult to make meaningful comparisons between cities because of variation in the scope of inventories conducted, but a universal reporting standard will be developed and adopted through a process being driven by ICLEI, making this possible. Dividing the total greenhouse gas emissions by Burlingame's estimated (U.S. Census Bureau) 2005 population yields a result of 11.9 metric tons CO₂e per capita per year. It is important to understand that this number is not the same as the carbon footprint of the average individual living in Burlingame, which takes into consideration, for example, lifecycle emissions from products (e.g., food) and services consumed within Burlingame. Similarly, the per capita emissions number for Burlingame is not directly comparable to every per capita number produced by other emissions studies because of differences in emission inventory methods.

⁶²Estimations of electricity purchased through Direct Access contracts at the county level were based on data provided by the California Energy Commission.

Base Year

Providing for a meaningful and consistent comparison of emissions over time required setting a base year with which to compare current and future emissions. 1990 is the base year established and utilized by the United Nations Framework Convention on Climate Change, the Kyoto Protocol and AB 32. AB 32 sets the goal of reducing emissions to 1990 levels by 2020 and to 80% below 1990 levels by 2050. However, emissions data from 1990 is often prohibitively difficult or impossible to collect. Rather than using the unreliable method of “back-casting” to calculate 1990 emissions levels, calendar year 2005 was chosen as the base year for Burlingame’s inventory as it is reasonable to expect that accurate records of key emission sources exist for that year in sufficient detail to conduct an accurate inventory. Using 2005 as a base year is also consistent with the base years being used by other Bay Area cities in their greenhouse gas inventories. A base year several years in the past, rather than the most recent year does though enable accounting of emissions benefits of any recent sustainability actions.

Emissions Sources and Inventory Methodology

The community-wide analysis comprises emissions *resulting* from within the geographic boundaries of the community. These emissions come from residential, commercial and industrial as well as transportation and waste management sources (also referred to as sectors). The inventory methodology broadly categorizes these sources as either stationary or mobile sources. It also categorizes the sources according to “scope,” which generally reflects where the emissions are *generated*. These scopes are defined below.

- ✧ Scope 1 emission sources within the context of community-scale emissions analyses include all direct emissions generated within the community boundaries (e.g., vehicle emissions)
- ✧ Scope 2 emission sources within the context of community-scale emissions analyses include all emissions generated outside the community’s geographic boundaries but generated due to activity occurring inside the boundaries (e.g., emissions from power plants associated with electricity consumption within the City’s boundaries).

The inventory includes emissions from government activities to the extent that these emissions are contained in the larger community-wide data sets that were analyzed for the community inventory. These government emissions are rolled into the “commercial” sector. At the time of this writing, a separate, more detailed inventory of government operation emissions is being performed and will be reported on in a later version of the Climate Action Plan. As the government emissions will likely account for only 1-2% of total community emissions (excluding potential methane emissions from the closed Burlingame landfill), the current inventory will still provide a reasonable approximation of Burlingame’s total community emissions until the government inventory is completed by ICLEI-Local Governments for Sustainability.

Creating the inventory required the collection of data from a variety of entities. Community electricity and natural gas data was provided by Pacific Gas and Electric Company (PG&E). The Metropolitan Transportation Commission and Bay Area Air Quality Management District (BAAQMD) were sources of transportation data from which fuel usage was derived. Solid waste data was provided by the California Integrated Waste Management Board and Republic Services, Inc. (Allied Waste).

Efforts were made to include all possible emission sources in the community-scale inventories. However, emission sources that met the following criteria were generally excluded:

- ✧ ***Small and unimportant*** – “De minimis” sources that, when combined, totaled less than 5% of the total of the emissions from the community.
- ✧ ***Prohibitively difficult to track with accuracy*** – Including off-highway construction equipment, non-combustion industrial emission sources and fuel not delivered by PG&E (e.g., wood, charcoal, propane, kerosene).
- ✧ ***Largely located outside the jurisdiction’s boundaries*** – Sources such as intercity transportation fuel usage for air and rail travel.

If Burlingame’s industrial sector had been characterized by emissions from very large energy intensive industrial facilities (paper and steel mills, industrial chemical plants, petrochemical plants and refineries, metal smelters or large cement making operations) these emissions would be represented within the context of the community-scale emissions inventory results in an appropriate fashion—with the understanding that (1) their emissions may be well documented in other inventory programs, (2) the purpose of the analysis is to account for the emissions the jurisdiction actually has the ability to influence, and (3) their inclusion could skew the results to the point of prohibiting the facilitation of intercity comparisons.

CACP Software and Emission Factors

ICLEI’s Clean Air and Climate Protection (CACP) software package was used to calculate emissions resulting from energy consumption and waste generation. The CACP software determines emissions using specific factors (or coefficients) according to the type of fuel used. Greenhouse gas emissions are aggregated and reported in terms of equivalent carbon dioxide units, or CO₂e. Converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is 21 times more powerful than carbon dioxide on a per weight basis in its capacity to trap heat, so the CACP software converts one metric ton of methane emissions to 21 metric tons of carbon dioxide equivalents.

The emissions coefficients and quantification method employed by the CACP software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) and the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form 1605). At the time of this writing, the CACP software has been used by more than 160 U.S. cities and towns to inventory their greenhouse gas emissions. However, it is worth noting that, although the software provides Burlingame with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation of reality, rather than an exact value.

Appendix C: Assumptions

ICLEI provides a software tool, Climate and Air Pollution Planning Assistant (CAPPA), which quantifies emission reductions⁶³ resulting from recommended programs. These GHG reduction estimates are based on the reported collective experience of U.S. jurisdictions and are data specific to Burlingame. Estimates of the initial costs to the City are based on current research and staff implementation experience. Estimates are based on first-year costs (nonamortized) for staff time, services and materials.

Additional Data Sources: City of Burlingame, 2009-2014 Housing Element Update, Indicators Report, Sustainable San Mateo County, ICLEI-Cities for Climate Protection Appendices for GHG emission reductions, California Integrated Waste Management Solid Waste Data for Burlingame, MIS Reports Solid Waste and Recycling 2008 Reports, PG&E 2008-2009 Data, Bay Area Air Quality Management District, California Energy Commission, Association of Bay Area Governments, California Public Utilities Commission, Joint Venture Silicon Valley-Climate Protection Task Force, C/CAG Energy Strategy 2012, Leadership in Energy and Environmental Design (LEED), United States Green Building Council

Assumptions for Phase 1: Recommendations for Implementation Prior to 2012

	GHG Reduction Recommendation	GHG Reduction and Cost Estimate Assumptions
1	Adopt Water Efficient Landscape Ordinance as required by AB 1881.	Assumes 15% water savings, Burlingame usage of 205 gallons per household per day, and 2.29 persons in each household. Costs: \$4,000. Costs that include staff time to develop final ordinance and required compliance documentation are not included in this estimate since the State of California requires the ordinance. These are estimated costs of \$4,000 for staff time to consider more stringent requirements.
2	Adopt a Residential Energy Conservation Policy (voluntary) to provide professional residential energy-efficiency and water-efficiency audits for residents at reduced cost. Promote the Residential Energy and Water Efficiency Checklist.	250 homes participate. 30% energy savings from audit. No quantification of water savings. If included could be additional GHG reductions reduction: 1,268 tons from audits + 47 tons from checklist Costs: \$10,000 subsidy for audits, Sustainability Coordinator to promote and educate, expand resources and City Web site expansion, coordinate selection of home energy auditors, Checklist resources on City Web site. \$150 cost for energy audit x 250 homes = \$37,500. Assume 25% subsidy = \$9,375.

⁶³ Burlingame data: 12,900 households, 2.23 persons per household. 12,858 housing units in Burlingame (6,111 single family homes, 409 single family attached, 983 MFD 2-4 units, 5,355 MFD 5+units, Source: City of Burlingame Web site.

GHG Reduction Recommendation	GHG Reduction and Cost Estimate Assumptions
<p>3 Research and consider Solar and Energy Efficiency Financing Program for residents and commercial.</p>	<p>100 loans for energy efficiency and solar installations per year once program established.</p> <p>Costs: TBD-estimated costs for this program cannot be estimated at this time due to the fact that the Solar and Energy Efficiency (SEE) District program development is currently under development. Once the program has been outlined by ABAG, staff time from the Finance Department will be necessary to consider participation in the regional program.</p>
<p>4 Adopt Green Building Ordinance for residential new construction/major remodel projects.</p>	<p>400,000 sq ft covered under new ordinance</p> <p>Costs: \$12,000 to develop ordinance, use of regional program, Build It Green (BIG) membership and leverage of resources already developed from other cities and BIG. Additional costs for workshop and expansion of Web site to include new requirements. 80 hours to evaluate ordinance and requirements (80 hrs x \$100 = \$8,000) plus additional staff time to modify Web site, train staff, and develop documents. Additional time for permit plan check to be included in permit application fees, similar to neighboring jurisdictions.</p>
<p>5 Adopt Commercial Green Building Ordinance (after voluntary period of 12 to 18 months) to require major new commercial construction properties (greater than 10,000 square feet) and major remodels to meet Leadership in Energy and Environmental Design (LEED) standard.</p>	<p>Assumes 150,000 sq ft (10 projects x 15,000 sq ft), of new commercial or major remodels. Voluntary program assumes 25% of new commercial projects will include green building measures (98 tons).</p> <p>Costs: The estimated cost is \$17,500. The voluntary phase would include staff time for the development of the Commercial Green Building Policy and include staff time for adding LEED resources, checklists to Web site and for permit documents estimated at \$2,000. (20 x \$100). The ordinance would include costs for staff training, estimate for LEED Accredited Professional (LEED AP) \$6,000 (\$3,000 x 2 staff). Staff time for development of new commercial green building ordinance estimated to be approximately \$7,500 (75 x \$100). Costs for staff time for plan check would be estimated at \$200 per plan check and could be absorbed by application fees. \$200x 10 plans = \$2,000.</p>
<p>6 Develop Commercial Energy Efficiency Policy: provide energy-efficiency technical assistance, Incentive/Recognition Program. Encourage commercial businesses applying for new/renewal of businesses licenses to complete PG&E energy-efficiency audit. Expand Burlingame's participation in Bay Area Green Business Program.</p>	<p>A. Assumes approximately 155 businesses per year complete commercial energy audit.</p> <p>B. Assumes 100 businesses participate per year in Green Business Program</p> <p>Costs: \$4,500 for new materials to promote and expand commercial outreach program and highlight resources, promote green business program, and provide recognition. Promotion and education materials to be developed for the Commercial Energy Program, Recognition Program, business license renewable program and the Bay Area Green Business Program.</p>

	GHG Reduction Recommendation	GHG Reduction and Cost Estimate Assumptions
7	Policy that requires Transportation Demand Management (TDM) strategies for new development of large commercial properties that encourage shuttle use, carpool, bicycle and transit. Provide TDM guidelines in permit packet for all new developments.	Assumes 150 additional persons use alternative method other than single-occupancy vehicle/year Costs: \$6,000 (60 hours x \$100). Estimated costs for staff time for policy development, developing and coordinating guidelines and incorporation into requirements.
8	Adopt policy to provide prioritized parking for hybrid, rideshare or alternative-fuel cars in city streets, garages, lots. Modify policy as technology advances to increase accommodation of hybrids/ alternatively fueled vehicles.	Assumes 50 new hybrids purchased/year and 12,000 less VMT per year per vehicle Costs: TBD, require estimated number of designated spaces for green parking. TBD: cost for policy development (Sustainability Coordinator), staff time for Public Works and parking enforcement.
9	Incorporate bicycle friendly intersections in street design and modifications. Ensure new developments provide safe/convenient travel by walking, bicycling or public transportation.	Assumes reduction of 300 trips from single-occupancy cars and 10 mile round trip. Costs: Estimated costs are to be determined and include time for staff to incorporate these requirements. Additional costs could be added for staff to write grants to MTC for grant funds for bicycle, pedestrian-oriented improvements.
10	Research methods to increase ridership and expand shuttle service and partner with local groups to increase public transportation alternatives	GHG to be determined based on modifications and ridership increase Costs: Estimated costs cannot be determined. It is assumed that the City costs would not increase in Phase 1.
11	Upgrade residential/commercial recycling service to: a) "Single stream" recycling collection service for residential and commercial b) Weekly collection of single stream recycling for residential c) Weekly collection of organics/food collection for residential	Assumes increased organics collection = 618 new organic tons, and increased single stream collection = 823 new tons. Population = 29,000. 1,441 new tons per year (~pounds per person per month). 99.37 pounds per person per year ~additional diversion of 8 pounds per person per month/2 pounds per week. 2,898 from single stream. 266 from food/organics collection. Very conservative estimate based on CAPP data, emission reductions could be significantly more Costs: no costs to City, garbage and recycling services are paid by ratepayers.
12	Adopt Commercial Recycling Ordinance that requires businesses to divert recyclables organics, cardboard, paper.	150 businesses increase recycling by 125 pounds per month or 1,500 pounds per year Costs: \$3,500 Finance staff (35 hours x \$100) and Sustainability Coordinator staff time to coordinate ordinance and reports
13	Encourage development of community group ("Burlingame Green") to expand promotion and education of climate action programs.	Emission reductions based on campaigns selected Costs: No cost to City.

	GHG Reduction Recommendation	GHG Reduction and Cost Estimate Assumptions
14	Dedicate part-time (.50 FTE) Sustainability Coordinator.	20 hours per week; 1039 hours per year @ \$85/hr, \$88,315 Costs: The costs are for this contracted position and are estimated to cost \$89,000
15	Develop "City Green Team" (Public Works staff, other) to prioritize and implement energy-efficiency /water-efficiency upgrades for city facilities.	20,000 sq ft with energy-efficiency upgrades average 30% increase in energy efficiency. Costs: Public Works staff time: \$12,000 12 hours per month x \$100
	TOTAL	\$158,500

Assumptions for Phase 2: Recommendations for Implementation 2012 to 2020

	GHG Reduction Recommendation	Estimated Initial Costs
1	Identify and implement methods to expand solar and renewable energy generation for residential and commercial. Streamline the permit process for solar and other renewable energy and provide a Renewable Energy Incentive Program.	Assumes 80 new Kwh, 36 residents @ 5kw = 180 kw, 20 businesses @10 kw = 200 Kwh Cost: \$7,900 (Staff time for 1 day training \$75 x 8 = \$600, Training costs \$300, Staff time to streamline permit process 20 x \$100 = \$2000, Staff time to evaluate and change regulations for wind 50 x \$100 = \$5000)
2	Adopt Commercial Energy Conservation Policy (voluntary) to encourage inclusion of Energy and Water Efficiency Checklist for commercial properties sold to comply with minimum energy efficiency and water conservation.	Assumes voluntary participation from an estimated 100 businesses. Costs \$3,400 12 hours for checklist, 15 hours for promotion, 12 for policy development
3	Adopt a mandatory Commercial Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water-conservation standards in Energy and Water Efficiency Checklist for commercial properties sold or when title is transferred.	Assumes 248,000 sq ft meet LEED requirements under new ordinance Costs: \$30,600 (Staff time to modify CECO model ordinance used in other cities), 75 x \$100 = \$7,500 Guidelines, Checklist, Web site development 60 x \$85 = \$5,100, Coordinate certification process 150 x \$100 = \$15,000, Ensure compliance 50 x \$85 = \$4,250 Staff training \$3,000

	GHG Reduction Recommendation	Estimated Initial Costs
4	Adopt mandatory Residential Energy Conservation Ordinance (after 12 to 18 months of voluntary education and promotion) to require compliance with minimum energy-efficiency and water-conservation standards in Energy and Water Efficiency Checklist for residential properties sold or when title is transferred.	Assumes 100 homes sold per year, conservative estimate due to 183 homes sold per year per Housing Element, 25% energy efficiency Costs: \$38,100 (Staff time to modify RECO model ordinance used in other cities, 100 x \$100=\$10,000, Guidelines, Checklist, Web site development, 60 x \$85 = \$5,100 Coordinate certification process, 200 x \$100 = \$20,000 Staff training \$3,000
5	Research methods to expand and enhance shuttle and public transportation services to increase shuttle ridership and public transportation alternatives	Assumes 50 new passengers per day and an average 9.8 mile average trip Cost: \$8,500 Includes staff time for promotion and education, coordination with regional public transportation organizations
6	Encourage development that is mixed use, infill and higher density	Estimated GHG reductions TBD Costs: Estimated costs to be determined
7	Evaluate the current Construction and Demolition (C&D) Ordinance and consider an increase to the current required diversion rate.	Estimated GHG reductions TBD Costs: \$4,500 (Costs for report review 20 x \$50 = \$1000 Ordinance modifications 25 x \$100 = \$2,500 Promotion/education \$1,000
8	Require recycling at major public events in Burlingame (of cardboard, paper, containers and food/organics).	Estimated GHG reductions are 377 tons for public event solid waste reduction Costs: \$2,500 Includes cost of staff training and additional staff time to inform and monitor this program
9	Adopt a policy to achieve citywide diversion rate of 75% measured diversion by 2015	Estimated GHG reductions TBD Costs: \$4,500 Includes staff time for policy development (use of neighboring jurisdiction policies reduces staff time) and coordination with recycling and solid waste provider
10	Adopt a Civic Green Building Policy that requires “Leadership in Energy and Environmental Design” (LEED) green building standard for new municipal construction and major remodels	Assumes 5,000 sq foot building of municipal buildings/, 30% energy efficiency in comparison to conventional construction Costs: \$17,000, Policy 40 x \$100 = \$4,000, Training \$3,000 Compliance, registration, project coordination, \$10,000 Cost for policy development Cost for staff training/accreditation LEED Accredited Professional (LEED AP)
11	Consider establishing Sustainable Commission	Estimated GHG reductions TBD Costs: TBD
12	Complete a feasibility study to install solar or other renewable energy at select City Facilities (e.g., wastewater treatment plant) and install where feasible.	Estimated GHG reductions TBD Costs: \$10,000 for feasibility study to be completed by staff and/or contracted staff

	GHG Reduction Recommendation	Estimated Initial Costs
13	Adopt Sustainable Purchasing Policy w/ two mandatory requirements: City fleet purchases must require hybrid or alternative-fuel vehicles (with some exceptions) and paper product purchases must have a minimum of 30% recycled content	Estimated GHG reductions TBD Costs: \$2,500 for staff time to modify the current policy, provide additional education materials
14	Retain Sustainability Coordinator	Estimated GHG reductions TBD Costs: 20 hours per week/1039 hours per year at \$85/hr = \$88,315 The cost for this contracted position is estimated at \$89,000
	TOTAL	\$218,500

Glossary of Terms⁶⁴

Adaptation — Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.⁶⁵

Anthropogenic — Made by people or resulting from human activities. Usually used in the context of emissions that are produced as a result of human activities.⁶⁶

Base Year — An emissions analysis year for which comprehensive and reliable data can be obtained. It is better to select a more recent base year for which a lot of information can be obtained easily than to spend weeks trying to track down data that may not exist or be incomplete.

California Air Resources Board (ARB) — The ARB is the state agency tasked with implementing AB 32, The California Global Warming Solutions Act of 2006, and achieving the mandated emission reduction goals.

California Climate Action Registry (CCAR) — A private nonprofit organization originally formed by the State of California. The California Registry serves as a voluntary greenhouse gas (GHG) registry to protect and promote early actions to reduce emissions by organizations. The California Registry provides leadership on climate change by developing and promoting credible, accurate and consistent GHG reporting standards and tools for organizations to measure, monitor, third-party verify and reduce their emissions consistently across industry sectors and geographical borders.

Carbon Dioxide — Carbon dioxide, abbreviated CO₂, is essential to living systems and released by animal respiration, decay of organic matter and fossil fuel burning. It is removed from the atmosphere by photosynthesis in green plants. The amount of CO₂ in the atmosphere has increased by at least 25% since the burning of coal and oil began on a large scale. Atmospheric carbon dioxide varies by a small amount with the seasons, and the ocean contains many times the amount of the gas that exists in the atmosphere.

Carbon Dioxide Concentration — The atmospheric carbon dioxide concentration, at 353 parts per million on a volume basis (ppmv) in 1990, is now about 25% greater than the pre-industrial (1750-1800) value of about 280 ppmv, and higher than at any time in at least the last 160,000 years. Carbon dioxide is currently rising at about 1.8 ppmv (0.5%) per year due to human-caused emissions and currently accounts for approximately 84% of U.S. greenhouse gas emissions.

Climate Change — Climate change refers to any significant change in measures of climate (such as temperature, precipitation or wind) lasting for an extended period (decades or longer). Climate change may result from:

⁶⁴ Unless otherwise noted, definitions of glossary terms were obtained from ICLEI's "Cities for Climate Protection Milestone Guide"

⁶⁵ IPCC "Third Assessment Report Working Group III: Mitigation"

⁶⁶ NASA's Earth Observatory library

- ✧ Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- ✧ Natural processes within the climate system (e.g., changes in ocean circulation);
- ✧ Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification, etc.)⁶⁷

Criteria Air Pollutants (CAPs) — The term criteria air pollutants refers to pollutants that are regulated under the U.S. Clean Air Act. As with carbon dioxide, the major sources of these pollutants are fossil fuels. Most measures that reduce carbon dioxide emissions also reduce criteria air pollutants. Criteria air pollutants include nitrogen oxides (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), sulfur oxides (SO_x) and particulate matter smaller than ten microns in diameter (PM-10). ICLEI's CACP software provides estimated emissions of CAPs as well as GHGs for emissions analyses and reduction benefits of measures.

Emissions Factor — A unique value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., grams of carbon dioxide emitted per barrel of fossil fuel consumed).⁶⁸

Equivalent Carbon Dioxide (CO₂e) — Equivalent carbon dioxide, abbreviated as CO₂e and also known as global warming potential (GWP), is a unit that allows emissions of greenhouse gases of different strengths to be added together and framed in terms of comparative units. For carbon dioxide itself, emissions in tons of CO₂ and tons of CO₂e are identical, whereas for methane, an example of a stronger greenhouse gas, 1 ton of methane emissions has the same GWP as 21 tons of CO₂. Thus 1 ton of methane emissions can be expressed as 21 tons of CO₂e.

Global Warming — Global warming describes the recent trend of increasing average global surface and tropospheric (referring to the lowest part of the atmosphere where “weather” phenomena occur) temperatures that scientists believe is caused by increased emissions of human-induced greenhouse gases. The greenhouse gases (CO₂, methane, nitrous oxides and CFCs) are emitted into the atmosphere and increase the atmosphere’s “entrapment” of heat.

Global Warming Potential (GWP) — Global warming potential is a concept developed by the Intergovernmental Panel on Climate Change that provides a comparative measure of the impacts of different greenhouse gases on global warming, with the effect of carbon dioxide being equal to 1.

Greenhouse Gases and the Greenhouse Effect — The Earth’s climate is determined by a delicate balance between the solar energy that arrives from space and the heat energy that the Earth creates from the sun’s rays. The energy that arrives from space should always equal the energy that the Earth emits back to space. When something disturbs this balance, our climate adjusts by cooling or warming the Earth to return things to normal. A portion of outgoing heat energy is absorbed in the atmosphere by greenhouse gases such as water vapor, carbon dioxide, methane, and nitrous oxide. If these trace gases were not present, the average temperature on the Earth’s surface would be -32 degrees Fahrenheit, and life as we know it would not have evolved here. But the natural greenhouse effect keeps the average global surface temperature at a comfortable 59 degrees Fahrenheit.

⁶⁷ EPA, www.epa.gov/climatechange/glossary.html

⁶⁸ EPA, www.epa.gov/climatechange/glossary.html

Today, the atmospheric concentration of the most important greenhouse gas, carbon dioxide, is higher than it has been in the past 650,000 years. Scientists participating in the British Antarctic Survey have succeeded in charting the atmospheric concentration of carbon dioxide over the last 800,000 years. Their research has shown that temperature unfailingly rises and falls in response to carbon dioxide levels. This increase is the result of an increased reliance on fossil fuels and deforestation, which has caused an imbalance between the absorption and release of carbon dioxide by vegetation. Other greenhouse gases, also found in the atmosphere in increasing amounts, are methane, nitrous oxide and the chlorofluorocarbons (CFCs).

IPCC—Intergovernmental Panel on Climate Change —The Intergovernmental Panel on Climate Change (IPCC) was jointly established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to:

- ✧ Assess available scientific information on climate change;
- ✧ Assess the environmental and socioeconomic impacts of climate change;
- ✧ Formulate response strategies.

It has emerged as the predominant international forum for the development of scientific knowledge and policy advice on matters related to climate change. Its periodic Assessment Reports are relied upon by governments to guide policy making on this issue. The IPCC's Third Assessment Report in 2001 projects that the Earth's average surface temperature will increase between 2.5° and 10.4°F (1.4°-5.8°C) between 1990 and 2100 if no major efforts are undertaken to reduce the emissions of greenhouse gases (the "business-as-usual" scenario). Furthermore, the Third Assessment Report also found that "there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

Kyoto Protocol —The Kyoto protocol was adopted by consensus at the third session of the Conference of the Parties (COP-3) in December 1997 in Kyoto, Japan. When ratified by a certain percentage of participating countries, it contains legally binding emissions targets for developed countries in the post-2000 period. By arresting and reversing the upward trend in greenhouse gas emissions that started in these countries 150 years ago, the Protocol promises to move the international community one step closer to achieving the Convention's ultimate objective of preventing "dangerous anthropogenic [human-induced] interference with the climate system."

According to the Protocol, developed countries commit themselves to reducing their collective emissions of six key greenhouse gases by at least 5%. This group target will be achieved through cuts of 8% by Switzerland, most Central and East European states, and the European Union (the EU will meet its target by distributing different rates among its 61 member states); 7% by the US; and 6% by Canada, Hungary, Japan, and Poland. Russia, New Zealand, and Ukraine are to stabilize their emissions, while Norway may increase emissions by up to 1%, Australia by up to 8%, and Iceland 10%. The six gases are to be combined in a "basket", with reductions in individual gases translated into "CO₂ equivalents" that are then added up to produce a single figure. In 2005 the Kyoto Protocol went into effect after 141 industrialized countries signed on to the agreement.

Methane — Methane, abbreviated CH₄, accounted for about 8.6% of U.S. emissions in 2005. Methane is produced by anaerobic decomposition of solid waste in landfills and sewage treatment facilities, wetlands and rice paddies, as a by-product of fossil fuel energy production and transport and also from outgassing in livestock. It is also the principle constituent of natural gas and can leak from natural gas production and distribution systems and is emitted in the process of coal production. The methane concentration in the atmosphere has been rising

steadily for several centuries, keeping pace with the increase in the world population and expansion of the world economy.

Nitrous Oxide — Nitrous oxide or N₂O (not to be confused with nitrogen oxides or NO_x) is a potent greenhouse gas accounting for about 5.1% of U.S. CO₂e emissions in 2005. Main sources for this GHG are nitrogen fertilization of agricultural soils, agricultural runoff and motor vehicles equipped with catalytic converters.

Ozone — An ozone molecule consists of three atoms of oxygen. Ozone is much more reactive than oxygen and is toxic to human beings and living matter. At ground level it forms smog and causes damage to forests and humans. (In the stratosphere, it functions mainly as a filter for ultraviolet radiation and to a lesser extent as a greenhouse gas.) Ground level ozone formation is closely connected to climate change since the primary sources of emissions that cause it (e.g., motor vehicle use) are also global-warming pollutants. Additionally, the formation of ground level ozone requires not only pollutants but also heat and sunlight. As regions get hotter due to global warming, local ozone smog problems tend to be exacerbated.

United Nations Framework Convention on Climate Change (UNFCCC) — This convention served as the foundation of global efforts to combat global warming. Opened for signature at the Rio Earth Summit in 1992, its ultimate objective was the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human-induced] interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”

U.S. Conference of Mayors Climate Protection Agreement — This initiative was launched in 2005 by Seattle Mayor Greg Nickels. He invited mayors to commit to reduce emissions in their cities to 7 percent below 1990 levels by 2012.

Western Climate Initiative (WCI) — launched in February 2007, the WCI is a collaboration of seven U.S. governors and four Canadian Premiers created to identify, evaluate and implement collective and cooperative ways to reduce greenhouse gases in the region, focusing on a market-based cap-and-trade system.