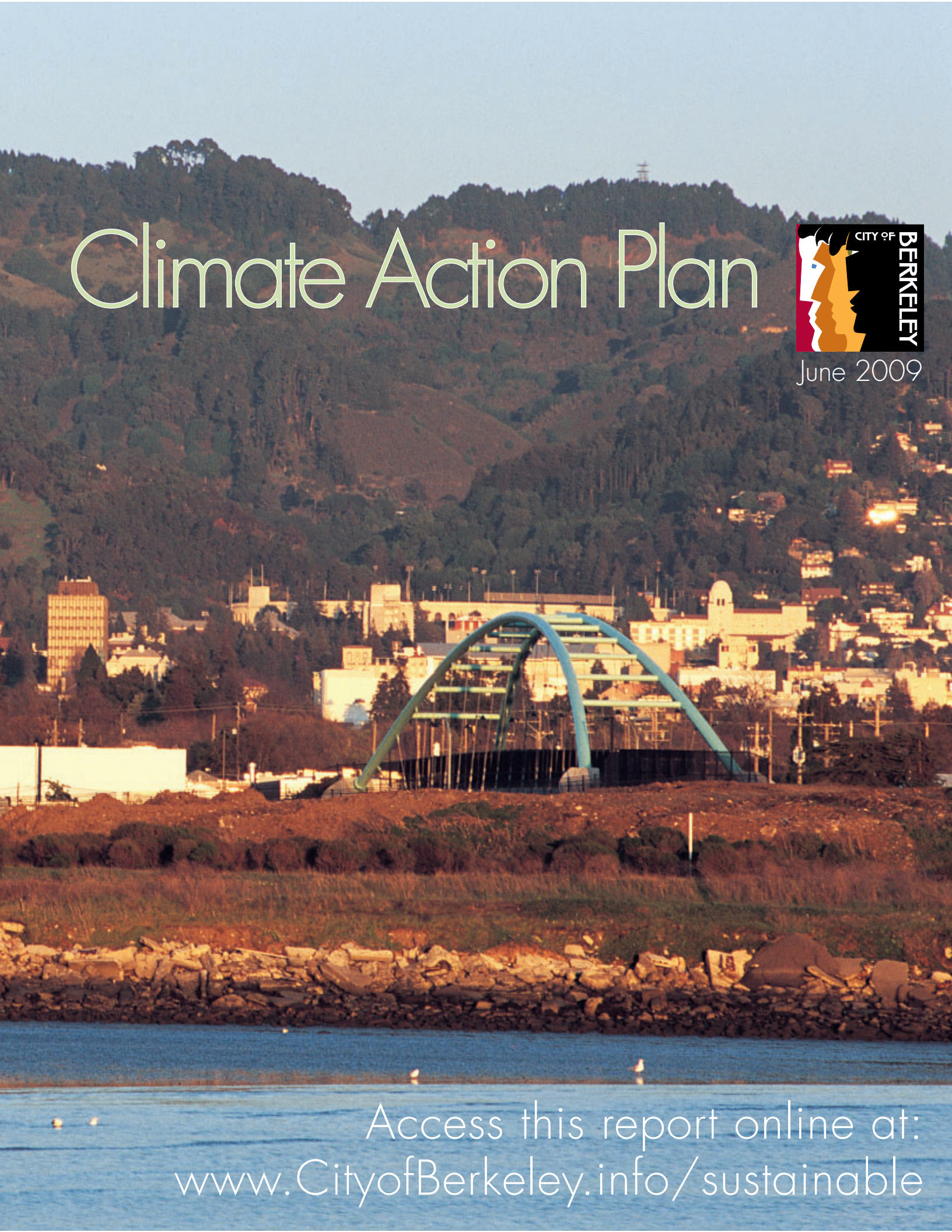
Climate Action Plan

CITY OF BERKELEY

June 2009



Access this report online at:
www.CityofBerkeley.info/sustainable

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Acknowledgements

The City of Berkeley would like to thank the following individuals and groups for their input, guidance, and support on the Berkeley Climate Action Plan:

- The hundreds of community members who took the time to contribute ideas and ask questions for the benefit of this plan
- The Berkeley Mayor and City Council
- The City cross-departmental "G-Team"
- The City Commissions that hosted "Climate Action Workshops"
- The Mayor's Advisory Group on Climate Protection
- ICLEI – Local Governments for Sustainability
- UC faculty, staff members and student leaders who contributed to the plan through their research, volunteerism, and guidance
- The San Francisco Foundation

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Executive Summary

Berkeley Bicycle Patrol Officers Chris Waite (left) and Brian A. Mathis.

The science is clear. Global warming is a real and significant threat to humankind. However, our response to this threat presents opportunities to create a more livable, equitable, and economically vibrant community. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, recycling our waste, and building local food systems, we can keep dollars in our local economy, create new green jobs, and improve community quality of life. In fact, most of the actions in the plan will provide more savings – nearly $500 million in total by 2020 – than initial costs.

Even beyond the benefits of local climate action, the impacts associated with climate change make action at all levels an urgent and absolute necessity. Globally, the rise in temperatures has profound implications for the availability of the natural resources on which economic prosperity and human development depend. The changing climate also has potentially severe economic, health, social, and environmental consequences for us close to home, including:

- Threats to coastal infrastructure due to a rising San Francisco bay: The bay rose seven inches over the past 150 years. Estimates are that by 2100, the bay could rise up to a meter.[1]
- Increased incidence of large wildfires: The risk of large wildfires in California could increase by as much as 55% by century's end.
- Serious public health threats: Increasing temperatures exacerbate local air pollution, lead to intensified heat waves, and expand the range for infectious diseases.
- Water shortages: Due to rising temperatures, the Sierra Nevada mountain snowpack that supplies much of the state's water supply could decrease by 80% by century's end. Loss of snowpack threatens drinking and agricultural water supplies as well as hydropower generation and the health of the state's creeks and rivers.[2]

The cost of inaction, or inadequate action, is unacceptable. Berkeley citizens recognize this truth and are eager to get to work. In November 2006, Berkeley voters issued a call to action on the climate challenge by overwhelmingly endorsing ballot Measure G. The mandate was simple but bold: Reduce our entire community's greenhouse gas (GHG) emissions by 80% by the year 2050. The measure directs the Mayor to develop a Climate Action Plan to reach that target.

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[1] San Francisco Bay Conservation and Development Commission website: www.bcdc.ca.gov/index.php?cat=56 (2008).

[2] Our Changing Climate: A Summary Report from the California Climate Center (2006).

Mayor Tom Bates embraced Berkeley citizens' call to action and provided leadership in engaging the community in a local climate protection campaign. This plan is the result of the campaign that Measure G set in motion. It is rooted in the vision for a sustainable Berkeley that emerged from the climate action planning process. The plan's purpose is to serve as a guide for setting the community on a path to achieve that vision.

> Berkeley Measure G:
> *Should the People of the City of Berkeley have a goal of 80% reduction in greenhouse gas emissions by 2050 and advise the Mayor to work with the community to develop a plan for Council adoption in 2007, which sets a ten year emissions reduction target and identifies actions by the City and residents to achieve both the ten year target and the ultimate goal of 80% emissions reduction?*
> Passed with 81% of the vote in November 2006

Vision for the year 2050:

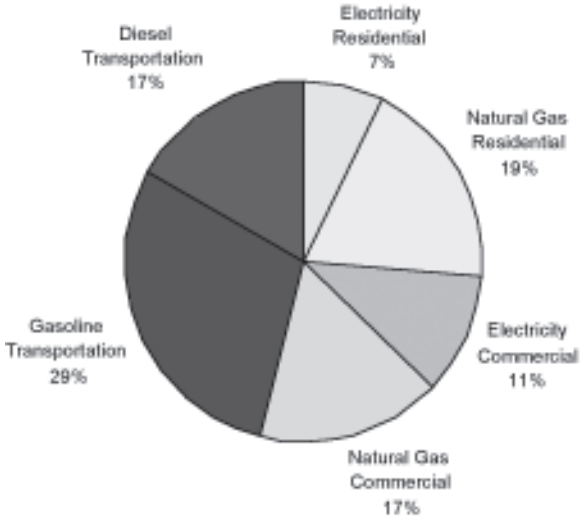
- New and existing Berkeley buildings achieve zero net energy consumption through increased energy efficiency and a shift to renewable energy sources such as solar and wind.
- Public transit, walking, cycling, and other sustainable mobility modes are the primary means of transportation for Berkeley residents and visitors.
- Personal vehicles run on electricity produced from renewable sources or other low-carbon fuels.
- Zero waste is sent to landfills.
- The majority of food consumed in Berkeley is produced locally, i.e., within a few hundred miles.
- Our community is resilient and prepared for the impacts of global warming.
- The social and economic benefits of the climate protection effort are shared across the community.

Berkeley's Emissions Inventory

To ensure that the community stays on course to meet its aggressive GHG reduction target, it is necessary to track our progress by conducting regular, community-wide GHG emissions inventories.

It helps to think of the inventory as a "snapshot" of our community's GHG emissions for a given year. It identifies the major sources and quantity of GHG emissions produced by residents, businesses, and public institutions. In 2005 Berkeley emitted approximately 576,000 metric tons of GHG emissions. The chart (top of page ES3) illustrates these emissions by source.

Berkeley's GHG Emissions by Source in 2005[3]



The inventory reflects the emissions that result from motor vehicles driven and electricity and natural gas consumed within Berkeley city limits. While there are important limitations in the inventory methodology, it does serve as a useful tool for tracking community emissions over time and for targeting climate protection strategies to address the main emissions sources.

Targets & Trends

Per Measure G, Berkeley's emissions reduction target is an 80% reduction below 2000 levels by 2050. This target is expressed in absolute tons and is not relative to projected growth. In order to monitor progress along the way, it is effective to set interim, short-term targets. The 2020 target is to achieve a 33% absolute reduction below 2000 community-wide emissions levels, which equates to about a two percent reduction per year in total community-wide emissions.[4]

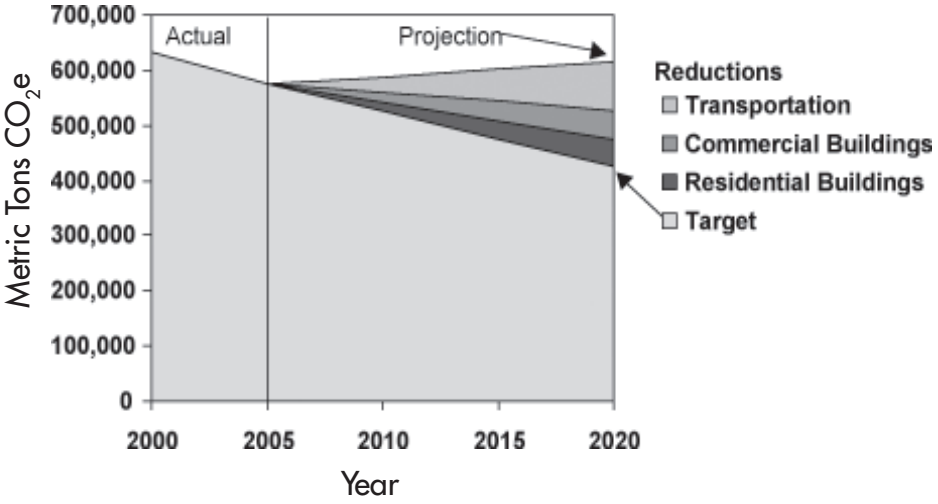


Figure 1: The top line illustrates Berkeley's GHG emissions (in metric tons) trend between 2000 and 2005 and the projected increase in emissions between 2005 and 2020. The wedges in the chart represent contributions to GHG reductions each sector is responsible for in order to achieve the overall year 2020 reduction target – a 33% reduction below 2000 levels.

This plan focuses on actions our community can and should implement between now and 2020, but in the context of promoting the types of innovative approaches that will be necessary to achieve the ultimate 2050 target.

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[3] Estimated from the Berkeley 2005 GHG emissions inventory conducted by ICLEI – Local Governments for Sustainability.

[4] The 2020 target was determined from a linear extrapolation from year 2000 emissions levels to 80% below 2000 levels by the year 2050.

Based on forecasted emissions levels, a 33% reduction from 2000 levels equates to an annual GHG emissions reduction of nearly 188,000 metric tons by 2020.

Recent trends in Berkeley's community-wide GHG emissions show an almost nine percent decrease between 2000 and 2005, one of the largest reductions in GHG emissions documented by a U.S. city. However, the community cannot count on or fully identify the array of social and economic factors that contributed to this short-term trend. This plan outlines a series of actions aimed at continuing this trend and achieving Berkeley's emissions reduction targets.

Recommended Emissions Reduction Actions

The Berkeley Climate Action Plan was designed under the premise that local governments and the communities they represent are uniquely capable of addressing the main sources of the emissions that cause global warming: the energy consumed in buildings and for transportation, and the solid waste sent to landfills.

Below is a summary of the core recommended strategies for each category of action included in the plan. See the corresponding chapters for detailed recommendations:

1. Sustainable Transportation & Land Use

1. Sustainable Transportation & Land Use (Chapter 3)
The plan is designed to reduce vehicle miles traveled in the community by making cycling, walking, public transit, and other sustainable mobility modes the mainstream and to increase vehicle fuel efficiency and the utilization of low-carbon fuels:

- *Increase the safety, reliability, and frequency of public transit.*
- *Expand other mobility options, such as car share pods and shuttle buses, into areas where existing public transit is less frequent and accessible.*
- *Accelerate implementation of the City's Bicycle and Pedestrian Plans and continue efforts to make walking and cycling safe, healthy, and enjoyable alternatives to driving.*
- *Ensure that new development is "green" development, meaning that it is oriented toward transit and is coupled with enhancements to green and open space, urban forestry efforts, and water conservation efforts, among others.*
- *Manage parking effectively to minimize driving demand and encourage and support alternatives to driving.*
- *Create incentives for low-carbon vehicles such as electric vehicles and plug-in hybrids.*

2. Building Energy Use

Berkeley's Shorebird Park Nature Center is a stawbale building that incorporates solar and wind energy systems to offset energy demand and reduce GHG emissions.

2. Building Energy Use (Chapter 4)

The community's task is to reduce conventional energy use in every existing Berkeley home, business, and institution through high-quality energy efficiency retrofits and a greater reliance on renewable energy such as solar:

- *Strive to achieve zero net energy performance in new construction by 2020.*
- *Enhance and lower the cost of energy efficiency services and standards for existing residential and non-residential buildings.*
- *Develop a local, clean, decentralized renewable energy supply to meet a larger portion of the community's energy needs.*
- *Continue to increase energy efficiency and renewable energy use in public buildings.*
- *Prepare local residents for job opportunities in the emerging green economy.*

3. Waste Reduction & Recycling

3. Waste Reduction & Recycling (Chapter 5)

These measures aim to eliminate solid waste at its source, i.e., the point of production, and to maximize reuse and recycling throughout the community:

- *Enhance recycling, composting, and source reduction services for residential and non-residential buildings.*
- *Expand the types of materials that can be recycled locally, such as certain plastics.*
- *Expand efforts to eliminate waste at its source by limiting the use of plastic bags and by increasing producers' responsibility for product waste and packaging.*

4. Community Outreach & Empowerment

4. Community Outreach & Empowerment (Chapter 7)

The success of local climate action efforts rests on behavior change. Actions designed to educate and empower community members are fundamental to this plan:

- *Launch a coordinated outreach and education campaign to mobilize residents, businesses, and industry.*
- *Continue to expand the opportunities students have to learn about and take action on climate change.*
- *Increase awareness and action in the City government by providing training on how to increase sustainability at home and in the workplace.*

5. Preparing for Climate Change Impacts

5. Preparing for climate change impacts (Chapter 6)

We live in a region that knows well the value of preparedness. Even as the community ramps up efforts to mitigate greenhouse gas emissions, it is critical that we start now to apply the region's preparedness doctrine to the risks associated with climate change. The City should partner with local, regional, and state agencies to develop a plan of action for climate adaptation.

From Planning to Action: Everyone has a Role to Play

While measuring GHG emissions, establishing reduction targets, and developing a Climate Action Plan are essential steps, the most important component of the community climate protection effort lies ahead: Implementation.

Turning this plan into action rests on more than just ideas and good intentions. It requires Berkeley residents, businesses, the City government, and other institutions to urgently rise to the challenge of making big changes – changes in our infrastructure, technological advances, ramped up green workforce development, and change in the decisions we make every day as members of the Berkeley community. Everyone must play a role.

The Climate Action Plan recommends strategies that support individuals' and businesses' efforts to consume less energy and produce less waste. Implementing the plan will, for example, increase access to public transit and make it safer to commute by foot or bicycle, provide incentives to make one's home or business more energy efficient, and increase the convenience of recycling and composting waste. The City is committed to playing a leadership role in eliminating barriers to local climate action.

In the meantime, individuals can start now to reduce their carbon footprint and save money at the same time. Here are just a few easy action steps to consider:

- Change your commute. Pick at least one day per week to ride your bicycle, walk, take public transit, or carpool to work. If you already do so, encourage a friend or family member to join you.
- Go unplugged. Many appliances are "vampires." They suck electricity even when turned off. Plug your TV, stereo and other appliances into a power strip and turn it off when the appliances are not in use.
- Generate less waste. The average American generates over four pounds of trash each day. Generate less trash by taking simple steps such as using reusable coffee mugs and grocery bags.
- Save water. Install a low-flow shower head and faucet aerator. These easy-to-install devices can significantly reduce water consumption and the energy it takes to heat water.
- Grow your own food. Join a community garden or plant a garden in your yard. Local food production reduces the distance food must travel to get to our tables, among several other benefits.

The Edible Schoolyard (above), a program of the Chez Panisse Foundation, is a one-acre organic garden and kitchen classroom for students at the Martin Luther King Jr. Middle School in Berkeley.

Chapter 1: Introduction

The science is clear. Global warming is a real and significant threat to humankind. However, our response to this threat presents opportunities to create a more livable, equitable and economically vibrant community. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, recycling our waste, and building local food systems, we can keep dollars in our local economy, create new green jobs and improve community quality of life. In fact, most of the actions in the plan will provide more savings – nearly $500 million in total by 2020 – than initial costs.

Even beyond the benefits of local climate action, the impacts associated with climate change make action at all levels an urgent and absolute necessity. Globally, the rise in temperatures has profound implications for the availability of the natural resources on which economic prosperity and human development depend. The changing climate also has potentially severe economic, health, social and environmental consequences for us close to home, including:

- **Threats to coastal infrastructure due to a rising San Francisco Bay:** The Bay rose seven inches over the past 150 years. Estimates are that by 2100, the bay could rise up to a meter.[1]
- **Increased incidence of large wildfires:** The risk of large wildfires in California could increase by as much as 55% by century's end.
- **Serious public health threats:** Increasing temperatures exacerbate local air pollution, lead to intensified heat waves, and expand the range for infectious diseases.
- **Water shortages:** Due to rising temperatures, the Sierra Nevada mountain snow-pack that supplies much of the state's water supply could decrease by 80% by century's end. Loss of snow-pack threatens drinking and agricultural water supplies as well as hydropower generation and the health of the state's creeks and rivers.[2]

Berkeley citizens recognize the growing threat that the climate crisis poses and are eager to do something about it. In November 2006, Berkeley voters issued a call to action on the climate challenge by overwhelmingly endorsing ballot Measure G. The mandate was simple but bold: Reduce our entire community's greenhouse gas (GHG) emissions by 80% by the year 2050. The measure directs the Mayor to develop a Climate Action Plan to reach that target.

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[2] Our Changing Climate: A Summary Report from the California Climate Change Center (2006)

Mayor Tom Bates embraced Berkeley citizens' call to action and provided leadership in engaging the community in a local climate protection campaign. The goal of the campaign was twofold. One, provide as many opportunities as possible for Berkeley residents to engage in developing local climate protection strategies that will affect our community for years to come. Two, educate community members about the role each of us can and must play if the Measure G targets are to be achieved.

Berkeley Measure G:
Should the People of the City of Berkeley have a goal of 80% reduction in greenhouse gas emissions by 2050 and advise the Mayor to work with the community to develop a plan for Council adoption in 2007, which sets a ten year emissions reduction target and identifies actions by the City and residents to achieve both the ten year target and the ultimate goal of 80% emissions reduction?

Passed with 81% of the vote in November 2006

This plan is the result of the campaign that Measure G set in motion. It is rooted in the vision for a sustainable Berkeley that emerged from the climate action planning process. The plan's purpose is to serve as a guide for setting the community on a path to achieve that vision.

Vision for year 2050:

- New and existing Berkeley buildings achieve zero net energy consumption through increased energy efficiency and a shift to renewable energy sources such as solar and wind
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- The majority of food consumed in Berkeley is produced locally, i.e., within a few hundred miles
- Our community is resilient and prepared for the impacts of global warming
- The social and economic benefits of the climate protection effort are shared across the community

Turning the vision and this plan into action rests on more than just ideas and good intentions. It requires Berkeley residents, businesses, and institutions to urgently rise to the challenge of making big changes - changes in our infrastructure, technological advances, ramped up green workforce development, and change in the decisions we make every day as members of the Berkeley community. No one entity or sector – not the City government, nor schools, nor industry

or small businesses, nor individual residents – can create these changes alone. Everyone must play a role.

At the same time, our community must ensure that the solutions we propose and implement are sensitive to a broader set of societal concerns such as social justice, local economic vitality, public health, and dependence on oil, a finite resource. Addressing the climate challenge is not only an opportunity to reduce greenhouse gas emissions, but also an opportunity to build a positive, community-based movement in Berkeley that results in increased civic pride and improved quality of life.

The time for complacency and old habits is over. The time for bold action has begun.

Climate Action Plan Purpose

The Berkeley Climate Action Plan was designed under the premise that local governments and the communities they represent are uniquely capable of addressing the main sources of the emissions that cause global warming: the energy consumed in buildings and for transportation, and the solid waste sent to landfills.

The purpose of the plan is to guide the development, enhancement, and ultimately the implementation of actions that aggressively cut Berkeley's greenhouse gas emissions. The plan does the following:

- Describes Berkeley's GHG emissions sources
- Provides an estimate of how those emissions could be expected to grow
- Recommends goals, policies and actions that we as a community can implement to achieve GHG reductions and other community benefits such as increased green job opportunities and improved public health. Several of the recommendations in the plan require Council approval separate from adoption of the Climate Action Plan and also require additional funding in order to be implemented.
- Provides a timeline for the plan's implementation, including identifying existing and potential costs and funding sources
- Defines a strategy for turning this plan into action and transparently tracking and reporting progress toward our goals

Clearly, our community does not start from scratch. Berkeley is known throughout the world as a pioneering green city that is willing to lead social change through innovative and creative action. Ways in which Berkeley exhibits climate action leadership include:

- Berkeley was the first city in the nation to offer curbside recycling
- The City government pioneered the use of bio-diesel and car-sharing in its fleet

- The City was the first to require that energy and water saving measures be implemented at the time a residential or commercial building is sold or being substantially renovated
- Small businesses in Berkeley receive subsidized energy and lighting retrofits
- Residents have access to free energy and water saving devices
- Berkeley was the first City to establish its climate protection targets through a vote of the people

Furthermore, this plan builds on already adopted City policies and plans, including: the Berkeley General Plan, the Bicycle Plan, the Pedestrian Plan, the Green Building Initiative, the Environmentally Preferable Purchasing Policy, the Zero Waste Goal, and Berkeley's official endorsement of the Kyoto Protocol, among others.

Partly as a result of these and many other existing actions and planning efforts, the community reduced the GHG emissions that result from electricity, natural gas and transportation fuel consumption by nearly nine percent between 2000 and 2005 – a truly remarkable accomplishment.

How Was This Plan Developed?

Just as the climate action planning effort was set in motion by Berkeley voters, the plan itself is a product of community members' ideas and vision for a "climate friendly" city.

The City Council allocated two years of funding to enable City staff to perform extensive research on potential climate protection strategies and to conduct a robust community input process. Development of the plan was a cross-departmental effort coordinated by the City's Office of Energy & Sustainable Development (OESD). OESD relied on the expertise of staff from the Department of Public Works, which includes the Transportation Division and the Solid Waste Management Division; the Department of Planning & Development; the City Manager's Office, which includes the Office of Economic Development and neighborhood services staff; and the Department of Health and Human Services; among others.

The public process was designed to maximize the opportunities community members have to contribute ideas, learn more about the various components of the climate issue, and get involved in existing sustainability efforts.

There was extensive opportunity to engage in the development of the plan prior to the release of the first draft in 2008, including:

Climate Action Kick-Off: This event was held in May 2007 and attended by over 170 community members.

Framework Report for Community Engagement: A summary report released in June 2007 that outlines where Berkeley's GHG emissions come from and some potential emissions reduction strategies, and invites community input on Berkeley's Climate Action Plan.

Commission-Hosted "Climate Action Workshops": Seven City Commissions hosted public workshops for the purpose of providing a forum for participation in plan development.

Community Events & Meetings: City staff persons and volunteers participated in many community events. Over 1,500 people stopped by a "Berkeley Climate Action" booth or attended a community event with a climate action component.

Emails, Phone Calls & On-Line Forums: The City also solicited ideas and feedback on a website specifically designed for that purpose (www.BerkeleyClimateAction.org) and through various email networks.

At the invitation of the mayor, a number of local experts in the fields of climate science, energy, transportation, and public engagement also served as informal advisors leading up to the release of the first and second drafts of the Climate Action Plan.

In addition, UC faculty, staff members and student leaders contributed to the plan through their research, volunteerism, and guidance. Chancellor Robert Birgeneau also set a positive example by setting aggressive carbon reduction targets for the University and empowering staff and faculty to develop a concrete and detailed plan on how to reach those targets. Appendix D includes an overview of UC Berkeley's climate protection initiative.

In January 2008, City staff presented to City Council and released for public comment the first draft of the Berkeley Climate Action Plan. Hundreds of community comments were submitted on that draft through a variety of means, including:

- At another round of public workshops hosted by City Commissions and the City's Office of Energy & Sustainable Development
- At additional community-led meetings hosted by organizations such as the Sierra Club, League of Women Voters, Livable Berkeley, and the Bicycle Friendly Berkeley Coalition
- On-line at www.BerkeleyClimateAction.org

An underlying theme of public comments on the first draft is that the plan offered a strong vision, but more specific implementation steps are needed, including an implementation timeline, estimates of costs associated with implementation, and identification of potential sources of funding. Community members also urged the City to be bold when designing strategies to achieve our GHG emissions reduction goal.

A second draft of the Climate Action Plan was presented to City Council in September 2008. It carried forward the main program elements from the first draft, and filled in those program elements with specific measures needed to achieve the necessary scale of GHG emissions reductions. Because the second draft included significant new information staff undertook another round of public review and comment. The public comment period on the second draft was open from September 23, 2008 to January 16, 2009.

This final draft of the plan, adopted by Council on June 2, 2009, once again benefited from community feedback and discussion gathered at approximately a dozen community meetings, including commission meetings, "town hall" meetings hosted by Council Members, and presentations at neighborhood associations. Several community members also provided detailed comments on the second draft at www.BerkeleyClimateAction.org.

The result of the extensive community and expert input is a detailed and far-reaching plan that reflects a wide range of ideas and influences and that benefited from the creativity, diversity and passion that is Berkeley. The City will continue to reach out to local residents, businesses and community organizations to monitor the plan's efficacy, maximize its benefits, and keep it up to date so it can serve as a dynamic blueprint for achieving the necessary scale of GHG reductions.

How does Local Climate Action Interface with Action at the Regional & State Levels?

The Berkeley Climate Action Plan was prepared at a time of unprecedented potential for local, regional, and state government agencies to collaborate on addressing the climate crisis. In December 2008, the California Air Resources Board (CARB) approved the Climate Change Scoping Plan, which contains the main strategies California will use to reduce GHG emissions. The Scoping Plan is a central requirement of **Assembly (AB) Bill 32**[3] (Nunez), the Global Warming Solutions Act of 2006 that requires California to reduce its greenhouse gas emissions to 1990 levels by 2020. Essentially serving as the state's climate action plan, it recognizes the fundamental role of local governments in reducing the emissions that result from energy consumption and waste generation. Many of the measures in the state's plan rely on local government actions. Through the plan, the state also encourages local governments to adopt GHG reduction targets for City government and community-wide emissions, and to develop local action plans for achieving those targets. Berkeley's Climate Action Plan is

[3] See more on state-level climate legislation at www.arb.ca.gov/cc/cc.htm (2009).

already serving as a model for cities across the state that are embarking on their own action planning processes.

An essential component of the state Scoping Plan is reducing GHG emissions from transportation. In September 2008, Governor Schwarzenegger signed **Senate Bill (SB) 375** (Steinberg). SB 375 mandates an integrated, regional land use and transportation planning approach to reducing GHG emissions from cars and light trucks. Cars and light trucks generate about 31% of statewide GHG emissions, and a little over one quarter of GHG emissions within the Bay Area and within Berkeley. The law directs CARB to establish regional GHG reduction targets for cars and light trucks and assigns Metropolitan Planning Organizations (MPOs) throughout the state (the Association of Bay Area Governments and the Metropolitan Transportation Commission in the Bay Area) to develop plans for achieving those targets. Essentially, SB 375 is a mechanism for implementing the measure in the state's Scoping Plan related to reducing regional transportation-related GHG emissions. Through the SB 375 process local governments in the Bay Area (and in other regions) will have to work together to integrate development patterns and transportation networks in a way that achieves regional GHG reduction targets while also meeting housing needs, protecting greenspace, and addressing other regional planning objectives. SB 375 also provides relief from certain California Environmental Quality Act (CEQA) requirements for development projects that are consistent with regional plans that achieve the established GHG reduction targets. The City of Berkeley looks forward to the opportunity to work collaboratively with other cities in the region and views the Berkeley Climate Action Plan as an important resource for developing the regional plan required by CARB.

Another central piece of state legislation that affects climate action at the local government level is **SB 97 (Dutton)**. Signed into law by Governor Schwarzenegger in August 2007, SB 97 provides that greenhouse gas emissions and their effects are subject to CEQA. CEQA requires that agencies identify a given project's potentially significant effects on the environment and mitigate those significant effects whenever feasible. Public agencies such as local governments are therefore now obligated to determine whether a given project's climate change-related impacts are significant and to mitigate any significant effects. CARB is tasked with recommending where the threshold of "significance" lies.

There are several other important state laws and executive orders that interface directly with efforts in Berkeley and other cities throughout California to reduce greenhouse gas emissions and to prepare for the impacts of global warming. These include, but are certainly not limited to:

- **AB 1493 (Pavley, 2002):** Known as the "Pavley Bill," AB 1493 directed CARB to adopt vehicle standards that lower GHG emissions to the maximum extent technologically feasible, beginning with the 2009 model year. The standards would reduce GHG emissions

from California passenger vehicles by about 22% by 2012 and about 30% by 2016,[4] thereby having a significant impact on local GHG reduction efforts.

- **SB 107 (Simitian, 2006):** SB 107 obligates the investor-owned utilities (IOUs) to increase the share of renewable energy sources (e.g., wind, solar, geothermal) in their electricity mix to 20% by 2010. Known as the Renewables Portfolio Standards (RPS), the law is intended to decrease California's reliance on fossil fuels and reduce GHG emissions from the electricity sector. Governor Schwarzenegger has since called for 33% of California's electricity to be provided by renewable resources by 2020. As of 2008, about 12% of California's electricity demand is met with renewable resources. A cleaner, greener electricity grid is a key component of achieving state and local GHG reduction targets. The City of Berkeley supports the Governor's call to increase the RPS to 33% and urges PG&E to achieve that standard.
- **Executive Order (EO) S-13-08:** Given the serious threat of sea level rise to California's water supply and coastal resources and the impact it would have on our state's economy, population and natural resources, in 2008 Governor Arnold Schwarzenegger issued EO S-13-08 directing state agencies to enhance the state's management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. As part of implementation of EO S-13-08, the California Resources Agency, along with the Cal/EPA, the Business Transportation and Housing Agency, the Department of Health and Human Services, and others, is developing the state's first comprehensive Climate Adaptation Strategy (CAS). Berkeley and other local governments should participate in the planning and implementation of the CAS.

Climate Action & Green Collar Jobs

Addressing climate change is not only a cause for environmentalists. Climate action intersects with efforts to create employment opportunities in the emerging green economy. Implementing the Berkeley Climate Action Plan will result in increased demand for skilled labor that can do the work we need done, such as energy efficiency retrofits, solar installations, processing of recyclables, growing and processing local food, and designing, building and maintaining infrastructure related to alternative transportation.

Importantly, this demand for labor is *local*, because it requires improving our *local* environment. It cannot be outsourced. The City must work with neighboring cities and

[4] See more on AB 1493 at www.arb.ca.gov/cc/ccms/ccms.htm (2009).

community agencies to connect local residents to emerging job opportunities. In doing so we will protect the environment and provide pathways to sustainable employment at the same time.

The City of Berkeley and several partners have already begun the task of preparing local residents for jobs in the emerging green economy. Together, through a cooperative effort called the *East Bay Green Corridor Partnership*, the Cities of Berkeley, Oakland, Richmond and Emeryville are joining with leaders from UC Berkeley and Lawrence Berkeley National Laboratory (LBNL) to design a regional program that supports green workforce development. The goal of the effort is to provide the training necessary to meet future workforce demand in the green economy and to continue to attract green energy investment in the region. The partnership works collaboratively to identify regional employer demand and develop new technical and soft skills training and education programs to help meet that demand. The overarching vision is to have in place Green Energy Education Pathways that provide multiple entry points into the training and education system and that lead to jobs with career ladders and benefits. See additional specific strategies for developing a green collar workforce in Chapter 4.

Chapter 2: Berkeley's Greenhouse Gas Emissions Estimates

A. Why Conduct a GHG Emissions Inventory?

Measure G targets an 80% greenhouse gas emissions reduction below 2000 levels by the year 2050. This target is in absolute terms, meaning that it is independent of population or workforce growth. To ensure that Berkeley stays on course to meet this long-term target, it makes sense to set interim, short-term targets and to track emissions reduction progress over time by conducting regular, community-wide greenhouse gas emissions inventories.

It helps to think of an emissions inventory as a "snapshot" of community emissions for a given year. This "snapshot" is a useful policy tool because it quantifies the main sources of heat-trapping emissions for which the community is responsible. Equipped with this knowledge, we can better target policies and actions to address those sources.

The emissions inventory is useful for another important reason: it helps to remind us that we are both part of the global warming problem and part of the solution. The GHG emissions that the inventory captures are the result of *our* energy consumption in *our* homes, businesses, industries and institutions and in *our* motor vehicles. We are sources of global warming pollution, known as anthropogenic sources. Fortunately, we are also the source of solutions. By driving less, creating more energy efficient buildings, shifting to renewable sources of energy and by committing as a community to the actions laid out later in this plan, we can collectively start to turn this problem around. One city cannot solve the problem on its own. But if Berkeley leads, as it has done so often in the past, others will follow.

B. Inventory Methodology

The International Council for Local Environmental Initiatives (ICLEI) conducted Berkeley's GHG emissions inventory for the year 2005. ICLEI provides the accepted community-level inventory methodology for over 700 local governments throughout the world. City staff conducted inventories of Berkeley's 1990[1] and

[1] Berkeley's 1990 GHG emissions inventory is incomplete due to lack of available transportation-related data.

2000 emissions using ICLEI's inventory methodology and emissions analysis software tool (Clean Air & Climate Protection software).

To estimate Berkeley's emissions, ICLEI and City of Berkeley staff persons collected data from a number of different sources. PG&E provided electricity and natural gas consumption data for community-wide energy consumption. This energy consumption data is applied to an emissions factor in order to arrive at an estimate for tons of GHG emissions.[2] The Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (BAAQMD) provided transportation-related data. MTC provides an estimate for total vehicle miles traveled (VMT) within City limits and BAAQMD provides an estimated breakdown of the vehicle types that are responsible for Berkeley's VMT.

When calculating Berkeley's emissions inventory, all electricity and natural gas consumed in the City is included. This means that, even though the electricity used in Berkeley buildings is produced elsewhere, the emissions associated with it appear in the inventory. The decision to calculate emissions in this manner reflects the philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

However, the emissions that result from energy consumption at UC Berkeley (UCB) and Lawrence Berkeley National Laboratory (LBNL) are not included in the inventory. ICLEI's inventory methodology assumes that local governments have little ability to influence the operational decisions of autonomous institutions in a community, such as universities and buildings owned and operated by other levels of government. Both UCB and LBNL are developing and implementing strategies to reduce their own greenhouse gas emissions.

For the transportation sector, Berkeley's GHG inventory estimates the emissions that result from vehicles driven within City limits. While the intent of ICLEI's inventory methodology is to measure emissions that a local government can influence through municipal policy, setting the boundaries of the inventory at the city limits leads to a less than complete picture of how a community may influence those emissions. First, the current methodology under-reports community transportation-related emissions. For example, Berkeley's inventory does not currently capture sources of emissions such as people driving to or from Berkeley by interstate (e.g., on I 80); the emissions that result from Berkeley citizens driving outside of Berkeley; and the emissions that result from citizens of other communities driving to Berkeley (until they reach City limits) for jobs and other services. In short, *Berkeley is responsible for significantly more transportation-related emissions than what is reported in the emissions inventory.*

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[2] The emissions factor for electricity was provided through ICLEI by PG&E and is 0.49 lbs. CO_2e per KWh. The emissions factor for natural gas was provided through ICLEI by the U.S. Department of Energy and is 12.3 lbs. CO_2e per therm.

Second, because the current inventory methodology only captures vehicle travel within city limits, it does not capture how local land use decisions can affect *regional* motor vehicle travel. For example, focusing mixed-use development near transit stations in Downtown Berkeley may increase passenger vehicle miles traveled (and the associated emissions) in Berkeley in the short-term by increasing Berkeley's population. But such a land use strategy would ultimately reduce the *region's* greenhouse gas emissions by enabling more individuals to drive less because they can now live in a more compact, pedestrian-friendly, transit-oriented neighborhood such as Downtown Berkeley.

As described further in the Sustainable Transportation & Land Use chapter, Berkeley's land use and transportation decisions occur in a regional context. Therefore, the community must consider other indicators beyond the community-level emissions inventory when making policy decisions. ICLEI is currently updating its inventory protocols to enable communities to better capture and report transportation-related GHG emissions. In addition, City staff is working to develop more specific estimates for the scale of emissions generated as a result of vehicle miles driven to and from Berkeley.

An additional limitation of note to the current community level emissions inventory methodology is that, despite the fact that the beneficial effects of waste diversion on greenhouse gas emissions are well documented, the Berkeley greenhouse gas emissions inventory *does not* include the emissions that result from the waste our community sends to the landfill. This is not an oversight but, rather, is indicative of the difficulty in accurately measuring solid waste-related emissions. This limitation notwithstanding and in light of the known GHG reduction potential of solid waste diversion, this plan contains a series of solid waste diversion strategies, as well as the potential GHG reductions associated with them. Further, ICLEI is currently partnering with the Alameda County Waste Management Authority & Recycling Board (known as StopWaste.Org) to update Berkeley's emissions inventory to include solid waste-related emissions.

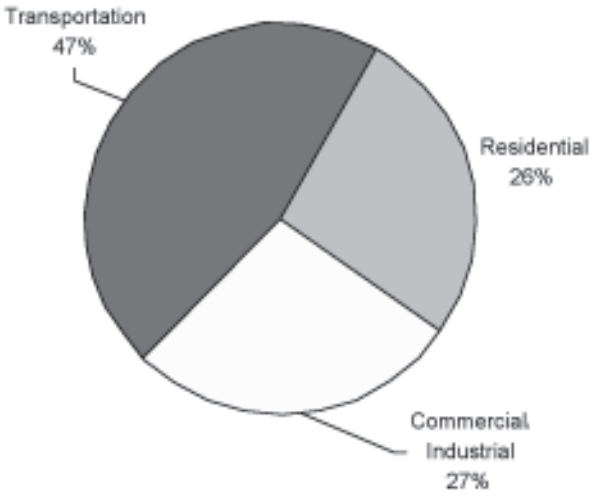
Despite the limitations mentioned above, ICLEI's emissions analysis assistance is sophisticated and useful. But calculating the emissions that result from energy consumption with precision is inherently difficult. The model depends upon numerous assumptions and is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as a rough approximation rather than an exact value.

C. Berkeley's Emissions Portfolio

The table and charts below depict Berkeley's most recent emissions "snapshot," year 2005.

Berkeley Greenhouse Gas Emissions (2005)			
Sector	**Source**	**Metric Tons CO_2e**	**Percent**
Residential		**152,599**	**26%**
	Electricity	40,822	
	Natural Gas	111,777	
Commercial		**157,746**	**27%**
	Electricity	61,302	
	Natural Gas	96,444	
Transportation		**265,544**	**47%**
	Gasoline	169,031	
	Diesel	96,512	
TOTAL EMISSIONS		**575,889**	**100%**

Community Greenhouse Gas (GHG) Emissions by Sector (2005)



Berkeley's community-wide greenhouse gas emissions totaled 575,889 metric tons of CO_2-equivalent ($MTCO_2e$)[3] in 2005. This is roughly the equivalent amount of emissions that result from 106,000 sedans traveling 12,000 miles per year.

Gasoline and diesel consumption by vehicles driving within the Berkeley City limits accounts for about 47% of Berkeley's total greenhouse gas emissions, approximately 265,500 $MTCO_2e$ per year as of 2005. The emissions that result from gasoline consumption, mostly in private vehicles, are nearly double the emissions that result from the diesel consumed in trucks and other large vehicles. Gasoline consumption is the single largest source of GHG emissions in Berkeley.

Commercial and residential buildings account for the remaining 53% of emissions. Natural gas use is by far a larger source of emissions than electricity in both the commercial and residential sectors. Natural gas is predominately used for space and water heating.

Municipal operations constitute about one percent of Berkeley's total emissions. These emissions are included in the commercial and transportation sector data.

The 2005 inventory reflects a significant decrease in greenhouse gas emissions in Berkeley: an almost nine percent decrease between 2000 and 2005, one of the largest reductions in GHG emissions documented by any U.S. city.

A portion of these reductions can be attributed to increased energy efficiency in Berkeley homes and businesses. This period also included the 2000 California

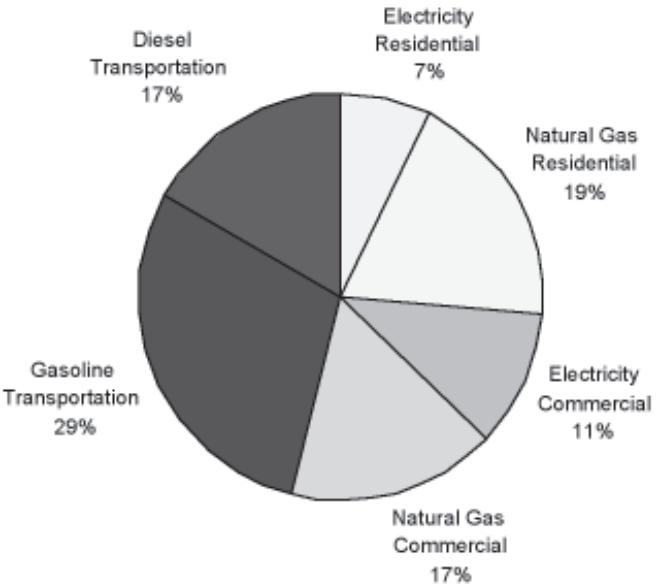
[3] Emissions are aggregated and reported in terms of carbon dioxide equivalent units, or CO_2e. Converting all greenhouse gas emissions to carbon dioxide equivalent units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is 21 times more potent than carbon dioxide in its ability to trap heat, so ICLEI's emissions analysis software converts one ton of methane emissions to 21 tons CO_2e.

energy crisis. Surveys conducted by utilities and community groups at that time show that many consumers turned to energy efficiency in order to reduce energy costs.

According to data provided by the Metropolitan Transportation Commission (MTC), transportation-related emissions remained steady during that same period. The table below shows a slight reduction, but given the approximate nature of the community emissions analysis, the reduction is considered to be within the margin of error.

Berkeley GHG Emissions Trend (in metric tons CO_2e): 2000 - 2005

	2000	2005	Percentage Change
Residential Sector			
Electricity	45,806	40,822	-10.9%
Natural Gas	129,971	111,777	-14%
subtotal	**175,777**	**152,599**	**-13.2%**
Commercial/Industrial Sector			
Electricity	70,636	61,302	-13.2%
Natural Gas	112,417	96,442	-14.2%
subtotal	**183,053**	**157,746**	**-13.8%**
Transportation Sector			
Gasoline	175,888	169,031	-3.9%
Diesel	97,145	96,512	-0.7%
subtotal	**273,033**	**265,544**	**-2.7%**
TOTAL EMISSIONS	**631,863**	**575,889**	**-8.9%**



Overall the reductions add up to approximately 56,000 fewer metric tons of greenhouse gas emissions in the atmosphere compared to 2000, or the emissions equivalent of taking over 12,000 sedans off the road.

While the reduction in GHG emissions in Berkeley between 2000 and 2005 is a remarkable accomplishment, a sustained, community-wide emissions reduction effort is necessary to continue this trend and achieve Berkeley's emissions reduction targets.

How does energy consumption translate into GHG emissions?

1 kWh of electricity = approximately 0.5 lbs. (0.22 kg) CO_2e

1 therm of natural gas = approximately 12 lbs. (5.6 kg) CO_2e

1 gallon of gasoline = approximately 20 lbs. (9.4 kg) CO_2e

D. Emissions Inventory vs. Carbon Footprint

Not all of the greenhouse gas emissions generated by the community are included in Berkeley's emissions inventory. This does not mean that we limit our strategies to those that reduce the emissions we can currently quantify. It means, rather, that with the current state of emissions modeling, a community is limited in its ability to comprehensively measure and quantify its climate impact.

This point illustrates the difference between an emissions inventory and a "carbon footprint." Berkeley's inventory includes the emissions that we know how to measure and that result from actions taken within the City. Alternatively, a "carbon footprint" examines a broader range of emissions for which individuals and institutions are responsible. For example, a "carbon footprint" may examine lifestyle and consumption choices such as air travel; the energy required to grow and ship the food we eat; and the "embodied energy" in products, i.e., the energy associated with acquiring raw materials and manufacturing, packaging, transporting, distributing, using and disposing of a given product. At this time, it is difficult to accurately calculate and assign responsibility for the emissions that result from this energy consumption at a community scale. Nonetheless, it is important that Berkeley residents and businesses do what is in their power to reduce their "carbon footprint" by buying local, reducing packaging and taking other climate-friendly behavioral steps outlined in this report.

E. Emissions Forecast and Targets

Setting interim targets is essential in order to gauge community progress on the road to 80% by 2050. In fact, 10-15 years is about the longest timeframe over which defensible assumptions can be made about the impact on future emissions of things like technological change; future growth in population and housing; and future local, state, and federal legislation.

This plan focuses on actions our community can and should implement between now and 2020, but in the context of promoting the types of innovative approaches that will be necessary to achieve the ultimate 2050 target.

The 2020 target is to achieve a 33% absolute reduction below 2000 community-wide emissions levels, which equates to about a two percent reduction per year in total community-wide emissions. The City will seek to "frontload" reductions in the short-term by achieving at least a three percent annual reduction in community-wide GHG emissions for the first two years following adoption of the CAP (2010 – 2011).

The interim 2020 target is based on the 2050 target established by Measure G. It was determined from a linear extrapolation from year 2000 emissions

levels to the targeted 80% below 2000 levels by 2050. Though the Measure G targets are aggressive and were established based on scientific understanding of the scale of reductions needed to achieve climate stabilization, scientific knowledge of safe thresholds of GHG emissions in the atmosphere has advanced considerably since that time and will continue to advance into the future. As of 2009, leading scientists agree that achieving climate stabilization may actually require reducing global GHG emissions by 25-40% below 1990 levels by 2020, or more. As it works to implement the policies in this Climate Action Plan, the City will also revise and continually update the community-wide GHG reduction target based on the latest scientific understanding. City staff will provide annual reports to City Council on progress made toward achieving its climate protection goals as well as on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization.

To accurately estimate the actual reduction in tons needed to achieve the City's current 2020 target, it is necessary to estimate a forecast of how the community's future emissions may change in a "business-as-usual" scenario. A "business-as-usual" scenario assumes no community emissions reduction activities. It projects emissions based on applying basic housing unit and workforce growth factors to the energy consumption data used to conduct Berkeley's emissions inventory. The Association of Bay Area Governments (ABAG) provides projected workforce and housing unit data in its *Projections 2007*,[4] an estimate of how much Berkeley is forecasted to grow through 2035. Based on these data, City staff estimates that a 30% reduction from forecasted emissions levels is required to meet the absolute target. This equates to an annual GHG emissions reduction of over 188,000 metric tons CO_2e by the year 2020.[5]

Note that when establishing an emissions reduction target for the Berkeley community, it is important to not lose sight of the fact that climate change is a global issue and that GHG emissions know no boundaries. Meaning that even though Berkeley has its own local GHG reduction target (as do hundreds of local governments), it would be antithetical to the purpose of setting a climate protection target if that target were achieved in part by shunning its share of growth and shifting it to other communities. This is especially the case given the fact that Berkeley is a transit-rich, walkable community as compared to most communities in the region. Berkeley residents have generally excellent transit choices as well as extensive bicycle and pedestrian infrastructure.

It is important, therefore, that Berkeley assumes its share of the region's population growth and ultimately establishes a methodology for tracking progress toward the GHG reduction goals that accounts for change in population or economic activity

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[4] *ABAG Projections 2007* is available at www.abag.ca.gov/planning/research/projections_2007.html

[5] The targeted reduction from the 2020 growth forecast is lower than the 33% absolute reduction because there was a significant decrease in emissions between 2000 and 2005, which is greater than the forecasted growth between 2005 and 2020.

that is *inconsistent* with what has been assumed, i.e., an unexpected growth or reduction in Berkeley's population or economy. The outcome of the methodology, which City staff is currently refining, will provide a better accounting of regional transportation-related GHG emissions.

For example, if the Berkeley community were to absorb more household growth than what is forecasted by ABAG, then one could assume that that household growth is being displaced from somewhere else in the region. Because Berkeley is a relatively dense, transit-rich community, one could also assume that the average new household in Berkeley drives less and is responsible for fewer GHG emissions than the average household in the region. Given these assumptions, a new household in Berkeley is displacing some GHG emissions that would have occurred if that household was cited elsewhere, i.e., in a less dense and transit-rich community. In order to account for the regional nature of transportation and land use policy, this displacement of GHG emissions related to where household growth occurs must be captured and quantified. City staff is working to integrate a methodology for doing so in to ongoing efforts to track Berkeley's community-wide GHG emissions and emissions reductions.

In conclusion, greenhouse gas emissions from each of the various sources identified in Berkeley's emissions inventory must decrease steadily and significantly over the coming years to achieve the Measure G targets. This requires implementing an unprecedented array of strategies mainly geared toward reducing energy consumption in buildings and motor vehicles. A series of such strategies, as well as actions for reducing waste, is outlined in the remaining chapters of this report.

Chapter 3: Sustainable Transportation & Land Use

A. The Vision: Cycling, Walking, Public Transit and Other Sustainable Modes of Transportation Become Mainstream

According to Berkeley's most recent greenhouse gas emissions inventory, vehicle trips (including cars, trucks, buses and motorcycles) within Berkeley city limits account for 47% of Berkeley's total greenhouse gas emissions, approximately 265,500 metric tons CO_2e ($MTCO_2e$) per year in 2005. Gasoline consumption in automobiles is the single largest source of emissions in Berkeley.[1]

In order for the community to achieve its GHG reduction target, transportation-related GHG emissions must decline by approximately 30% by the year 2020. This equates to an annual reduction of about 90,000 $MTCO_2e$ within the next 12 years. This is the equivalent of reducing gasoline consumption by over 9.2 million gallons per year by 2020.

To say that achieving this target requires significant change is an understatement. Transportation modes such as public transit, walking and bicycling must become the primary means of fulfilling our mobility needs, and remaining motor vehicle use must be far less carbon-intensive. More active modes of transportation will become the mainstream when they are as convenient and cost effective as driving.

Shifting the balance toward sustainable transportation modes requires a combination of policies, consumer education initiatives, sustained sources of revenue, and effective incentives. In essence, it requires assembling policies and programs that together will aggressively reduce vehicle miles traveled (VMT) and the associated GHG emissions, while also improving community mobility and quality of life. The main pieces of Berkeley's "mobility management puzzle" are:

- **Smart Growth:** "Walkability," "bikeability" and ridership of public transit are fundamentally tied to density and a mix of land uses near transit

[1] The current community-level GHG inventory methodology (provided by ICLEI) measures only the emissions that occur within city limits. It therefore does not include the emissions that result from freeway traffic, airplanes and boats, and vehicle travel on UC Berkeley and Lawrence Berkeley National Laboratory campuses. It also does not include the emissions that result from Berkeley citizens driving outside City limits or from people driving to Berkeley (until they reach the City limit). Please see Chapter 2 for a full description of the emissions inventory methodology.

hubs and jobs (such as in Downtown Berkeley) and along transit corridors (such as San Pablo and University Avenues). To maximize quality of life benefits as well as GHG reductions, Smart Growth in Berkeley must be "green growth." It must support enhanced green space; urban forestry efforts and local food production; green building measures; and effective water conservation and storm water management practices. Smart growth in Berkeley must also help meet the demand for affordable and workforce housing.

- **Increased Safety, Reliability and Frequency of Existing Public Transit:** BART and AC Transit provide essential services to the people of Berkeley and beyond. In order for public transit to become mainstream, these services must expand, improve customer service, and be integrated into a broader mobility management system that includes shuttles, the bicycle and pedestrian network, car sharing, and more.

- **Expansion of other Underused Modes:** AC Transit buses and BART trains serve as the north/south backbone of the East Bay's public transit system. In general, east/west transit service is less frequent, and development of other transit modes is necessary to truly enable community members to travel from their neighborhoods to destinations throughout the City without a car. Travel modes expected to be increasingly important parts of Berkeley's mobility management system include:

  - A network of short-route local transit buses, i.e., employer-based and commercial shuttles and on-demand vehicles
  - A larger network of car share pods conveniently located adjacent to transit networks and in neighborhoods underserved by transportation alternatives
  - An increased role for rideshare/casual carpool programs
  - An expanded bicycle and pedestrian infrastructure including bicycle share programs
  - An increased role for taxis
  - A ferry system that is fully integrated into existing transit services
  - Neighborhood electric vehicles

These modes of transportation must be integrated with AC Transit buses and BART to form a comprehensive, convenient alternative transportation network that connects people to key destinations.

- **Pricing Strategies:** As well as encouraging residents to choose an alternative to the car, it is important that those who choose or need to drive a car pay the full costs, including environmental costs, of doing so. This is especially true for individuals who drive alone. Examples of how these costs may be addressed in Berkeley include:

- Expanding parking pricing (e.g., meters and/or permit zones) to certain areas where parking is currently free
- Implementing a parking fee that would make it more expensive for individuals to own multiple cars
- Increasing parking costs associated with existing on and off-street parking facilities

In addition to local efforts, the City and its residents can also support regional pricing strategies such as:

- Instituting a carbon tax on gasoline
- Implementing "Pay-As-You-Drive" programs in which motorists have the opportunity to lower their insurance costs by driving less

As well as serving as a disincentive to driving, such fees also serve to build revenue that can be used to provide enhanced, more sustainable mobility options in Berkeley and in the region. Action must be taken to ensure that any additional fees do not negatively affect low-income households. On the contrary, fees should be structured and employed to improve access to a range of transportation modes.

- **Enhanced Marketing, Community Education, and Incentives:** Behavior change underlies the success of each of the components outlined above. The City of Berkeley and its partners must combine efforts in the policy arena with targeted education for residents and businesses and savvy marketing of sustainable mobility options.

Each of the components outlined above is described in more detail, along with implementation steps and timelines, later in this chapter.

B. A Growing Problem: Dependence on Driving

Achieving the scale of reductions necessary to reach the community's target is a truly daunting task.

Why is the task so daunting?

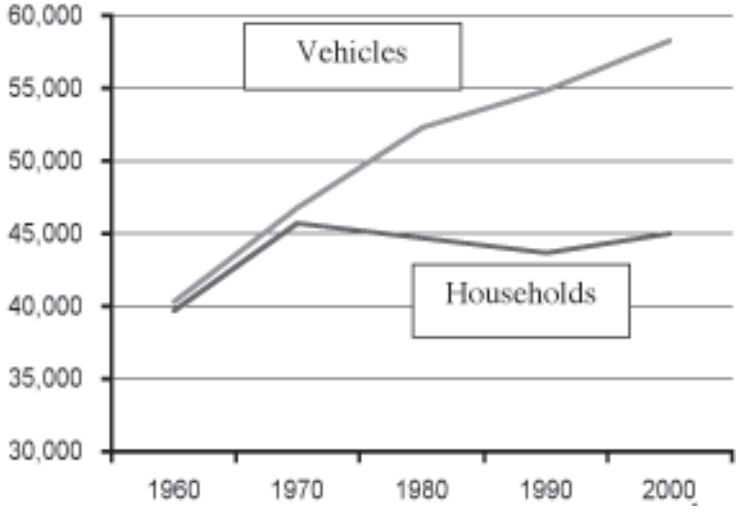
To answer that question it is helpful to visualize the challenge of reducing GHG emissions from the transportation sector as a three-legged stool. One leg represents vehicle fuel efficiency; the second leg represents the fuel's carbon content; and the third leg represents the amount vehicles are driven, known as vehicle miles traveled (VMT). Until recently, legislation at the state and federal levels has largely focused on the first two legs of the stool. Such legislation is essential and effective, but a stool needs three legs to stand.

Technological improvements that result in increased fuel efficiency and lower carbon fuels are being overwhelmed by the steady increase in VMT. Between 1983 and 2001, personal travel in the U.S. grew at an annual rate of 3.6 percent. Since 1982, VMT has increased by 47% per person, from an average of 6,800 miles per person per year to almost 10,000 miles per person per year.[2] Since 1980, the number of miles Americans drive has grown three times faster than the U.S. population, and almost twice as fast as vehicle registrations.

Upward swings in gasoline prices tend to moderate these trends to some degree. But given the difficulty in changing the factors that contribute to increasing VMT, such as low-density community design and people's decisions about where they want to live, it will take many years to reverse current trends.

Close to home, the San Francisco Bay Area is expected to grow by nearly 2 million people, a million cars, over 700,000 new homes, 1.8 million new jobs, and a tripling in freight volumes between 2000 and 2035. The number of daily vehicle trips is expected to increase by 5 million per day and the daily VMT will increase by 50 million miles per day by 2030.[3]

Berkeley household and vehicle population since 1960[4]



The City of Berkeley is not immune to such trends. For example, vehicle ownership has been growing steadily for many years. In 2000, there were approximately 59,500 privately owned cars in Berkeley, nearly 20,000 more than there were in 1960. This is true even though the population of the city has remained essentially steady since the 1970's. In fact, between 1970 and 1990, the Berkeley population decreased by over 13,000 people, while the number of cars owned by Berkeley residents *increased* by approximately 10,000 during that same time period.

In short, as a community, as a region, and as a nation, we are increasingly dependent on driving. The problem of steadily increasing VMT makes it such that transportation-related GHG emissions will likely stay far above the reduction targets established at the state-level by California's Global Warming Solutions Act (AB 32) and at the local-level by Berkeley's Measure G.

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[2] FHWA Traffic Volume Trends, August 2007.

[3] Metropolitan Transportation Commission.

[4] U.S. Census, 2000.

C. Making The Connection: Land Use, Global Warming & Livability

Achieving state and local climate protection goals makes reducing VMT an imperative. How does a rapidly growing Bay Area – which is expected to grow by two million people, one million cars, and 1.8 million jobs by 2035 – succeed at reducing the growth in VMT? The answer lies in a multi-faceted approach, including more citizen education and outreach, strategic transportation pricing, and an enhanced alternative transportation infrastructure. A fundamental component of the approach also lies in growing in a way that makes it easier for community members to drive less.

A large and growing body of evidence shows that living near transit is the single largest influence on vehicle miles traveled.[5] Overall, the evidence shows that people who live near transit drive between 20% and 40% less. Accordingly, the most effective strategy for reducing VMT in the long-term is to site new housing near transit.

The Relationship between Density in Berkeley and GHG Emissions in the Region

The Bay Area is expected to grow by two million people by 2035. Berkeley, like all communities, is responsible for absorbing a share of the increased housing demand associated with expected population growth. If one community does not accommodate its share by not providing enough housing supply, then presumably other communities will be forced to accommodate more than their share.

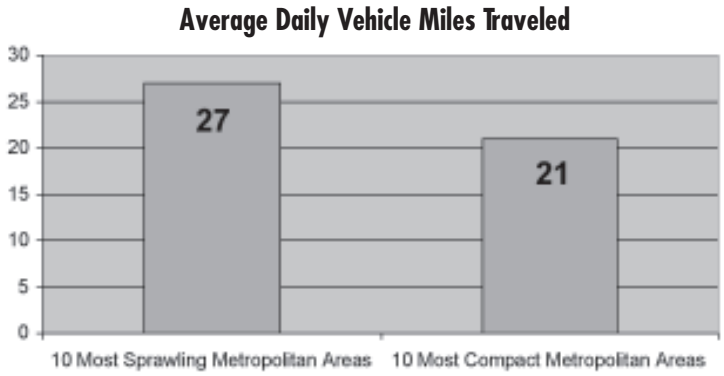
Given the fact that Berkeley is a transit-rich, walkable community as compared to most communities in the region, it is safe to assume that if Berkeley does not accommodate its share of the region's growth, then that growth will occur in areas that are less walkable and transit-rich, and therefore have higher levels of car use and the associated GHG emissions. Conversely, if Berkeley does accommodate its share of growth by providing additional housing units in transit-oriented areas, then Berkeley would be playing a role to effectively reduce regional GHG emissions.

Berkeley has a good record of accommodating its share of the region's growth. For example, for the previous Regional Housing Needs Allocation (RHNA), Berkeley was expected to build 1,269 new housing units between 1999 and 2006. Berkeley built 1,234 units during that time period, which is 97% of the RHNA goal.

While Berkeley should continue to build more housing, greater emphasis should also be placed on other transit-rich communities that have not met their RHNA goals for accommodating the region's growth. It is the region's responsibility as a whole to reduce transportation-related GHG emissions through effective land use policy.

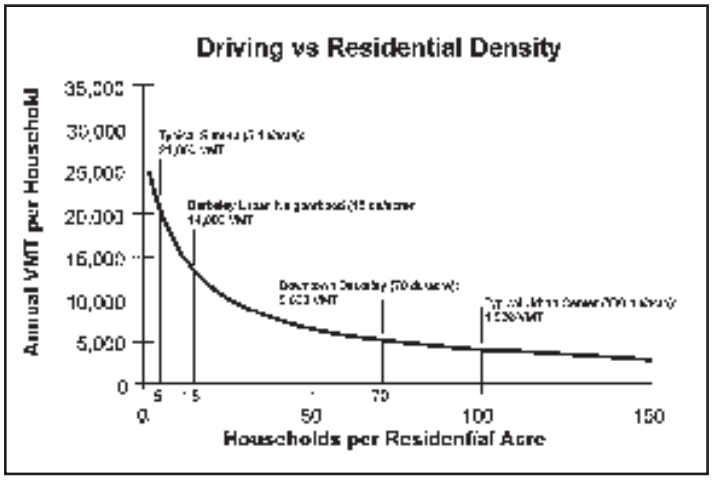
See Chapter 2 for additional discussion regarding regional growth forecasts and their effect on Berkeley's emissions and emissions reduction targets.

[5] The correlation between density and VMT has been measured in studies including but not limited to: a) Holtzclaw et al, "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco;" b) Norman et al, "Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions;" c) Cervero, *The Transit Metropolis*; d) Cervero et al, "Travel Characteristics of Transit-Oriented Development in California;" e) Dittmar & Ohland, *The New Transit Town*; f) Center for Neighborhood Technology, "Hidden in Plain Sight."



Source: Ewing, Pendall, and Chen 2002

The benefits of building more housing in proximity to transit are not only environmental. Compact development patterns result in improved public health (by reducing local air pollutants associated with driving and by promoting a more active lifestyle) and improved access to alternative forms of transportation. In Berkeley, more housing near transit hubs and corridors means more customers for local businesses. Importantly, transit-oriented, walkable, bikeable communities are also more resilient to a volatile economy. For example, housing values in transit-rich areas such as Berkeley are more stable than in the outlying areas of the region. As gas prices inevitably increase, Berkeley residents are also better able than most in the region to hop on transit, walk or ride their bike to fulfill their mobility needs. And transit-friendly, walkable, bikeable communities are also important to maintaining quality of life for the elderly. By 2035 one quarter of the Bay Area population will be over 65 years of age. It is important for older people who would rather not or who are unable to drive to still get around town without having to get behind the wheel.



When municipalities encourage density, they also encourage reduction in VMT (Adapted from Holtzclaw 2002)

While options to improve vehicle fuel efficiency and fuel carbon content are relatively limited at the local level (and are largely addressed through state and federal policy), cities like Berkeley do have significant power to direct any new residential and commercial development toward locations that are close to transit and have retail and other services within walking or bicycling distance. As the Bay Area seeks to accommodate two million people over the next 25 years, it is especially critical that every new unit that is added be well served by transit. Every Bay Area city is expected to do its share of accommodating population growth, and Berkeley is particularly well positioned to do so given its existing high level of transit service.

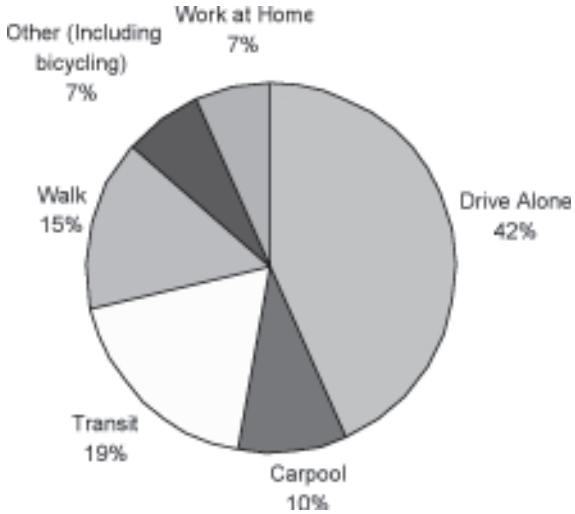
In fact, a number of Berkeley neighborhoods are living examples of how travel characteristics are affected by land use policies. A comparison of travel behavior in the Bay Area shows that Berkeley households drive significantly fewer miles, and emit 58% fewer transportation-related greenhouse emissions, than the average Bay Area household.

When specific areas (called Travel Analysis Zones, or TAZs) in Berkeley are compared, households in zones located near BART stations drive less and are therefore responsible for fewer emissions. For example, residents of Downtown Berkeley emit

Comparison of Average Travel Characteristics between Berkeley and Bay Area[7]				
Area/Zone	**GHGs per household per year**	**Savings compared to Bay Area Avg.**	**% Reduction per household**	**Tons reduced per 1,000 households per year**
Bay Area avg.	6.8 tons	---	---	---
Berkeley avg.	2.9	3.9 tons	58%	3,908
Downtown Berkeley	1.1	5.7	84%	5,709
Ashby BART	2.1	4.6	69%	4,645
N. Berkeley BART	2.7	4.1	62%	4,115

84% fewer transportation-related GHG emissions than the Bay Area average.[6]

There are a number of important reasons for this. First, for a medium-sized city integrated into a larger metropolitan area, Berkeley includes an unusually high proportion of residents who live close to where they work or go to school. For example, many UC students, faculty and staff live in Berkeley in order to be close to campus. Many of them walk or bicycle to campus and those who drive make mostly short trips. ***In the 2000 U.S. Census, 15% of Berkeley residents reported walking to work, compared with just 3.2% in Alameda County.***

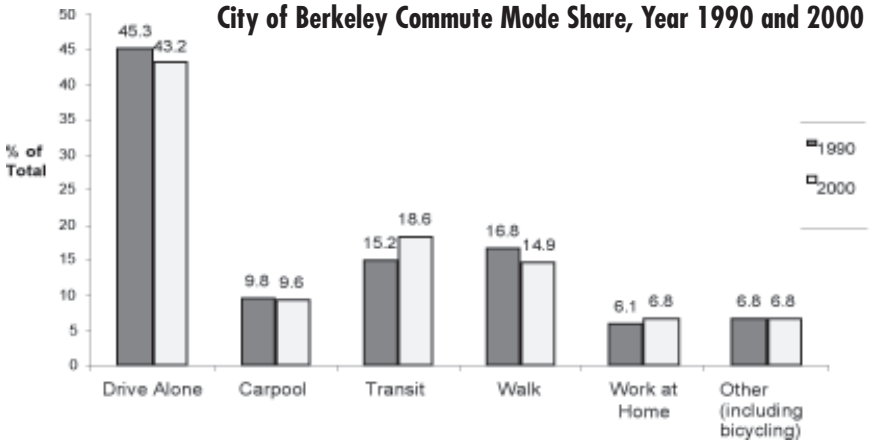


City of Berkeley Commute Modes, Year 2000

Second, residents of the Downtown and other relatively compact neighborhoods are able to make at least some shopping and other non-work trips on foot or bicycle, thereby reducing overall automobile use.

Finally, a relatively high-proportion of Berkeley residents lives near AC Transit lines or one of Berkeley's three BART stations, enabling increased mobility without reliance on a car. In 2000 just 42% of Berkeley residents reported driving alone to work, compared to 66% in Alameda County. Nearly one in five people commute on transit and one in ten carpools.

City of Berkeley Commute Mode Share, Year 1990 and 2000



Such figures are noteworthy. But it is also important to note that Berkeley has not improved its commute mode share markedly since 1990. Clearly, maintaining the status quo will not do if the community is to achieve its voter-approved emissions reduction targets.

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[6] MTC Travel Model and Climate Change maps

[7] Findings based on data provided by the Metropolitan Transportation Commission.

D. Sustainable Transportation & Land Use Actions

The goals, policies and actions outlined in this section are consistent with and build on existing City of Berkeley plans and policies, including:

- The Berkeley General Plan
- Specific Area Plans (including the draft Downtown Area Plan)
- Bicycle Plan
- Pedestrian Plan (currently in draft form)
- Transit First Policy

Ultimately, the purpose of the policies and actions included in this chapter is to serve as guides for doing what is in the community's power to:

- Reduce vehicle miles traveled in the community and in the region
- Increase vehicle fuel efficiency and the utilization of low-carbon fuels

See Appendix A for a consolidated list of goals, policies and implementing actions, along with an implementation timeline, related to sustainable transportation and land use.

1. Goal: Increase density along transit corridors

As has been mentioned, an essential component of reducing transportation-related greenhouse gas emissions in Berkeley and in the region is to direct new development to locations that are close to transit and have retail and other services within walking distance (such as the Downtown).

The Association of Bay Area Governments (ABAG) provides regular forecasts for how the nine-county Bay Region and the cities therein are expected to grow. According to ABAG's *Projections 2007*, the total population of Berkeley is expected to grow from 104,400 in 2005 to 119,400 in 2035 – a total increase of 15,000 people, about half the growth rate projected for the region as a whole. The City is expected to increase its housing stock from 45,530 in 2005 to 50,980 during that same period – or an increase of 5,450 units. The projections expect an average increase in housing of about 182 units per year. Jobs are expected to increase from 75,430 to 87,150, or about 11,700 jobs. ABAG is projecting that the average number of workers per household will increase substantially over the projection period, with employed residents increasing from 55,510 in 2005 to 77,450 in 2035 – or about 22,000 new workers living in Berkeley. Although not calculated by ABAG, this means that the average number of workers per household will increase from 1.22 in 2005 to 1.52 in 2035 – very close to the regional averages for both those figures. It is largely because of this increase in workers per household (both here and in the region)

that the region's (and Berkeley's) job/housing balance does not substantially worsen over the 30-year projection period. Today, Berkeley has about 20,000 more jobs than employed residents. In 2035, Berkeley is projected to have only 10,000 more jobs than employed residents.[8]

The increase in housing units in Berkeley forecasted by ABAG reflects the significant existing imbalance between jobs and housing in the City, and projected employment growth. The City is also relatively "transit-rich" with four fixed rail stations (BART and Amtrak) and over 20 AC Transit bus routes in a relatively small city.

Berkeley's job/housing imbalance results in high demand for limited housing and a large number of people driving into the city on a daily basis. About 50% of employed Berkeley residents, or 28,000 people, live and work in Berkeley. These 28,000 residents fill 44% of the jobs. Thirty-six thousand non-resident commuters fill the remaining 56% of Berkeley-based jobs.

The fundamental issue for Berkeley is the cumulative effect of the need to accommodate its portion of the region's growth – especially given the growth of jobs at UC Berkeley and Lawrence Berkeley National Laboratory. With Berkeley's growth in employment, its central location in the region, and its access to transit, our community is likely to be called on over time to accommodate more of the region's residential growth, rather than less. The City must accommodate long-term growth while preserving the essential qualities of the community and achieving our GHG reduction goals.

The most effective strategy for accommodating growth and reducing VMT is to site new development near transit.

Consider the following additional statistics:

- Households in Transit Oriented Developments (TOD) drive 5,000-7,500 fewer miles per year,[9] and use transit five times more than households in adjacent locations.[10]
- Office workers use transit 3.5 times more when job sites are in close proximity to transit.[11]
- Rates of GHG emissions have been shown to be 2 to 3.4 metric tons per year per household lower within TOD locations.[12]

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[8] *ABAG Projections 2007*. www.abag.ca.gov/planning/research/projections_2007.html

[9] Deborah Dagang and Terry Parker, "Transportation Land Use Strategies to Minimize Motor Vehicle Emissions: An Indirect Source Research Study", California Air Resources Board, 1995.

[10] California Department of Transportation, "Statewide Transit-Oriented Development Study Technical Appendices", 2002.

[11] Lund et al. (2004) "Travel Characteristics of Transit-Oriented Development in California".

[12] California Department of Transportation, "Statewide Transit-Oriented Development Study Technical Appendices", 2002.

Compact development also provides several other benefits, including preservation of forests, open space and farmland by focusing growth in the urban core; providing more opportunities for physical activity like walking and cycling; and reducing costs associated with road construction and other infrastructure.

Clearly, by accommodating more people near jobs, transit and other services, the Berkeley community can play an important role in reducing GHG emissions and maintaining a vibrant, healthy community.

At the same time, many in Berkeley are concerned about the impact of increasing density on neighborhood character and community quality of life. In Berkeley, where transit corridors such as San Pablo, University and Shattuck Avenues are sometimes adjacent to existing lower density residential neighborhoods, design and zoning tools should seek to step down density into the neighborhood, while maintaining or even increasing what is permitted immediately adjacent to the major boulevard. In this manner, impacts on existing neighborhoods can be minimized. It is also imperative that new development is built (or renovated) according to nationally recognized green standards and encompasses requirements and incentives to enhance local green space, conserve natural resources, protect sites of historical significance, and minimize shading of public places. In this way Berkeley can absorb growth in a manner that is not only consistent with stated GHG-reduction goals, but also improves community livability.

a. Policy: *Encourage the development of housing (including affordable housing) retail services, and employment centers in areas of Berkeley best served by transit*

Policies to increase residential and commercial density near transit are already articulated in the Berkeley General Plan, Land Use (LU) chapter. Examples include:

> *Policy LU-23 Transit-Oriented Development:* Encourage and maintain zoning that allows greater commercial and residential density and reduced residential parking requirements in areas with above-average transit service such as Downtown Berkeley.
>
> *Policy LU-25 Affordable Housing Development:* Encourage development of affordable housing in the Downtown Plan area, the Southside Plan area, and other transit-oriented locations.

As well as reducing commute VMT by adding housing near transit, the community can do more to reduce the number and length of shopping trips that require driving. While residents are able to meet some of their needs in local commercial districts, Berkeley lacks stores in significant categories like consumer electronics, appliances, men's clothing, and, in some areas, grocery stores. Filling gaps in retail demand can help reduce the need for Berkeley residents to drive to shopping malls in Emeryville, Walnut Creek, or other cities.

Locating compact residential development and neighborhood-serving retail development along the same transit corridors represents an integrated strategy for

reducing VMT and increasing other mobility options. More retail options provide residents, workers, and transit riders with more convenient access to services, while more residents and workers translate into more customers for local stores and services. Further, adding affordable housing and residential-serving retail in Berkeley's most transit-accessible corridors also has the potential to provide low-income households with convenient access to transportation and other services without having to own a car.

Implementing Actions:

- *Conduct a "land use scenario study" in order to help visualize, quantify, and compare the impacts on VMT (and the associated GHG and local air pollutant emissions) of various land use scenarios.* The study should also consider the impacts of various land use scenarios on solar access, views, and usable open space. The study should focus its analysis on corridors within Berkeley that are best served by public transit and/or have the potential to be transit-served corridors in the future. The study should also help to identify and prioritize additional opportunities to create/expand green space within the city.
- *Implement zoning adjustments to facilitate a mix of housing and commercial development (including retail services and employment centers) in certain transit-served areas.* Proposed zoning adjustments or changes to the General Plan will not have any force or effect until approved by a separate action by the City Council. Such proposals will undergo thorough review by commissions, community members and the City Council. Review processes will include noticed public hearings. Proposed zoning adjustments include:
    - Encourage car-lite (e.g., households with fewer cars than driving-age residents) and, where possible, car-free (e.g., households without cars) development in certain transit-served areas by creating incentives and eventually requiring developers and business owners who work with the City, AC Transit, BART and other appropriate agencies to develop and implement a plan of action for reducing the impact of their development/business on VMT
    - Encourage car-lite and/or car-free development in certain transit-served areas by making parking requirements more flexible for developers and business owners that site near transit and that provide services, infrastructure and/or mitigation payments to reduce parking demand. Options a developer/business owner could provide in lieu of providing parking spaces may include:
        - ✔ Car share parking
        - ✔ Indoor and outdoor bicycle parking

- ✔ Indoor showers and changing rooms for cycling employees
- ✔ Dedicated parking for electric vehicles, hybrids and plug-in hybrids
- ✔ Implementation of an Eco-Pass program for employees/tenants
- ✔ Mitigation payments that would be allocated to local transportation demand management projects

- Establish parking maximums in specified transit-rich areas of the City.
- Adjust zoning to allow for greater residential density and specified commercial uses along certain transit corridors and in proximity to the Downtown Berkeley, Ashby and North Berkeley BART stations
- Establish minimum building heights in certain transit-rich areas such as the Downtown in order to prevent the underutilization of transit-served areas
- Ensure that dense transit-served corridors transition well into surrounding lower density residential zones in order to preserve the character of interior neighborhoods
- Increase current bicycle parking requirements for new development in Berkeley

■ *In order to improve livability and reduce VMT in existing neighborhoods that are not well served by transit, consider where in-fill neighborhood-serving retail, that is oriented to basic daily needs such as "corner stores" and small markets, may be feasible.*

■ *Develop tools and guidance that the Zoning Adjustments Board (ZAB), Planning Commission and City Council can utilize in order to effectively consider and reduce the impact on GHG emissions of a given land use-related proposal.* Examples include:

- Provide guidance and tools to the ZAB and Planning Commission that would help to guide the process of reviewing a given proposal based on the impact the proposal would have on local and regional GHG emissions. The guidance and tools would help the ZAB to consider the impact on GHG emissions of a given proposal when administering the "non-detriment finding." This guidance would reflect City Policy on the importance of reducing greenhouse gas emissions
- Require that any changes that result in "down-zoning" in certain areas in proximity to transit undergo a thorough review for impact on local and regional GHG emissions

■ *Partner with UC Berkeley to assess and address unmet housing demand of UC employees and students.* UC Berkeley is the largest employer in the City of Berkeley and therefore has a substantial impact on commu-

nity VMT. The high cost and high demand for housing means that many UC employees and faculty are unable to live in Berkeley. UC could do more to address those housing needs. Some institutions directly address this issue by either developing housing themselves, subsidizing others to do so, or through direct housing assistance to employees.

- *Partner with UC Berkeley and the Berkeley Unified School District to identify opportunities to site affordable housing near transit for faculty and staff.*
- *Provide enhanced assistance during the permit process for transit-oriented development projects.*
- *Encourage the preservation and adaptive reuse of historic buildings. Preservation can be an important climate protection strategy that does not conflict with the goal of building new transit-oriented housing.* Preservation and reuse of existing buildings not only preserves embodied energy in buildings, but also reduces the GHG emissions associated with demolishing a building, transporting demolition debris, and building a new building. Existing buildings can be intensified to create additional housing or commercial space to help meet future demand.

2. Goal: Increase and enhance urban green and open space, including local food production, to improve the health and quality of life for residents, protect biodiversity, conserve natural resources, and foster walking and cycling

Green and open spaces are essential components of Berkeley's livability, public health and ecological sustainability. Safe and inviting public parks, vibrant community gardens, and high-quality street design help to foster physical activity (and low-carbon mobility) such as walking and cycling. Well-designed open spaces can also serve as parts of an advanced and integrated stormwater system that promotes stormwater quality and reduces downstream flooding. Utilizing natural systems to manage water resources also has the potential to reduce the need for more energy and carbon intensive stormwater infrastructure projects. Further, Berkeley's parks, gardens and streetscapes can be designed to conserve shrinking water resources by utilizing drought-resistant plants and water-efficient irrigation techniques.

a. Policy: *Require new developments in specified areas to contribute to street-level open space on site or in the public realm*

Implementing Actions:

- Establish an "Open Space Fee" or similar mechanism for the creation of new and enhancement of existing streetscapes, public open space, and community gardens.
- *Allow multi-unit residential projects to provide street-level public open space in lieu of some required on-site private open space.*
- *Consider the feasibility of establishing policies that would discourage the removal of usable open space in private lots unless such open space would be provided elsewhere on site or the property owner agrees to pay an "Open Space Fee" or similar mechanism which would be used to fund the maintenance of existing or the creation of new public open space.*

b. Policy: *Promote tree planting, landscaping, and the creation of green and open space that is safe and attractive and that helps to restore natural processes*

A healthy urban forest has several benefits, including:

- Reducing the energy consumption associated with air conditioning buildings by providing shade
- Reducing local ambient temperatures by shading paved and dark colored surfaces like streets and parking lots that absorb and store energy rather than reflecting it
- Intercepting and storing rainwater, thereby reducing water runoff volume
- Improving community quality of life through beautification and by reducing noise pollution and encouraging pedestrian traffic

Trees also provide a GHG reduction benefit through a process called carbon sequestration. A single mature tree can absorb as much as 48 lbs. of carbon dioxide per year. Estimates are that between 660 and 990 million tons of carbon is stored in urban forests nationally.[13]

Implementing Actions:

- *Maintain and protect mature trees wherever possible and maximize tree planting as part of public open space and street improvements.*
- *Consider developing street tree master plans for sub-areas within the City.* Such plans would guide the selection of appropriate tree species for streets and open spaces and outline a regular maintenance and planting cycle to ensure that hazards to trees are minimized and that the local tree stock continues to increase.

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[13] Alexander, Katherine. *Benefits of Trees in Urban Areas.* www.coloradotrees.org/benefits.htm.

- *Consider developing a tree preservation ordinance that would articulate strong standards for the preservation and replacement of trees in the public right of way.*
- *Identify opportunities for tree planting and to maintain existing and create new public open spaces in order to increase community access to parks and plazas.* The City should ensure that as development increases along certain transit corridors it is accompanied by an appropriate level of tree planting and green and open space enhancements.
- *Establish standards and guidelines to ensure that ecologically beneficial stormwater quality and retention features and water conservation features are integrated into the design of landscaping features on both public and private land.*
- *Encourage the development of green roofs by providing outreach and guidelines consistent with the building code.*

c. Policy: *Increase access to healthy and affordable foods for the community by supporting efforts to build more complete and sustainable local food production and distribution systems*

The "Victory Garden" movement during World War I and World War II turned the U.S. into a nation of gardeners. This was a time of crisis in which the federal government asked citizens to plant gardens to reduce pressure on the food supply brought on by war. In 1943, Americans planted over 20 million Victory Gardens and the harvest accounted for nearly a third of the vegetables consumed in the country that year.[14]

Today gardening and a growing local food movement are again making a comeback. Communities' desire to cut costs, eat healthier, and reduce their carbon footprint, along with concerns about our food system's dependence on rapidly depleting fossil fuels, is spurring a move toward more sustainable food production and distribution.

Sustainable food systems reduce the distance food must travel to get to our tables. When food is produced, processed and distributed near where it is consumed, transportation miles are minimized as well as are the associated pollutants. According to a WorldWatch Institute study, a typical meal brought from a conventional supermarket chain consumes 4-17 times more petroleum for transport than the same meal using local ingredients.[15] Despite California's massive food production capacity, the state imports 40% of its food, which translates into at least 250,000 tons of GHG emissions per year, according to an NRDC study.[16]

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[14] See www.revivevictorygarden.org (2009)

[15] Hal Walweil, "Home Grown: The Case for Local Food in a Global Food Market." WorldWatch Institute, 2002.

[16] NRDC Policy Fact Sheet, "Food Miles: How Far Your Food Travels has Serious Consequences on your Health." NRDC, 2007.

Sustainable food systems also prioritize the consumption of organic food over conventional food, and the consumption of vegetables rather than meat. Organic food production requires far less fossil fuel inputs than conventional systems, which in turn reduces GHG emissions. Likewise, a meat diet requires twice as much energy to produce as a vegetarian diet.[17] Globally farm animals generate 18% of GHG emissions, according to estimates by the United Nations.

Local food systems offer a host of social and economic benefits as well. For example, growing a garden can make a difference for a family's food budget. And efforts to increase access to local, affordable, healthy food for low-income families, the elderly, and others with mobility challenges can improve public health. Local food systems also help to insulate communities from volatile oil prices, which in turn affect food prices. Finally, food localization can create high-quality local green jobs in the farming, food processing and distribution trades.

The City of Berkeley already has a foundation on which to build when it comes to promoting local, nutritious food. The City Council adopted a Food and Nutrition Policy in 2001. Its purpose is to "help build a more complete local food system based on sustainable regional agriculture that fosters the local economy and assures that all people of Berkeley have access to healthy, affordable, and culturally appropriate food."[18] Examples of how this policy is currently being implemented include the City's financial and logistical support of community gardens and the City has also included local food criteria in Requests for Proposals (RFP) for vendors to prepare and deliver food for the City of Berkeley Summer Food Program.

In response to crises like climate change, Peak Oil, health disparities, a shaky economy, and the loss of greenfields and farmland due to suburban sprawl, the City and its partners must do more to build a resilient and sustainable local food system.

Implementing Actions:

- *Encourage and support existing community gardens as well as neighborhood initiatives to launch additional community gardens.*
- *Include community gardens and orchards in the planning for the Santa Fe Right-of-Way.*
- *Encourage local community gardens to donate excess produce to local food banks.*
- *Continue to provide compost to community and school gardens.*
- *In collaboration with local business associations and merchants, continue to expand and promote the* ***Buy Local Berkeley Campaign***. The goal of the campaign is to build a vibrant local economy by encour-

[17] Heller, M.C. and G.A. Keoleian. *Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System.* 2002.

[18] The City of Berkeley Food and Nutrition Policy is available at: www.ci.berkeley.ca.us/PUBLICHEALTH/chronicdisease/food-policy-exhibit-a925.pdf

aging consumers and businesses to buy local. Shifting more consumer purchases to local businesses has the potential to increase tax revenue for the City, expand local investments in non-profits and local businesses, and create more local jobs while simultaneously reducing vehicle miles traveled.

- *Consider developing and adopting a Buy Local Ordinance that would give preference to local businesses.* The ordinance would encourage local institutions, businesses, and consumers to join the City in spending locally.
- *In partnership with business associations and others, create incentives for restaurants that feature local, organic foods.* Incentives could include marketing and promotion assistance, among others.
- *Support local educational institutions such as the Berkeley Unified School District, the Berkeley Adult School and UC Berkeley to continue educating students in growing and preparing their own food.* Nearly all of the Berkeley Unified School District's (BUSD) schools have gardens, several of which produce food for school consumption. Through garden and cooking classes, students are introduced to food production, nutrition, composting, and ecological awareness.
- *Promote the purchase of food from local producers for schools, senior centers, after-school programs, the summer food program and others.* This action can be carried out by including local and nutritious food criteria in Requests for Proposals for vendors to prepare and deliver food for such programs. Currently 30% of the produce BUSD serves to students is sourced locally.
- *Support state and federal legislation that prioritizes local food production.*
- *Continue to make street space available for farmers markets and explore opportunities for additional markets in Berkeley so as to increase access to local, healthy food.*
- *Encourage and provide guidelines consistent with the building code for buildings to incorporate rooftop gardens that can be used for food production.*
- *Through the City's website and publications, encourage residents to grow food in home and community gardens using methods that reduce GHG emissions, such as using organic inputs and compost.*
- *Through the City's website and publications, make information available to the public to facilitate consideration of a less carbon-intensive diet, such as eating less meat and choosing vegetarian or vegan options instead.*
- *Support local efforts to provide training to residents in farming and gardening techniques.*

- *Work with East Bay Municipal Utility District to consider a program that would provide reduced water rates for community gardens as an incentive for residents to utilize community garden space to grow their own food.*
- *Identify opportunities to open up City-owned vacant land to encourage local food production for local consumption.*
- *Support the development of local food distribution and processing facilities.* The City can provide this support in several ways, including: utilizing procurement dollars and City contracts to support local green businesses and providing marketing assistance.
- *In collaboration with AC Transit, identify opportunities to improve public transportation options to local food markets.*
- *Work with community partners to identify methodologies for better tracking and reporting on the rate of local food production and consumption and the associated cost and GHG impacts, and other indicators.*

3. Goal: Manage parking more effectively to minimize driving demand and to encourage and support alternatives to driving

a. Policy: *Design and implement parking strategies to create disincentives for driving – especially for single-occupancy commuting – and, where possible, to build revenue for transportation services.*

Such services may include:

- Expansion of car sharing
- Improved bicycle infrastructure
- Bicycle-sharing programs
- Sidewalk repair and other pedestrian improvements
- A local shuttle bus network

Implementing Actions:

- *Encourage UC Berkeley, the City's largest employer, to reduce its plans to build new parking spaces and to also revise its parking policies and programs to better encourage, support, and invest in alternatives to driving.*
- *Identify areas in Berkeley in which increased parking rates would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses.* Such neighborhoods should be well served by alternative transportation options.

- *Identify areas in Berkeley in which extending parking meter hours of enforcement would effectively discourage driving and build new revenue while not having a significant negative effect on local businesses.*
- *Consider the establishment of Parking Benefit Districts, which would receive a portion of parking revenues generated in the area.*
- *Evaluate the feasibility and efficacy of redesigning the Residential Preferential Parking (RPP) Program so as to apply it citywide (in every neighborhood) and utilize the revenue to design programs and infrastructure that make alternative transportation options more accessible, convenient and attractive.*
- *Structure RPP permit costs so that each additional permit acquired by a given household escalates in cost.*
- *Consider setting RPP permit prices based on the fuel efficiency of the vehicle for which the permit is being acquired.*
- *Install RPP permit holder-exempt parking meters in some RPP zones.*
- *Make on-street parking rates equivalent to or higher than off-street (parking lot) parking rates.*
- *Raise on- and off-street parking rates as appropriate.*
- *Consider putting an increase to the City's 10% tax on off-street parking revenue on the ballot.*
- *"Un-bundle" prices for housing and parking so that parking spaces require separate payment and are not included in the rent or purchase price of a unit.* Those who choose to live car-free should not be burdened with the cost of a parking space they do not need. And those that do require a car should be made aware of the full costs associated with owning it.
- *In certain popular destinations such as the Downtown, employ parking information signage to direct motorists to available off-street parking.* This action minimizes idling and motorists' need to drive around in search of an open spot.
- *Ensure that local employers are abiding by state requirements to participate in the parking cash-out program.* State law requires certain employers who provide subsidized parking for their employees to offer a cash allowance in lieu of a parking space. The intent of the law is to reduce vehicle commute trips and emissions by offering employees the option of "cashing out" their subsidized parking space and taking transit, walking, cycling, or carpooling to work instead.

- *Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles.*

4. Goal: Identify opportunities for generating sustained revenue for implementing community transportation demand management programs

a. Policy: *Create additional strategic fees/taxes in order to build revenue for transportation demand management (TDM) efforts and to further discourage driving alone*

Implementing Actions:

- *Institute a "Transportation Services Fee" for new development and utilize funds in part for alternative transportation programs that reduce vehicle trips and traffic congestion.*
- *Institute an "In-Lieu Parking Fee" on new development and utilize funds in part for alternative transportation programs that reduce parking demand.*
- *Encourage UC Berkeley to implement a "Transportation Services Fee" on new off-campus projects to mitigate the transportation impacts associated with new development.* Fee revenue would go towards funding alternative transportation programs.
- *Conduct a feasibility analysis of a City of Berkeley "congestion pricing" program.* Congestion pricing is the practice of charging motorists to use a given roadway during times of heaviest use. Its purpose is to ease traffic congestion and promote alternative forms of transportation.
- *Support development of a regional "climate mitigation fee" applied to either gasoline or vehicle registration.* The revenue would be used to support public transportation and other transportation demand management efforts.

5. Goal: Accelerate Implementation of the City's Bicycle & Pedestrian Plans

The City of Berkeley is already a recognized leader for its efforts to make walking and cycling a safe, healthy and enjoyable alternative to driving. Our community ranks as the safest of its size in California for walking and bicycling and recently won the National Organization on Disability's Accessible America Competition.

Continued enhancement of the City's cycling and walking infrastructure is a longstanding City priority. The City emphasized the importance of a robust cycling network in its 1977 Master Plan and has since adopted and updated a Berkeley Bicycle Plan (last updated in 2005). The City is also currently completing the first citywide Pedestrian Master Plan. These plans are comprehensive blueprints for making alternatives to the automobile more comfortable and safe, thereby encouraging people to shift from driving and toward making trips by bicycle or by foot. The plans seek to address bicycle and pedestrian safety, improvements in the community's bicycle and pedestrian infrastructure and more.

In 2003, Berkeley established a citywide network of Bicycle Boulevards. Bicycle Boulevards use large pavement markings, attractive signs, traffic calming, and other improvements placed on a convenient, evenly-spaced network of low-traffic, low-speed streets throughout the city.

As of 2000, about 15% of Berkeley residents commuted to work on foot and about five percent commuted by bicycle. Getting more people to leave their car at home for both work and non-work trips is a fundamental component of achieving Berkeley's greenhouse gas emissions reduction goals.

For example, the Berkeley Bicycle Plan sets a goal of doubling the share of bicycle commuting from five percent to 10% (as a reference, the City of Davis, CA has a bicycle commute mode share of nearly 15% despite the fact that the city is less compact than Berkeley).

City staff estimates that achieving a five percent increase in bicycle commute mode share plus a doubling of the share of non-work commute trips made by bicycle would result in a reduction of over 2.5 million vehicle miles driven annually. This equates to a 1,157 metric tons reduction in GHG emissions annually.

a. Policy: *Continue to expand and improve Berkeley's bicycle and pedestrian infrastructure*

Implementing Actions:

- *Integrate bicycle boulevards and pedestrian networks into broader alternative transportation system and identify mobility gaps that could be addressed through additional bicycle/pedestrian infrastructure.* Additional infrastructure could include bicycle lanes and boulevards, signage showing distance to various destinations, sidewalk lighting, etc. Explore funding from such programs as the "Safe Routes to Transit" program for this purpose.
- *Extend Bicycle Boulevard network. For example, construct an extension on the 9th Street Bicycle Boulevard.*
- *Improve cross-jurisdictional bicycle route connections through signage, bikeway route modification where warranted, and physical improvements.*

- *Identify opportunities to modify City streets to better serve the safety and needs of pedestrians and cyclists.* Street modifications that serve to slow or reduce automobile traffic and make walking and cycling more safe and viable include traffic circles and allocating additional roadway space to cyclists. The City should develop and adopt "Complete Streets" design standards, and routinely accommodate bicycle and pedestrian improvements in all streets and sidewalks projects.
- *Identify and implement opportunities to improve the flow of cycling along bicycle boulevards, consistent with public safety, including consideration of replacing stop signs with yield signs at traffic circles on bicycle boulevards.* Many Berkeley cyclists see the stop signs as unnecessary and inconvenient given that the traffic circles already effectively slow automobile traffic, and are designed to function as "all-yield" intersections.
- *Continue to create additional bicycle parking throughout the community, including near transit centers and other key destinations and as part of any new development projects.* Since 1996, the City has installed more than 500 bicycle racks, supported the installation of electronic bicycle lockers at BART and rail stations, and helped to establish the Downtown Berkeley BART Bike Station. In 2008-09, the City plans to add approximately 350 new on-street bicycle racks, with a capacity for 700 bicycles. BART has bicycle storage at the Ashby BART Station, and an expanded Downtown Bike Station is under consideration.
- *Provide adequate sidewalk width, pedestrian crossing time, "count down" signals, and universal access signal features at all signalized crosswalks.*
- *Evaluate the need for new mid-block pedestrian crosswalks where there are high volumes of pedestrians and a long distance between intersections.*
- *Regularly update the Bicycle and Pedestrian Plans, including updating indicators of pedestrian and cyclist safety.*
- *Consider establishing a network of bicycle rental stations. As a first step, conduct a feasibility analysis to help identify program design, costs and funding options.* Bike-sharing programs implemented in other parts of the world have proven to be effective. In Paris, for example, a network of automated bicycle rental stations is placed within a few hundred yards all over the city. Bicycles can be borrowed and used for short trips for a small fee. A much smaller scale program was established in Washington, D.C. in 2008, and a number of other U.S. cities are studying or developing bike-sharing programs.

b. Policy: *Partner with local and regional organizations and agencies to promote and market cycling and walking as attractive alternatives to driving*

A number of local and regional agencies and organizations are already dedicated to promoting cycling, walking and other alternative forms of transportation. Examples include:

- Sierra Club
- Bicycle Friendly Berkeley Coalition
- East Bay Bicycle Coalition
- The Berkeley Path Wanderers Association
- TransForm (formerly known as the Transportation and Land Use Coalition)
- BART
- AC Transit
- Alameda County Transportation Improvement Authority
- Alameda County Congestion Management Agency
- Metropolitan Transportation Commission
- Bay Area Air Quality Management District
- Livable Berkeley
- Berkeley Design Advocates
- Greenbelt Alliance
- Urban Land Institute

It is important to leverage existing outreach efforts when working to increase the mode share for cycling and walking in Berkeley.

Implementing Actions:

- *Secure marketing firm to design a community-wide marketing campaign to increase the mode share of bicycles and walking (and other forms of alternative transportation).* The campaign should succeed at encouraging and educating residents and employees regarding how to meet their mobility needs in a safe, healthy and fun way without driving a car.
- *Enhance bicycle and pedestrian safety outreach and education for cyclists, walkers and drivers.* For example, the City of Berkeley's Public Health Division, along with other City divisions, should continue to provide safety education and promotion of cycling and walking. Partners in this effort include the California Office of Traffic Safety, the Alameda County Safe Routes to School Program, and International Walk to School Day.
- *Promote participation is such bicycle promoting events as Bike to Work Day.*

- *Promote the use of bicycle delivery services and bicycle cargo trailers to local businesses and residents.*

c. Policy: *Partner with BART, AC Transit, and other transit providers to improve bicycle access on trains and buses and at stations and stops*

Improvements to bicycle access on BART, AC Transit, UC and LBNL shuttles and at transit stations and bus stops can help reduce car trips by making the combining of cycling and transit a more viable and convenient travel option.

Implementing Actions:

- *Expand and improve secure bicycle parking at all Berkeley BART stations and bus stops.*
- *Increase the capacity for bicycles on BART trains by removing some seats and making other changes to select cars.*

d. Policy: *Continue to incorporate bicycles into municipal operations*

Implementing Actions:

- *Maintain and expand the Bicycle Fleet Pool available for City employees and encourage more City staff persons to take advantage of it.*
- *Continue to provide secure bicycle parking near City Hall and other city employment sites.*
- *Consider other bicycle fleet programs such as electric bicycles, cargo bikes, and mileage reimbursement for employee's personal bicycle use for work trips.*

6. Goal: Make public transit more frequent, reliable, integrated and accessible

The choice to use transit over a private automobile is dependent on many variables, including: reliability, frequency of service, cost, travel time, perceived safety, and comfort. Improvements in any one of these factors can increase transit ridership.

High-density, transit-rich cities experience significant reductions in private automobile use. A study by John Holtzclaw of the Sierra Club found that, in San Francisco, a reduction of nine vehicle miles traveled is achieved for every passenger mile of transit service.[19] Other research shows that the total effect of public transportation nationwide is to reduce energy use in the transportation sector by the equivalent of 4.2 billion gallons of gasoline per year. Public transportation reduces GHG emissions from automobile travel by 37 million metric

[19] Sharon Feigon, *Transit Matters: Mitigation Climate Change with Sustainable Surface Transportation*, U.S. Federal Transit Administration, Transportation Research Board, 2003.

tons per year. For perspective, to achieve parallel savings by planting new forests, one would have to plant a forest larger than the state of Indiana.[20]

Berkeley is lucky to have generally excellent transit choices, with three BART stations, more than 20 AC Transit routes, numerous shuttles (UC, LBNL, Alta Bates, West Berkeley Shuttle), Capitol Corridor/Amtrak, as well as paratransit, private shuttles, and taxis.

In 1996, Berkeley adopted a Transit First Policy (Resolution 58,731), which states, "It shall be the official Policy of the City of Berkeley that alternative transportation and public transit be given preference over single occupancy vehicles on designated preferential transit streets."

As of 2000, about 20% of Berkeley residents used BART or the bus for their work commute. Increasing this percentage requires working closely with AC Transit, BART and community-based organizations to ensure that fares stay low or get lower, more frequent service and more routes are added, and that the safety and comfort of the transit systems are improved. Efforts must also be made to increase the use of transit for non-work trips.

a. Policy: *Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley*

Implementing Actions:

- *Integrate bus routes into broader alternative transportation system, identify gaps in bus service routes and potential scenarios for addressing such gaps, and improve frequency and reliability of bus service where required.* This action would include working with AC Transit to evaluate short-term strategies to reduce "bus-bunching," which can discourage transit ridership.
- *Improve access to public transportation in the Berkeley hills. Options include shuttle buses, on-demand transit, and more frequent and expanded AC Transit bus service.*
- *Encourage more efficient payment systems such as "proof of payment" and level boarding to speed bus transit service.*
- *Ensure that transit buses are fuel-efficient, utilize alternative fuels, and are appropriately sized.*
- *Install real-time transit signage at bus stations and stops.* Knowing when the bus will arrive significantly improves the user-friendliness of the system by lowering the anxiety and uncertainty around waiting. Real-time, multi-route departure signs were installed in the BART Plaza and at the northeast corner of Shattuck and Center Streets in 2008.

[20] Bailey, Linda; Patricia L Mokhtarian, Ph.D., and Andrew Little. *The Broader Connection between Public Transportation, Energy Conservation and Greenhouse Gas Reduction.* Submitted by ICF International. 2008.

Real-time have been installed at all the 72R Rapid Bus stops on San Pablo, and are being installed on the 1R Rapid Bus stops on Telegraph and Shattuck. The City can work with AC Transit increase the number of real-time signs at bus stops. Further, real-time transit information should be made available through communication technology, such as the Internet and mobile phones.

- *Install and improve bus shelters and benches, and ensure that they are safe, well lit, and well maintained.*
- *Improve bus flow by removing certain stop signs and on-street parking spaces, by timing signals, and by creating "queue-jumper" lanes where delay occurs regularly.* These and similar recommendations are included in the Line 51 Transit Service and Reliability Study and the Line 1R Transit Service and Reliability Study. The City should work with AC Transit to implement the recommendations included in these studies.
- *Work with AC Transit and BART to implement the recommendations of the South and West Berkeley Community Based Transportation Plan, which calls for transit service to meet MTC "Lifeline" service standards in low-income areas.*
- *Enhance sustainable mobility options for seniors and the disabled by providing "universal access" level boarding (e.g., roll-on/roll-off boarding for wheelchairs) on buses and shuttles that easily accommodates wheelchairs, walkers, and other individuals with mobility impairments.*

b. Policy: *Partner with AC Transit, BART and other community stakeholders to consider opportunities for Bus Rapid Transit or light rail systems along certain major transportation corridors (e.g., San Pablo and University Avenues and the Telegraph Ave./Downtown route currently under consideration)*

AC Transit has established "Rapid Bus" lines along San Pablo Avenue (72R) and Telegraph/Shattuck Avenues (1R). AC Transit has also released a Draft Environmental Impact Report (DEIR) for the proposed East Bay Bus Rapid Transit (BRT) system from San Leandro to Downtown Berkeley. In Berkeley, BRT would operate on Telegraph Avenue to the UC campus and then terminate in Downtown. The BRT proposal includes dedicated bus lanes and raised stations to make buses more reliable and efficient, especially given projected increases in congestion on most major streets.

Implementing Actions:

- *Continue timely assessment and development of proposed East Bay Bus Rapid Transit (BRT) system.* According to the project's Draft Environmental Impact Report released in 2007, BRT would be faster and

more reliable than the existing bus line and is projected to draw over 9,000 additional boardings per day by 2025. This is important given the expected significant increase in the Bay Area's population (and associated traffic congestion) in that same time period. Further, travel corridors served by BRT could provide opportunities for transit-oriented development and streetscape improvements.

BRT also has some potentially significant impacts that must be addressed, generally related to the loss of traffic lanes and parking for private automobiles. AC Transit plans to propose mitigations for potential negative impacts as part of its Final Environmental Impact Report.

c. Policy: *Partner with BART to expand and enhance BART service in Berkeley*

Implementing Actions:

- *Improve the pedestrian, cyclist and transit connectivity at the Downtown Berkeley BART station by implementing the Downtown BART Plaza and Transit Area Design Plan.*
- *Extend service hours and provide direct service from Berkeley to San Francisco in the evenings.*
- *Work with BART to install solar electric systems on Berkeley BART stations.*

d. Policy: *Partner with AC Transit, BART, UC Berkeley and other employers to provide subsidized transit passes and fare-free zones*

Cost and convenience of payment are key factors that affect people's mobility choices. The lower the perceived cost, the more likely community members will choose a given form of transportation. As such, providing free or heavily subsidized universal transit passes (e.g., Easy Pass) and/or free-fare zones have the potential to serve as effective strategies for increasing transit ridership and reducing single-occupancy driving.

Since 2003, City of Berkeley staff has received free AC Transit bus passes as part of their benefits package. These "Easy Passes" (formerly Eco Passes) are used for more than 48,000 rides per year. UC Berkeley students also participate in a Class Pass transit pass program. Students are assessed an annual fee and receive unlimited AC Transit bus rides. UC Berkeley also offers employees a deeply discounted Bear Pass. Most recently, Berkeley City College established a student Easy Pass program.

City staff estimates that providing free bus passes to *everyone who works in Berkeley* would result in a reduction of 5.7 million miles of driving per year, and an annual reduction of over 2,500 $MTCO_2e$. This equates to about three percent of the 2020 emission reduction target.

Providing free bus passes to *all employed residents* in Berkeley is estimated to reduce 4.6 million miles of driving per year, and over 2,000 $MTCO_2e$. This equates about two percent of the 2020 emission reduction target.

Actions to reduce the cost of traveling by bus and other forms of transit would not only reduce GHG emissions by reducing car trips, but it would also serve as an important travel subsidy for low-income families and those without access to an automobile.

Regional and State government expenditures should be reprioritized so that fares for all public transit can be significantly reduced and, in some cases, eliminated.

Implementing Actions:

- *Conduct a Citywide Mobility Study that analyzes the feasibility, efficacy, design, and benefits of providing free bus and BART passes, fare-free zones, and/or shuttles for individuals who live, work, and/or study in Berkeley.* The study will include an analysis of potential funding options to support improved and affordable transit, such as parking revenues, a special tax and other options.
- *Negotiate conditions of approval for all new residential multi-family developments to provide free or subsidized transit passes for tenants. Incentives can include reduced parking requirements for projects served by transit.*
- *Provide incentives for and eventually require all businesses to provide free or subsidized transit passes for employees.*
- Encourage UC Berkeley to require that transportation alternatives be provided for employees for new on- and off-campus building projects
- *Consider establishing Easy Pass programs for employees of businesses in specific transportation corridors, such as the San Pablo Avenue corridor and the corridor from Downtown Berkeley to Telegraph Ave. to Downtown Oakland and San Leandro.*
- *Study feasibility of providing fare-free zones in specified travel corridors or citywide.* This action is dependent upon the reprioritization of state and regional funding mentioned above.
- *Encourage and eventually require all eligible Berkeley employers to enroll in the Alameda County Congestion Management Authority Guaranteed Ride Home Program.* The program guarantees participants who use alternative forms of transportation a ride home if unexpected emergencies occur (i.e., family illness, unexpected overtime, etc.). This offer eliminates one of the often-cited reasons that people drive rather than take transit. In 2008, the Downtown Berkeley Association established a pilot program to offer the Guaranteed Ride Home program to employers with fewer than 75 employees.

e. Policy: *Expand and integrate community shuttle bus networks*

Implementing Actions:

- *Partner with BART, AC Transit, Bayer, Wareham Properties, UC Berkeley, LBNL, Alta Bates and others to design an integrated short-route shuttle bus system, including feeder or 'last mile' shuttles or bus service that would help customers access BART without driving. A shuttle network should be designed to address transit gaps and to better connect key destinations.*
- *Continue to enhance mobility options for people with disabilities by expanding existing paratransit, car share, and taxi services.*

f. Policy: *Encourage additional passenger rail service and ridership in Berkeley*

Implementing Actions:

- *Pursue joint marketing strategies with Capital Corridor/Amtrak to promote trains as a convenient form of transportation (include in broader alternative transportation marketing campaign).*
- *Improve bicycle and pedestrian access to passenger rail line, including installing additional signage.*

g. Policy: *Continue to partner with relevant agencies to establish a ferry service to San Francisco and other locations*

Implementing Action:

- *Expand bus and other transit service to any ferry terminal established at or near the Berkeley Marina so that there is consistent, coordinated, reliable transit service in conjunction with the ferry.* Couple with this action a parking strategy that discourages driving and long-term parking at any future ferry terminal and encourages using an alternative to the personal vehicle to reach the terminal instead.

h. Policy: *Support state and regional efforts to launch a high-speed rail system*

The California High-Speed Rail Authority has begun implementation of the 800-mile high-speed train system serving Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County and San Diego. High-speed trains will be capable of maximum speeds of 220 miles per hour with an expected trip time from San Francisco to Los Angeles in 2 hours and 40 minutes. The system is forecast to potentially carry over 100 million passengers per year by 2030.

A $9.95 billion dollar bond measure passed on the November 2008 ballot with $9 billion for implementing the high-speed train system and $950 million for improvements to other rail services that connect to the high-speed train service.

Implementing Actions:

- *Encourage state, regional, and local policy makers to support the development of a high-speed rail system that links all major California cities, including connecting service to Berkeley.*
- *Ensure that high-speed rail is fully integrated into existing transit services such as BART and AC Transit.*

7. Goal: Enhance and expand car sharing and ridesharing programs

Increasing the share of drivers that utilize car sharing and/or ridesharing to fulfill their mobility needs is an important piece of Berkeley's mobility management puzzle. Ridesharing reduces GHG emissions by reducing single-occupancy trips. Car sharing reduces GHG emissions because members of car sharing programs tend to drive less than non-members, and because car share program vehicles tend to be newer and more fuel-efficient than the average vehicle.

Berkeley is currently served by two car share organizations, City CarShare and Zipcar.

A study of the impact of the City CarShare program found that members use 76% less gasoline than non-members, and nearly 30% of City CarShare members sold a vehicle since joining. For every 25 households who joined City CarShare, six give up a car.[21]

The City of Berkeley has actively supported local car sharing since 2002 when car sharing was first established here through a grant from the City and two parking spaces in the Berkeley Way parking lot. In 2005, the City went further by establishing an innovative fleet car share program that provides City CarShare hybrid vehicles for City employees during working hours. The vehicles are available to all City CarShare members during evenings and weekends. In 2009 the City is partnering with City CarShare to incorporate a plug-in hybrid vehicle into the City's fleet car share program.

The City has also incorporated car share into the development process by requiring car share parking in the Library Gardens Building and even free car share membership for low-income residents in the David Brower Center/Oxford Plaza. In 2008, the City helped establish the first wheelchair accessible car share van.

In order to estimate the potential GHG reduction benefits of an expanded car share presence in Berkeley, City staff developed an expansion scenario in which Berkeley adds 500 additional car share vehicles by 2020. Although approximate, the estimate shows that if each vehicle serves 15 new members, an addi-

[21] Cervero, Robert and Tsai, Yuhsin, *San Francisco City CarShare: Second-Year Travel Demand and Car Ownership Impacts*. July 2003.

tional 500 vehicles would serve 7,500 more Berkeley residents than today, remove 3,500 cars from the city, and reduce GHG emissions by approximately 9,300 metric tons per year. This reduction equates to about 10% of the 2020 reduction target.

While it is unknown whether market demand would support 500 more car share vehicles in Berkeley, it is possible that widespread availability of shared cars would lead to a convenience "tipping point," where availability and locations grow to a point that many people feel they can give up their privately owned vehicle without sacrificing mobility.

As well as working to expand car sharing, the City also actively encourages ridesharing. The City offers deeply discounted carpool and vanpool monthly parking permits ($45 per month vs. $150 per month for single-occupancy vehicles) and promotes the ridematching services provided through 511.org. Commuters who share a ride to work also benefit from High Occupancy Vehicle (HOV) lanes and free bridge tolls in the region.

Nevertheless, it has proven difficult to increase the share of commuters ridesharing to work in Berkeley. Berkeley ranks 104th out of 159 cities in the region for carpooling.

The University of California Transportation Center is currently evaluating the feasibility of a Dynamic Ridesharing program for UC Berkeley employees, whereby faculty and staff would be able to log onto an Internet site to find others needing or offering a ride to or from a nearby location at a similar time. There are also a number of new private firms offering ridematching services to employers, event producers, and online social networks.

a. Policy: *Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing*

Implementing Actions:

- *Require that developers of new residential and commercial projects of a certain size (to be specified) make spaces available for car share vehicles (provide decreased parking requirements in return).*
- *Enhance outreach to promote increased car sharing (include in broader marketing effort).*
- *Integrate car share pods into broader mobility system by placing more car share pods adjacent to the existing transit network and in neighborhoods underserved by public transportation.*
- *Designate on-street parking spaces for car share vehicles.*
- *Encourage car share companies to site vehicles in private driveways by modifying current business license and zoning requirements.*
- *Provide car share subsidies for low-income residents.*

b. Policy: *Provide incentives and remove disincentives to ridesharing*

Implementing Actions:

- *Market existing discounted parking for carpools and vanpools and site such parking spaces near transit when feasible.*
- *In collaboration with community partners, include existing web and phone-enabled ridesharing programs in comprehensive marketing and outreach effort.* Telephone and computer technologies currently exist that enable the development of real-time, or dynamic, ridematching. Dynamic ridesharing can match passengers with drivers for individual ad-hoc trips as opposed to regularly scheduled trips.
- *In collaboration with community partners, market and enhance existing casual carpool program.*

c. Policy: *Expand capacity and service of local taxi fleets to provide an alternative to single-occupancy driving*

Implementing Actions:

- *Integrate information about the role of taxi service in marketing and outreach efforts.*
- *In collaboration with regional agencies and local taxi companies, consider studying the feasibility of establishing a discounted zone-based fare or flat fees, especially for travel to/from transit stations.*
- *Support shared taxi use, including real-time dispatch and routing.*

8. Goal: Encourage the use of low-carbon vehicles and fuels

Relatively speaking, municipal governments have limited opportunity to affect the technological improvements necessary to increase vehicle fuel efficiency and to lower the carbon content of fuels. But as residents, employees, business owners, city officials, students, etc., we affect our community's average fuel efficiency whenever we make a choice regarding the type of vehicle to drive (if we must drive at all). The role of city government and community-based agencies is to promote and provide incentives for low and zero-emissions vehicles as well as create the infrastructure necessary to support low carbon forms of transportation.

The state and federal governments also have an important role to play. For example, the Pavley Bill (AB 1493, became state law in 2002) would require significant fuel efficiency improvements in automobiles sold in California and therefore have a direct impact on community-level greenhouse gas emissions. Under the Pavley Bill, the average motor vehicle in 2020 could be expected to emit approximately 16% fewer GHG emissions compared with today's average automobile.

Whether a result of the Pavley Bill, a new piece of state or federal level legislation, or a combination of outreach and incentives at the community level, improved fuel efficiency requirements and the utilization of low-carbon fuels (including electricity) are necessary pieces of the puzzle for our community's GHG reduction targets. However, the City and its partners and citizens must ensure that low-carbon fuels such as bio-diesel are produced in a manner that does not have negative effects on food supply and that is shown to actually create a GHG reduction benefit when analyzed from a lifecycle perspective.

a. Policy: *Create incentives for high-efficiency vehicles, including electric vehicles and plug-in hybrids in the community*

Implementing Actions:

- *Evaluate opportunities to reduce parking rates in City-owned garages for vehicles that achieve a certain high threshold of fuel-efficiency.*
- *Evaluate opportunities to create additional free parking and charging stations for electric and plug-in hybrid vehicles.* Currently, the City provides an electric vehicle charging station in the Center Street garage and two dedicated on-street parking spaces for electric vehicles near City Hall.
- *Provide incentives in City parking and transportation demand management policies for developers and business owners that provide plug-in locations for electric vehicles and plug-in hybrids.*
- *Include information about electric vehicles in broader marketing campaign.*

b. Policy: *Provide leadership in building a market for plug-in hybrids*

Implementing Actions:

- *Purchase (City government) plug-in hybrids when they become available and partner with car share organizations to provide plug-in hybrids to car share pods throughout the city.*

c. Policy: *Encourage the responsible production of low-carbon bio-fuels*

Implementing Actions:

- *Initiate efforts to convert local restaurant grease into bio-fuel for City-owned and private vehicles.*
- *Partner with local organizations and bio-fuel providers to educate the community on the role responsibly produced bio-fuels can play to reduce local emissions.*

9. Goal: Enhance and expand outreach, marketing and education regarding land use and transportation

Personal choice underlies many of the transportation-related changes that will have to occur in order for the community to achieve its GHG-reduction goal. Enhancing and expanding current education and outreach efforts is therefore fundamental to this plan. Such efforts are aimed at providing community members with access to information that enables them to make informed choices. For example, specific information about the economic and environmental impact of riding public transit or a bicycle as opposed to driving a car may influence the transportation choices one makes. Along with the City government, regional agencies and local community-based organizations are already playing a key role in providing information that can inform community members' choices.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness those ideas in order to make alternative transportation the mainstream. See the chapter on Community Outreach & Empowerment for more.

a. Policy: *Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens and visitors regarding alternative forms of transportation*

Implementing Actions:

- *Launch marketing and branding campaign that informs community members of their alternative transportation options.*
- *Include transportation-related education materials in a welcome package for all new homebuyers/renters.*
- *Consider expanding existing TravelChoice-Berkeley program. Coordinated by the Oakland-based TransForm, TravelChoice is an innovative program aimed at reducing single occupancy vehicle trips and congestion while promoting healthy physical activity.* Through door-to-door canvassing and connecting with people by phone, the program provides interested residents with information and incentives to add more walking, biking, public transit and carpooling into their daily routines.

  In 2007-08, TravelChoice started in Berkeley, contacting over 7,500 households in south and west Berkeley. In early 2008 an additional 9,000 households were contacted in north Berkeley and along San Pablo Avenue.
- *Sustain and expand the Safe Routes to School Program (SR2S.) The program promotes walking and cycling to school and improving traffic safety around schools through education, incentives, increased law*

enforcement, and engineering measures. The program not only addresses GHG emissions, but also has health-benefits for children. SR2S is currently being implemented in Berkeley through a partnership between TALC and the Berkeley Public Health and Public Works Departments.

- *Design and implement an annual 'Berkeley Car-Free Day' campaign.*
- *Actively promote and participate in annual Bike to Work Day.*
- *In collaboration with local businesses and community partners, identify incentives for telecommuting.* Telecommuting has the potential to reduce vehicle trips related to commuting to and from work.
- *Partner with hotels, motels, and other visitor destinations to provide visitors with information regarding public transit, bicycle and pedestrian facilities.*
- *Partner with local business associations to market the "Buy Local" campaign.* Buying local has the potential to reduce GHG emissions by eliminating car trips to more remote destinations.

10. Goal: Green the vehicle fleet used by the City government and increase alternative transportation options for employees of public institutions

The Berkeley City government has an active alternative fuel vehicle program, including a variety of electric, natural gas, and bio-diesel vehicles. In 2003 Berkeley became the first City government to utilize 100% bio-fuel in its fleet.

Today the City uses 20% bio-diesel (B20) blend and is investigating other alternative fuel options. The Berkeley Unified School District (BUSD) also utilizes B20 bio-diesel for its buses.

Berkeley also showed innovative leadership in retiring underused fleet vehicles and replacing them with City CarShare hybrid-electric vehicles.

a. Policy: *Increase fuel efficiency and use of alternative fuels in City government fleet*

Implementing Actions:

- *Retire underused and inefficient City fleet vehicles.*
- *Replace additional City fleet vehicles with City CarShare vehicles.*
- *Partner with City CarShare to integrate plug-in hybrid vehicles into the City's fleet.*
- *Purchase plug-in hybrids for City fleet when available.*
- *Ensure that bio-fuel utilized by the City fleet is responsibly produced and creates a GHG emissions reduction benefit when analyzed from*

a lifecycle perspective. Investigate using recycled grease from local restaurants as a fuel alternative.

- *Consider increasing bio-fuel mix used by the City from B20 to B50 or higher.*
- *Increase the fuel and route efficiency of Office of Solid Waste trucks by converting trucks to low-emission engines; utilizing route-efficiency software; and utilizing a higher percentage bio-diesel or other low-carbon fuel.*
- *Institute a City purchasing policy that requires the procurement of low-emissions vehicles whenever new vehicles need to be acquired.*

b. Policy: *Encourage the use of alternative transportation for City employees and elected officials*

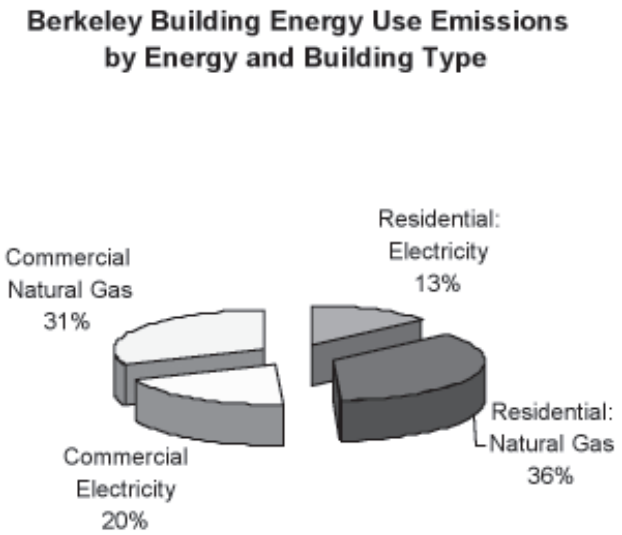
Implementing Actions:

- *Continue to supply City employees with the Easy Pass (formerly Eco-Pass).* Work to include BART ridership as part of the Easy Pass benefit.
- *Continue to supply City employees with pre-tax transit subsidies such as Commuter Check.*
- *Continue to offer deeply discounted carpool and vanpool monthly parking permits at City parking facilities.*
- *Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles.*
- *Consider phasing out free parking assigned to City Councilmembers.*

Chapter 4: Building Energy Use Strategies

A. Building Energy Use in Berkeley: An Overview

Electricity and natural gas consumption in our homes, businesses, industries and public institutions (including the City government) results in over 310,000 metric tons CO_2e ($MTCO_2e$) per year emitted into the atmosphere – about 53% of Berkeley's total GHG emissions. The energy we consume in our homes contributes about half of the total emissions from building energy use while energy consumption in non-residential buildings contributes the other half. Natural gas consumption, mostly for space and water heating, is by far the largest source of emissions related to building energy use.



To stay on track to achieve the community's interim emissions reduction target,[1] the community must reduce the emissions that result from building energy use by 35% by 2020.

This is no easy undertaking. In simple terms, the community's task is to '*reduce conventional energy use in every existing Berkeley home, business and institution*' through high-quality energy efficiency retrofits and a greater reliance on renewable energy such as solar. It also requires ensuring that any new construction meets high standards of energy performance.

The goals outlined in this chapter are designed to serve as a guide for meeting the task before us. They are the following:

- **Green New Construction and Remodels:** The City's goal is for new construction to meet "zero net energy" (ZNE) performance by 2020. A ZNE building combines energy efficient building design and systems with on-site renewable energy generation (e.g., solar) to result in zero net energy purchases from the grid. To achieve this goal the City will set minimum standards for how energy is used in buildings; encourage innovative strategies that minimize energy and water

[1] Berkeley's GHG reduction targets are explained in more detail in Chapter 2. The interim, year 2020 target for community-wide emissions is a 33% reduction below year 2000 emissions levels.

consumption, maximize the recycling of construction debris, and make for a more comfortable indoor environment; and assist property owners to lower the upfront cost of applicable energy saving solutions.

- **Energy Efficient Homes:** Vast amounts of potential energy and cost savings are locked up in Berkeley's existing residential building stock. The plan lays out strategies for enhancing and lowering the cost of energy efficiency services and standards for existing residential properties in order to make those properties as energy efficient as possible. Because more than half of Berkeley's housing units are rental properties, special programs must be developed to enable energy upgrades in this sector.
- **Energy Efficient Businesses and Institutions:** The efficient use of energy saves businesses money and minimizes GHG emissions. The plan makes recommendations for enhancing energy efficiency services and standards for existing commercial and industrial properties, both large and small. Like in the residential sector, the City's goal is to enhance demand for energy upgrade services while at the same time helping to lower the cost of employing those services.
- **Renewable Energy:** Efficiency alone will not achieve the Measure G targets. The community is also tasked with developing a local, clean, decentralized renewable energy supply to meet a portion of our energy needs. The City's goal is to eliminate at least 11,600 $MTCO_2e$ per year by 2020 through decentralized solar installations on residential and nonresidential buildings. The City is developing several strategies to address the main barrier to going solar: the upfront cost.
- **Green Public Buildings:** Institutions such as the City government and School District demonstrate important leadership by improving building energy efficiency and utilizing renewable sources of energy such as solar and wind. The solar installation on Washington Elementary School and the combination of solar and wind energy systems on the City's Shorebird Park Nature Center are just two of several examples of the City and School District taking a leadership path.
- **Community Education, Outreach, and Marketing:** Behavior change underlies the success of each of the components outlined above. The City of Berkeley and its partners must combine efforts in the policy arena with targeted education and social marketing for residents, businesses and institutions.
- **Local Green Jobs:** Enhancing local demand for services such as energy retrofits and solar installations not only reduces energy consumption and GHG emissions, but it also results in increased demand for skilled labor that can do the work. Through youth development and job training and placement programs, the City and its community

partners will match local residents with quality jobs in the emerging green economy.

As is described in more detail below, developing and implementing actions to achieve these goals entails *continuous improvement* in building energy use services offered to the community.

This means that minimum standards for energy efficiency in the residential and commercial sectors should *continuously be ratcheted up* and become more effective at saving energy and money over time. This plan provides recommendations for improving minimum energy standards in new and existing buildings. The plan does not create mandates or requirements. Any future recommended requirements in the plan must be approved by the City Council after a thorough review by commissions and community members. Consideration of any future requirements will include noticed public hearings.

Likewise, voluntary energy service programs offered in the community should be *continuously expanded and integrated* to become more effective and cutting edge over time.

Successfully implementing these actions also requires sustained collaboration across all sectors, including homeowners; tenants and landlords; business owners; real estate professionals; builders, architects, engineers, and contractors; city staff persons and elected officials; students, educators and school administrators; and others. Such collaboration has the potential to result not only in reduced GHG emissions, but also in an improved Berkeley building stock, reduced energy costs, and increased demand for "green jobs" in the building and energy service industries.

B. Building Energy Use Actions

The goals, policies and actions outlined in this section build on energy-related programs and services currently implemented by the City government and partner agencies in Berkeley. Though progressive when compared to many communities, we cannot count on the portfolio of energy-related services and mandates currently offered to achieve the scale of emissions reductions required to meet Berkeley's GHG reduction target. The measures described below represent a more aggressive, integrated approach to improving building energy efficiency, shifting toward decentralized sources of renewable energy, and connecting local residents to jobs in the energy services sector.

See the table in Appendix A for a consolidated list of goals, policies and implementing actions related to building energy use. The table also includes an implementation timeline and funding sources.

Berkeley Energy Initiative

Taken together, the measures in this chapter comprise the Berkeley Energy Initiative (BEI). More than just a list of isolated policies and programs, the BEI is an integrated set of energy reduction strategies designed to:

- ✔ Improve energy use standards for residential and nonresidential buildings
- ✔ Stimulate demand for energy upgrades such as energy audits, energy retrofits, and solar energy systems by providing enhanced services, incentives, and financing to enable building owners to meet local energy standards
- ✔ Keep money and generate green jobs in the local economy by shifting demand from resource consumption to resource conservation and by preparing local workers for emerging jobs in the energy services sector

1. Goal: Make green building business as usual in the new construction & remodel market

The green building movement is about building better buildings and more livable communities, not just protecting the environment. Green buildings conserve resources, save money on energy and water bills, provide a more comfortable and healthy environment for building occupants, and are proving to be more valuable than conventional buildings. Rapidly increasing numbers of government agencies, utilities, builders, architects, designers, contractors, developers and building material suppliers are embracing green building ideals and transforming the market place in the process. Many of the green building movement's ideas have come from the building industry itself because they make good business sense for the industry.

Green building encompasses:

- **Sustainable Sites:** Appropriate project locations reduce vehicle miles traveled and protect agriculture, open space and other environmentally sensitive areas. This results in development that is oriented towards pedestrians, cyclists and public transit, as well as reduces urban sprawl. Green buildings maximize the site's unique properties, including solar orientation, wind direction, and slope.
- **Passive Design:** Green buildings reduce the need for artificial lighting, heating, cooling and ventilation by incorporating these components as "passive" systems. This means that the buildings require very little external energy because they take advantage of the site for daylight and natural ventilation and are constructed or remodeled to reduce unwanted air infiltration and heat loss.
- **Water Efficiency:** Green buildings conserve water both inside and outside and often integrate innovative wastewater technologies such as gray water for irrigation. These measures often result in cost savings and pay for themselves many times over during the life of the building.
- **Materials & Resources:** Green buildings re-use existing materials to the fullest extent possible, use new materials that minimize impacts on

the environment, and minimize construction debris by recycling construction materials.

- **Indoor Environmental Quality:** Green buildings provide optimal air quality for building occupants over the lifetime of the building by eliminating materials that release volatile organic compounds and other toxic contaminants, and by providing proper ventilation. Enhancing the indoor environment for building occupants includes considering lighting and air quality, thermal comfort and access to daylight and views.

In putting green building for new construction and remodels into practice, it is important to have a standard by which to rate and compare the relative "greenness" of projects. The standard commonly used throughout the U.S. for new nonresidential projects is Leadership in Energy and Environmental Design (LEED). The U.S. Green Building Council provides the LEED standard. The City's current green building policy requires LEED silver certification for new City buildings.

A standard commonly used in California for new residential projects is GreenPoint Rated (GPR). StopWaste.Org and the Berkeley-based non-profit Build It Green (BIG) developed the GPR standard and BIG now administers the program statewide. Both the GPR and LEED standards are important tools for helping Berkeley to promote and track local green building efforts.

One important way that the City is working to promote green building practices is through the Berkeley's Best Builders program. As part of the program, applicable residential and commercial projects must adhere to the following requirements:

- **Green Building Consultation:** Applicants for discretionary projects must consult with a green building expert where green building practices can be explained and encouraged.
- **Green Building Checklist:** Large-scale development projects and new buildings with one or more dwelling units are required to complete a "green building checklist" (either LEED or GreenPoint Rated) and update it throughout the project.
- **Energy Conservation Analysis:** Projects with over 10,000 square feet of new nonresidential floor area are required to submit an "energy conservation analysis" (provided at no-cost by PG&E).

These requirements serve our community well and have done much to set the stage for a surge of green building projects in Berkeley. But given the increasing clarity around the multiple benefits of green building, the City's goal for new construction to achieve zero net energy by 2020, and the community's aggressive GHG emissions reduction target, the City and its partners need to do more to enhance existing green building services and standards. Specific policies and implementing actions include:

a. Policy: *Improve local energy and green building standards*

In an effort to reduce energy usage in California, in 1978 the California Energy Commission (CEC) adopted part 6 of Title 24 of the California Code of Regulations: Energy Efficiency Standards for Residential and Nonresidential Buildings. The Title 24 energy standards are updated on a triennial basis and the most recent standards become effective in 2009.

The City of Berkeley is evaluating establishing local minimum energy and building performance standards that are more aggressive than Title 24. New standards for Berkeley buildings would be linked to nationally recognized green building standards such as, ENERGY STAR for New Homes, ENERGY STAR for Affordable Homes, LEED, and GreenPoint Rated.

Implementing Actions:

- *Establish and continually ratchet up minimum energy standards for residential and nonresidential buildings that exceed the current Title 24 energy code for various building types specific to Berkeley's climate zone.* An example of a minimum standard for a specific building type would be a requirement that all new multifamily buildings meet federal ENERGY STAR standards for new construction. ENERGY STAR standards exceed Title 24.
- *Require that new projects achieve a minimum point level on an appropriate green building checklist (e.g., GreenPoint Rated Checklist for residential buildings or LEED checklist for nonresidential) and report projected GHG emissions.*
- *Expand and eventually require the monitoring, testing and commissioning of residential and non-residential building systems to ensure that buildings in Berkeley are performing as intended.* It is important to verify and document that buildings are performing as intended by the design. This process is known as commissioning for commercial buildings and performance testing for residential buildings.
- *Require that all new multi-unit buildings be "sub-metered" to enable monitoring of energy and water consumption on a unit-by-unit basis.*

b. Policy: *Simplify project review and permit approval process to encourage innovative green building measures*

The City strives to continually improve the service it provides to those seeking building permits. Planned service improvements include dedicating a building inspector to assist with green building questions, providing education materials related to green building, and ensuring that Planning & Development Department staff is up to date on the latest green building technologies.

Implementing Actions:

- *Dedicate a Senior Green Building Inspector to make it easier to use green building technologies under the building code and provide upfront coordination and assistance for builders committed to achieving a high level of green building.*
- *Identify funding sources and other incentives that can subsidize City permit fees for innovative or pilot green building projects.*
- *Adopt a green building curriculum and provide ongoing training for zoning and building permit plan-checkers in the City's Planning Department to enable them to be knowledgeable about the latest green building techniques.* The training curriculum should be updated regularly to reflect changes in building technologies and techniques.
- *Increase green building throughout the region by sharing best practices with other area cities through such entities as the Green Building Public Agency Council (PAC).* The PAC is a unique collaborative effort of over 100 participating public agencies that meet quarterly to share information, create consistent green building standards in their regions, and support each other's programs and initiatives.

c. Policy: *Identify and develop financial incentives and low-cost financing tools to enable increased green building in the private sector*

Implementing Actions:

- *Develop and catalogue financing options for consumers.* The City and partnering organizations such as the East Bay Energy Watch, Build It Green, and StopWaste.Org should provide such resources in a coordinated way.

d. Policy: *Enhance outreach to encourage developers to adopt national green building and energy performance standards, such as ENERGY STAR, GreenPoint Rated and LEED.*

Implementing Actions:

- *Highlight existing green buildings and cutting edge green technologies through green building tours.* Build It Green currently offers self-guided tours that showcase single and multi-family buildings that were built or remodeled using green materials and practices.
- *Highlight existing green buildings in Berkeley through case studies made available at the City's Permit Service Center and on City and partnering agency websites.*
- *Working with partner organizations and nearby jurisdictions, identify a sponsor and launch a green building awards competition.* Residential and commercial building projects would receive recognition and awards

based on metrics related to energy and water consumption, accessibility to alternative forms of transportation, and others and be showcased at the City's Permit Service Center.

- *Expand the green building display in the City's Permit Service Center and utilize it to showcase innovative green build materials and practices.*

2. Goal: Enhance energy services and standards and reduce costs of energy upgrades for existing residential properties

Electricity and natural gas consumption in residential buildings accounts for 26% of Berkeley's GHG emissions. The bulk of residential emissions – 76% – are from natural gas, which is used primarily for space and water heating.

The vast majority of Berkeley's residential structures were built before State-mandated energy standards for new construction were put into place. Many homes are drafty and have poor insulation and inefficient heating systems. While some homes have since been retrofitted with insulation, high-efficiency windows, new major appliances and systems, and other improvements, most existing homes have significant room for additional enhancements to reduce energy consumption. Indeed, the vast majority of GHG reductions from buildings to be gained over the next 30 years will be from energy-efficiency improvements to existing buildings, both residential and nonresidential.

Achieving a 35% reduction in residential sector GHG emissions requires substantial public and private investment, but will also result in substantial cost savings (and job opportunities) over time. According to estimates conducted by the California Building Performance Contractor Association (CBPCA), a typical pre-war 1,500 square foot home in Berkeley could reduce its overall energy consumption by 35-45% with a $5,000-$10,000 investment in energy efficiency improvements. Cost effective energy improvements include sealing air leaks, insulating the attic and walls, upgrading lighting and appliances, and reducing losses from phantom energy loads (i.e., appliances and electronic devices that consume energy even when turned off). Each home and occupant is unique, but one could expect a typical payback period for an investment similar to the one outlined above to be less than 10 years. Collectively, a 35% reduction in total residential energy use would reduce Berkeley residents' cumulative energy costs by approximately $300 million by 2020.

Capturing these opportunities to save energy and money, as well as to garner valuable co-benefits such as job creation and improved building comfort, requires making existing services and standards more aggressive, providing a suite of energy saving tools and resources to residents, and finding ways to remove barriers to action. Important pieces of the puzzle include:

- *Aggressive local standards for energy use in existing buildings: The City seeks to adopt local energy efficiency standards for existing residential buildings in order to create a consistent, thorough approach for achieving increased energy efficiency through energy retrofits.* Berkeley's standard will be linked to existing accepted standards such as HERS II (recently adopted by the State of California).
- *Education and marketing: Many property owners are aware of "low-hanging-fruit" energy saving measures such as utilizing ENERGY STAR appliances and compact-fluorescent light bulbs (CFLs).* Fewer are aware of a deeper, more integrated, performance-based approach to maximizing energy efficiency and cost savings in a home. This approach starts with a robust analysis of where energy is being wasted and how that waste can be eliminated in a cost-effective manner. Once a home energy analysis is conducted, the next step is connecting residents to a full suite of resources and trained service providers that can implement the energy upgrades. As this plan outlines, the City is developing programs and services that will help inform residents of their energy saving options and the multiple benefits of taking advantage of opportunities to improve their home's energy performance.
- *Financial incentives and financing assistance: Though the return on investment of energy-saving measures is often quite good, the upfront cost remains the single largest barrier to making substantial energy efficiency improvements in one's residence.* The City and a number of community agencies are working to provide various tools and incentives to address that barrier.

Outlined below are policies and implementing actions that will serve to make it easier and more cost effective for Berkeley residents to increase the energy efficiency of their homes.

a. Policy: *Establish a standard for home energy audits and energy improvements that provides thorough guidance on achieving deep, sustained energy savings in existing residential buildings*

Most existing residential buildings in Berkeley can be improved to use substantially less energy. Nevertheless, given the diversity of the building stock, the appropriate combination of integrated energy improvements is often specific to a building. By establishing a standard for energy audits and upgrades, the City will help to ensure that energy improvements are done in the most comprehensive and cost-effective manner.

The City can achieve compliance to local energy standards throughout the residential sector in different ways. One is to identify incentives and rebates for early compliance. Compliance could be one basis for eligibility for various energy-related incentives and financing provided by the City government. Another approach is to require improvements to a building's energy performance when a building undergoes a

major renovation, is sold, or is converted to condominiums. These events are also a good opportunity to conduct targeted outreach and education to residents. Finally, the City could establish a goal to have all residential buildings achieve local energy standards by a certain date.

The City has an existing standard, the Residential Energy Conservation Ordinance (RECO), which was adopted in 1980. RECO requires that every home or apartment building sold or transferred in Berkeley or undergoing renovations with a total value of $50,000 or more must meet a prescriptive list of energy and water efficiency requirements for a range of building systems and features, including: toilets, showerheads, water heaters, attic insulation, exterior door weather stripping and common area lighting (for multi-unit buildings).

RECO has served Berkeley well and has been copied and implemented by other U.S. cities. As a vehicle for energy and water efficiency improvements it has a far reach because it is mandatory and is applied whenever a home or apartment building is being sold or renovated.

That being said, it is important to note that the impact of RECO is limited to the time of sale and major renovations. Also, because it is a minimum standard that will apply to all residential buildings, RECO does not require consideration of more comprehensive and expensive measures that might be pursued on a voluntary basis given the proper information and support infrastructure.

The average energy savings associated with RECO measures currently ranges from an estimated 10-20% per building.

Implementing Actions:

- *In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing residential buildings that is designed to facilitate deep, cost-effective reductions in energy use.* The standard will ensure that existing residential buildings in Berkeley achieve aggressive, measurable energy efficiency improvements.
- *Phase in energy standards for existing residential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations, point of sale, and condo conversions.* The City should benchmark, track, and report on implementation progress at regular intervals.
- *Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley's energy standard so that they can serve the market.*
- *Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options (as described in more de-*

tail below under policies b - d) to assist property owners and tenants to comply with the local energy standard.

- *Partner with the Berkeley Association of Realtors and other real estate professional groups in an effort to conduct targeted outreach and education to new Berkeley homeowners.*

b. Policy: *Develop and provide comprehensive energy services for local residents*

Implementing Actions:

- *In collaboration with PG&E and state and federal government, provide financial incentives for compliance with local energy standards.* PG&E uses ratepayer money, collected through the public goods charge, to fund various incentives for energy improvements. The public goods charge is a surcharge placed on the bills of all PG&E (and other investor-owned utilities) customers. While helpful, the incentives funded through the public goods charge are generally not structured to achieve the scale of savings required under Berkeley's Climate Action Plan. The City seeks to work with relevant agencies to establish additional incentives geared toward Berkeley's local energy standards, i.e., designed to encourage a deeper, more comprehensive set of energy improvements. Such incentives could include providing property owners and tenants with rebates that could be applied to energy services provided by independent service providers.

- *Launch the Smart Solar Program.* The purpose of the program is to make it as easy and inexpensive as possible to make a home (or business) energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. The program achieves this purpose by removing market barriers that inhibit the widespread adoption of these technologies.

  Through the Smart Solar program, community agencies will conduct marketing and outreach and offer personalized consultations for potential customers. The consultations will provide guidance and resources to help property owners navigate through the multitude of technology options and incentives that are available. Qualified energy service providers that have experience and in-depth knowledge of the solar and energy efficiency markets will conduct the consultations. Customers will take away from each consultation a better understanding of the cost and benefits associated with potential energy saving solutions.

  Smart Solar is modeled after the highly successful Smart Lights Program, operated locally by the Community Energy Services Corporation. Smart Solar is being funding through the U.S. Department of Energy's Solar America Initiative.

  The program is scheduled to launch in pilot mode in April 2009.

- *Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements.* Berkeley FIRST is designed to address the financial hurdles facing property owners that wish to "go solar" and make significant investments in energy efficiency. The program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner's tax bill. The City launched Berkeley FIRST as a pilot program in the fall 2008 for solar PV installations as a test of the concept. If successful, the goal is to expand the program to support solar thermal installations and energy efficiency measures. '

- *Explore the feasibility of amending the existing program allowing a rebate of a portion of the City of Berkeley's transfer tax for seismic safety upgrades to also include major energy efficiency and solar improvements.*

- *Partner with Rising Sun Energy Center and other community partners to implement a 3-tier energy efficiency and job-training program.* The program delivers energy efficiency services to residents and on-the-job training for youth and people with barriers to employment. Energy services are provided through three progressive tiers:

  - *Tier I:* California Youth Energy Services (CYES) – Upon appointment, CYES sends two Youth Energy Specialists to a given home to do a basic check of household electricity, natural gas and water consumption and to provide free energy, water and cost savings devices. CYES serves as an energy reduction program as well as a valuable source of training and employment for local high school, community college and trade school students. According to program staff, on average CYES serves about 325 Berkeley households per year and achieves collective reductions of 150,000 kWh and 1,600 therms annually. This equates to an annual greenhouse gas emissions reduction of 43 metric tons and cost savings exceeding $21,000.

  - *Tier II:* Green Energy Training Services (GETS) – GETS is an energy efficiency training program and internship geared toward young adults between the ages of 18-35 with barriers to employment. The GETS program will follow up where CYES leaves off by developing program participants' analytical and installation skills, offering residents a comprehensive energy audit, and working with RSEC's High Performance Homes (HPH) program to install advanced energy savings measures in homes.

- *Tier III:* High Performance Homes (HPH) – HPH provides residents with more comprehensive energy efficiency measures, including attic, wall and floor insulation, duct sealing and pipe wrapping. This is a professional level, subsidized service for residents who want to make their home as energy efficient as possible. Trainees from the GETS program will work closely with the HPH contractors as pre-apprentices. RSEC will actively engage contractors working in moderate-to-low income programs to leverage their work with low-income homeowners to provide additional energy efficiency measures.
- *Tier IV:* Pre-Apprenticeship Trades Training & Postsecondary Career Pathways – Tier IV provides postsecondary classroom training and on-the-job training in the building trades, in business development and marketing, and in green energy and green building careers.

■ *Develop targeted energy services for home-based care facilities.* This program would fund performance-based audits and energy-saving measures for qualified childcare facilities, including home-based facilities that do not qualify for other energy programs offered for residential or commercial properties. The program would focus on energy saving measures (e.g., sealing air leaks) that provide several health-related co-benefits. Example co-benefits include elimination of moisture and mold, reduced pest infiltration and debris and other asthma triggers, reduced drafts and improved indoor air quality, reduced radon, and enhanced building durability and fire safety.

■ *Partner with East Bay Municipal Utility District (EBMUD) to identify additional opportunities for distribution of free water saving devices and education.*

■ *Rather than having ratepayer funds for energy efficiency and other energy saving programs (Public Goods Charge) be distributed through utilities, consider the feasibility and effectiveness of having those funds given directly to the City or some other agency or organization.*

c. Policy: *Expand and better integrate programs for low-income households*

Climate protection strategies have both costs and benefits. It is important to ensure that the costs of reducing GHG emissions are not a burden on those who can least afford to pay them, and that everyone shares the benefits of the climate protection effort.

A number of programs currently offered in Berkeley are specifically designed to both reduce energy costs for low-income households and protect the environment at the same time. The programs include:

- *City of Berkeley Weatherization Program:* Created in 1982, the City's weatherization program addresses health and safety issues in low-income homes and enables increased energy efficiency and

conservation. The program is funded through federal grants and the City's General Fund. Like the LIEE Energy Partners program mentioned below, the weatherization program offers numerous free services to low-income households, including new energy efficient appliances, water heaters and water heater blankets, attic insulation, door and window repair and replacement, low-flow showerheads, and more. Additional funds leveraged from Community Development Block Grants are able to provide'"Super Weatherization," which includes a more sophisticated, in-depth energy audit and more comprehensive energy measures.

- *Low-Income Energy Efficiency (LIEE) Program:* Funded by the State of California, the LIEE program provides no-cost weatherization services and energy education to low-income households in Berkeley and other communities throughout the state. The services are administered in Berkeley through PG&E's Energy Partners program. Energy services provided for free to low-income households include: attic insulation, energy efficient refrigerators, floor and wall repair, and more.

Together, the Energy Partners and City weatherization programs serve about 520 low-income households in Berkeley per year, or about four percent of all low-income households annually. Program staff estimates that on average each household served by these programs reduces annual energy consumption by 10-25%, saving residents over $100,000 on collective energy costs every year.

Despite the success of these programs, the City, PG&E and the appropriate state and federal agencies can take steps to increase the effectiveness of services offered to low-income households. Better integrating existing programs and expanding the services provided to include additional energy saving measures and a more comprehensive home energy audit would result in increased energy efficiency and cost savings, and would eliminate the need to return to the property to capture additional energy savings later.

Implementing Actions:

- *Conduct a "gap analysis" or baseline study to determine how to effectively expand and enhance energy services for low-income clients.* The gap analysis will determine how to eliminate duplication in services, how to provide more efficient and integrated services and, when funding is available, how to expand services to clients who have not yet been served.
- *Combine the delivery of City and agency programs with other income-qualified assistance programs.* An integrated suite of low-income programs will provide increased potential for energy and cost savings and health-related benefits as well as more cost-effective program delivery. Existing programs to be incorporated include:

- *Community Development Block Grant (CDBG) funded programs:* A program provided by the U.S. Department of Housing and Urban Development (HUD), CDBG funding supports the Home Safety & Repair program, administered locally by Community Energy Services Corporation (CESC). Eligible low-income homeowners are entitled to free home repair services such as plumbing, electrical and carpentry repairs; mobility and access installations (grab bars, hand rails, lifts, ramps, etc.); and fire and earthquake safety measures.
- *Senior and Disabled Home Rehabilitation Loan program:* This program assists low-income senior and disabled homeowners in repairing their homes, to eliminate conditions that pose a threat to their health and safety, and to help preserve the City housing stock. Qualified borrowers can receive interest-free loans of up to $35,000.
- *City of Berkeley Weatherization Program:* As described above, this program offers energy services to low-income residents.

■ *Develop and implement Green LEEP (Low-income Energy Efficiency Program).* Green LEEP would provide comprehensive, performance-based energy testing and installation of energy saving measures for qualified low-income residents.

■ *Develop and implement the Rental Housing Energy Efficiency Loan (RHEEL) program.* The RHEEL program would provide up to $10,000 per housing unit to reimburse landlords of low-income residents for comprehensive energy analyses and upgrades. The loan would be interest-free and repayable after either ten years or when the property is sold. The program would be implemented on a pilot basis for a relatively small number of rental properties for the first year and then, if successful, be expanded to include a larger number of buildings

■ *Partner with agencies such as GRID Alternatives to provide low-cost solar installations to low-income residents.* GRID Alternatives provides low-cost solar electric systems to qualified low-income homeowners. By using utility rebates, grants and sweat equity, GRID Alternatives is able to offer substantially reduced cost systems sized and installed for low-income homeowners. This program can be leveraged for property owners receiving new roofs under Berkeley's Senior and Disabled Home Loan program.

d. Policy: *Identify and capture opportunities for energy and water savings in renter-occupied units*

One significant barrier to achieving GHG reductions in residential buildings is what is referred to as the "owner/tenant split financial incentive." Building owners have little incentive to invest in energy or water efficiency improvements since

any gains will primarily flow to the tenants who often pay the utility bill. Conversely, tenants have little incentive to invest in structural efficiency improvements when they do not own the building and their tenure in a unit is generally of shorter duration relative to the""pay-back" on the investment.

Given the fundamental economic barrier to action that the split incentive represents, one plausible solution is to create a situation in which the landlord can more easily gain some financial benefit from her/his investments in building energy and water improvements so long as the tenants receive an overall reduction in expenses on their energy bill. This is much easier in theory than in practice.

In order to overcome the "split incentive" barrier, the Rent Board along with the appropriate City departments, community agencies and other stakeholders should begin a process to evaluate potential outreach efforts, incentive structures and mandatory requirements that enable both the landlord and the tenant to benefit from building energy and water efficiency improvements.

Implementing Actions:

- *Work with the Rent Board to explore ways in which the cost of high quality energy and water efficiency measures can be paid for by both property owners and tenants.* Such an analysis would consider the impacts that rent increases would have on tenants.
- *Work with community partners to design a program that would require that upon vacancy, an energy rating system be applied to rental units so as to inform future occupants of the costs and relative energy and water efficiency associated with the unit.*
- *Develop and market a green landlord database.* The database will include information about landlords that have implemented a defined set of energy and water saving measures. The database will help to inform potential tenants' housing choices.

3. Goal: Enhance Energy Services and Standards for Existing Commercial Properties

Similar to the City's residential structures, most of Berkeley's commercial/industrial building stock predates the State's existing energy standards. Many Berkeley businesses have considerable potential for energy (and money) savings through lighting upgrades, efficiency improvements made to heating, ventilating and air conditioning (HVAC) systems, and other measures.

The actions outlined in this section seek to expand existing efforts in large part by establishing aggressive local energy standards and enhancing and increasing access to tools such as more comprehensive energy audits, increased energy-related services, and financing assistance.

a. Policy: *Establish a standard for energy audits and energy improvements in nonresidential buildings that provides thorough guidance on achieving deep, sustained energy savings*

The City will establish a standard for energy audits and upgrades to help ensure that energy improvements are done in the most comprehensive and cost-effective manner.

As with residential buildings, the City can achieve compliance to local energy standards throughout the commercial sector in a few different ways. One, identify incentives and rebates for early compliance. Two, compliance can form the basis of a given building owner's eligibility for various energy-related incentives and financing provided by the City government. Three, requirements for improving building energy performance can be triggered during certain events, such as building renovation or point of sale or lease. These events are also a good opportunity to conduct targeted outreach and education to building managers and owners. Finally, the City could set a goal to have all nonresidential buildings achieve the local energy standards by a certain date.

The City has an existing standard, the Commercial Energy Conservation Ordinance (CECO), which was adopted in 1985. CECO requires that every commercial property owner that plans on selling a property, doing a major renovation (costing $50,000 or more), or building additions that will increase the "conditioned" area of the commercial property by more than 10% must initiate CECO compliance. Its intent is to help protect commercial property owners and tenants from energy price increases by reducing the amount of energy used for space ventilation, heating and cooling, hot water, and lighting.

Like its counterpart in the residential sector, CECO is an effective vehicle for energy and water efficiency improvements and has a far reach because it is mandatory whenever a commercial building is sold or substantially renovated. The average energy savings associated with the current CECO are about 10 - 15% per commercial building. Like the residential standard, the City will develop a new set of standards to be more broadly applied to the existing commercial stock.

Implementing Actions:

- *In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing nonresidential buildings that is designed to facilitate deep, cost-effective reductions in energy use.* The standard will ensure that existing nonresidential buildings in Berkeley achieve aggressive, measurable energy efficiency improvements.
- *Phase in energy standards for existing nonresidential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations and point of sale or lease.*

- *Consider requiring that a "cool roof" be installed anytime the roof of a commercial building is being built or re-roofed*. A cool roof reflects solar radiation rather than absorbing it. Most roofs have a typical solar reflectance of 10-20%. Using reflective materials can increase reflectance to 70-80%, which has GHG reduction and heat-island mitigation benefits. Researchers estimate that a building with 1,000 square feet of reflective roof area offsets the equivalent of 10 $MTCO_2e$ over the lifetime of the roof.[2]
- *Require all fluorescent lamps, magnetic ballasts, and incandescent lamps be retrofitted for higher efficiency technology for commercial building permits to be issued.*
- *Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley's energy standard so that they can serve the market.*
- *Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options (as described in more detail below under policies b-d) to assist property owners and tenants to comply with the local energy standard.*
- *Partner with property management firms and real estate professional groups in an effort to conduct targeted outreach and education to building owners.*

b. Policy: *Develop and provide comprehensive energy services for local businesses and commercial property owners*

Implementing Actions:

- *In collaboration with PG&E and state and federal government agencies, provide financial incentives for compliance with local energy standards.* PG&E uses ratepayer money, collected through the public goods charge, to fund various incentives for energy improvements. The public goods charge is a surcharge placed on the bills of all PG&E (and other investor-owned utilities) customers. While helpful, the incentives funded through the public goods charge are generally not structured to achieve the scale of savings required under Berkeley's Climate Action Plan. The City seeks to work with relevant agencies to establish additional incentives geared toward Berkeley's local energy standards, i.e., designed to encourage a deeper, more comprehensive set of energy improvements. Such incentives could include providing property owners and tenants with rebates or mini-

[2] Akbari, H., S. Menon, and A. Rosenfeld. 2008. "Global Cooling: Increasing Solar Reflectance of Urban Areas to Offset CO_2."

grants that could be applied to energy services provided by independent service providers.

- *Launch the Smart Solar program*. As is described above under Goal #2, the purpose of the program is to make it as easy and inexpensive as possible to make one's home or business energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. See additional detail in previous section.
- *Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements*. As is described above under Goal #2, the program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner's property tax bill. See additional detail in previous section.
- *Enhance the Smart Lights program energy audit process to make it more comprehensive*. The Smart Lights program provides businesses with hands-on assistance in assessing specific lighting needs and delivering significant discounts on the installation of high-quality, energy efficient lighting and refrigeration improvements. Based on the program's records, Smart Lights has conducted lighting system audits and retrofits in about 700 small businesses since 2002. The program has enabled energy savings approaching five million kWh in that same timeframe. The result is a reduction in Berkeley's greenhouse gas emissions of approximately 1,400 metric tons over the past six years. There is potential to further leverage the program's existing outreach and operations by expanding its services to include a more comprehensive energy audit for small businesses that would identify additional energy and cost saving measures.
- *Develop and implement the Berkeley Cleaner Solar program*. This grant program of up to $2,000 in direct subsidies for solar thermal projects would assist laundry facilities to offset natural gas consumption. Laundromats provide either heat or heated water for laundry and are therefore particularly vulnerable to natural gas price fluctuations. This subsidy would be leveraged with utility incentives, state and federal tax deductions, and assistance provided through the Berkeley Smart Solar program.
- *Improve marketing of energy-related rebates for small businesses. Rebates from entities such as PG&E and the California Energy Commission should be better marketed through City and partner agency websites and outreach*.

- *Market Demand Response Programs where appropriate. Such programs offer incentives for business owners who curtail their facilities' energy use during times of peak demand.*

c. Policy: *Identify opportunities for energy savings in renter-occupied/leased commercial buildings*

Similar to the residential market, there is an owner/tenant split incentive in the commercial market: commercial renters usually pay the utility bill and have little incentive to invest in building improvements related to energy; the owner does not pay utilities and therefore has little incentive to invest in improvements that would reduce energy consumption and costs. Unlike the residential rental market however, commercial property owners are not subject to rent control and can therefore pass through the costs of improvements without going through the procedures mandated for rented residential properties.

CECO (described above) increases the implementation of energy saving measures in buildings being sold or undergoing major renovations. However, that is a relatively small number of buildings. To address buildings that are not being sold or renovated, it will be worthwhile to establish standards, incentives and programs to make it easier for property owners to make energy upgrades.

In addition, the City and its partners must do more to educate commercial entities on state law (AB 1103, 2007) requiring energy consumption disclosure at the point of lease and point of sale in nonresidential buildings

Implementing Actions:

- *Develop model lease provisions that would encourage commercial landlords and tenants to share the liability and benefit of energy saving measures.*
- *Develop and market a green landlord database.* The database would include information about building owners that have implemented a defined set of energy and water saving measures.
- *Encourage commercial building owners to use Portfolio Manager for energy tracking.* Portfolio manager is a free, web-based database operated by the EPA for commercial buildings and their energy consumption. Building owners only need to fill in basic information on the building, upload the information, and Pacific Gas and Electric energy information will automatically be uploaded every month for easy tracking and monitoring. Energy information can easily be downloaded for new tenants, or at time of sale.

d. Policy: *Expand energy saving opportunities for large commercial properties*

With energy prices turning increasingly volatile, forward-thinking large commercial and industrial building owners and operators are already looking for ways to reduce energy consumption and cut costs. It helps that large commercial/

industrial properties generally have an account manager at PG&E who can provide up-to-date rebate and resource information. In collaboration with PG&E and relevant state agencies, the City can play a role to identify additional services and resources that make it easier for large commercial properties to save energy and money.

Implementing Actions:

- *Partner with local community agencies to encourage large commercial businesses to retire old HVAC systems.* The success of this effort depends on access to state-level subsidies and incentives.
- *Partner with local community agencies to implement commissioning and re-commissioning for new development, major renovations, and existing buildings.*
- *Improve marketing of rebates. Rebates from entities such as PG&E and the California Energy Commission should be better marketed through City and partner agency websites and outreach.*
- *Market Demand Response programs to large businesses in order to reduce high-carbon peak load.* Demand Response programs are designed to encourage and assist consumers to reduce electricity demand during times when demand for electricity is at its peak. During times of peak electricity demand, utilities often must utilize "dirtier" sources of energy in order to meet consumer demand."
- *Encourage local large businesses to track the energy consumption in their facilities through ENERGY STAR Portfolio Manager.* Portfolio Manager is a free, web-based energy management tool that enables businesses to track and assess energy and water consumption across a building portfolio.

4. Goal: Increase residential and commercial renewable energy use

The energy efficiency actions outlined above represent an irreplaceable step toward meeting the Measure G goals. It is also critical to "green" the energy supply we consume through increased utilization of renewable energy sources.

Essentially, the community has two main options for changing the composition of its energy supply:

- *Develop a local, clean, decentralized, renewable energy supply, mostly in the form of residential and commercial solar PV and solar thermal installations.* The City's goal is to achieve an annual GHG reduction of 11,600 metric tons by 2020 as a result of local solar installations. This goal is based on a preliminary analysis of unshaded

rooftops in Berkeley. The analysis indicates that there is more than two million square feet of roof space that is unshaded by adjacent structures. About 30% of this space is shaded by trees or otherwise unavailable for solar. The 2020 goal is to cover 70% of the available roof space with solar thermal or solar electric panels.

- *Add more renewable energy sources to the electricity grid.* This option can be accomplished by either working with PG&E and relevant State agencies to achieve a higher Renewable Portfolio Standard or through Community Choice Aggregation, also known as Community Choice Energy (CCE). Under CCE, the City government would be empowered to choose the community's energy provider and the source of electricity.

The City of Berkeley is committed to implementing the first option. It is not mutually exclusive with the second. The City must decide in the short term how best to implement the second option given existing and future policy priorities, market conditions, and risks to taxpayers and ratepayers.

Each of these options, along with policies and implementation actions for increased wind generation and other renewable technologies, is outlined in more detail below.

a. Policy: *Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses*

The first solar electric cell was created in 1954. Solar technology has come a long way since then. The basic principles of the technology have not changed, but the cost of installing a solar electric or solar thermal or hot water system has become increasingly competitive with conventional forms of energy. Globally, the use of solar electric systems has experienced growth rates of about 30% per year over the last decade and the cost of the technology has dropped at least three percent per year for the last 20 years.

Solar radiation can be captured to produce emissions-free electricity and heat for our homes, businesses and public institutions. Decentralized, solar generated power has a number of important advantages, including:

- *It reduces our reliance on fossil fuels and the greenhouse gas emissions that result from fossil fuel consumption*
- *Decentralized energy production is less vulnerable than grid energy during natural disasters*
- *It reduces stress on our local electricity infrastructure by reducing peak load*
- *Local production reduces electricity distribution costs and increases distribution efficiency by being installed close to energy loads, such*

as on a roof (10-20% of energy can be lost in the transmission of grid energy)

- *It eventually pays for itself and subsequent energy cost savings can go straight to one's bottom line*

In Berkeley, a hundred square feet of solar photovoltaic panels can save about 1,500 pounds (680 kg) CO_2e per year. On a per capita basis, Berkeley has the highest number of solar photovoltaic (PV) installations of any large city in Northern California. According to the California Energy Commission (CEC), there is 2,070 kilowatts (DC kW) worth of solar PV systems installed or approved for installation at 527 different sites within the City of Berkeley, including 22 kW at two municipal sites. While these installations represent a good start, it is still only a start.

A hundred square feet of solar thermal panels for hot water can save about 3,000 pounds (1,360 kg) CO_2e per year. Increasing the number of solar thermal installations in Berkeley is a particularly effective GHG reduction measure since the emissions that result from natural gas consumption in Berkeley buildings are more than double the emissions that result from electricity consumption. Solar thermal installations on a home or business can eliminate or greatly reduce the natural gas consumed to heat our water and our buildings. The cost for solar thermal installations is generally less than half the cost of a solar electric system for residential buildings; moreover, the technology is very simple, and long lasting. Many systems that were installed in Berkeley in the 1970s are still in operation today. Because of its low installation and operational costs, solar thermal is also an excellent choice for many small commercial applications that use significant amounts of hot water, such as laundromats, restaurants, hair salons, and fitness centers, as well as larger institutions, such as hospitals, schools, hotels and conference centers.

Implementing Actions:

- *Launch Smart Solar program*. As is described above under Goal #2, the purpose of the program is to make it as easy and inexpensive as possible to make one's home or business energy efficient and to utilize a solar photovoltaic (PV) and/or solar thermal system. See additional detail under Goal #2.
- *Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements*. As is described above under Goal #2, the program enables the City to provide financing for the upfront cost of major energy improvements in privately owned buildings and recoup that cost through a 20-year assessment on the building owner's property tax bill. See additional detail in previous section.

- *Launch an on-line Solar Map.* The application estimates the solar energy potential for commercial and residential structures and allows building owners to estimate the potential environmental benefits and monetary savings that would result from installing solar energy panels on their property. The user enters an address and sees a map view of that location.
- *Identify funding sources to subsidize and eliminate solar permit fees (including solar thermal) for residential dwellings and lower fees for solar permits for commercial buildings.*

b. Policy: *Partner with the State government and utilities to green the energy mix that supplies the region's grid electricity*

Should the City of Berkeley continue to rely on PG&E for its electricity supply, then that electricity supply will have to become significantly "greener." Achieving a green electricity supply relies heavily on the Renewable Portfolio Standard (RPS), a standard set at the state-level that is designed to gradually increase the portion of electricity produced or purchased by PG&E and other utilities from renewable energy sources such as solar, wind, geothermal and biomass.

The current RPS is 20% renewable energy by 2010. Governor Schwarzenegger set a goal of achieving 33% renewable sources by 2020 and the State Air Resources Board included that goal in its adopted Scoping Plan as part of implementation of AB 32 (Global Warming Solutions Act).

In 2007, PG&E received about 11.4% of its power supply from renewable sources.

Implementing Actions:

- *Support the California Air Resources Board recommendation to increase the Renewable Portfolio Standard to 33% by 2020. Urge PG&E to achieve that standard.*
- *Urge Congress to maintain tax credits for renewable power developers.* Such tax credits increase the supply of renewable energy sources, thereby making it easier for utilities such as PG&E to achieve the RPS.
- *Urge the State to revise net metering rules to enable residential and commercial customers to earn refunds for excess energy generated.*
- *Urge the State to allow utilities to count decentralized energy sources toward the RPS requirement and to raise the RPS a commensurate amount.*

c. Policy: *Consider Community Choice Energy*

Community Choice Energy (CCE) would involve the City of Berkeley partnering with other cities to form a joint powers authority to purchase electricity. CCE

enables participating cities to choose the community's electric provider and source of electricity, including bulk purchases of renewable energy for residents and businesses. CCE involves the City in the purchase, sale, and possible generation of the energy commodity. Under CCE, Berkeley and its partner cities would enter into long-term agreements to purchase electricity, including renewable energy. PG&E would ultimately provide the electricity to residents using their transmission and delivery systems (i.e., the utility poles and wires).

CCE has potential benefits, including the increased use of renewable energy sources for electricity generation and local control of energy policy and electricity rates. CCE also has risks, such as costs to the City (particularly during start-up), potentially higher electricity rates and the potential that PG&E's electricity generation mix could emit fewer GHG emissions than what would be achieved by CCE in the short-term. Note that PG&E's 2007 power mix does include 23% nuclear and 13% large hydroelectric sources.

In the fall 2008, the cities of Berkeley, Oakland and Emeryville released a feasibility study (revised from an earlier draft) and business plan. At that time, staff recommended not to proceed with CCE due to risks and uncertainties associated with the program, including known and unknown financial and legal risks associated with creating and operating an enterprise with a $230 million dollar annual budget. Emeryville has since decided not to proceed with CCE, and Oakland may consider the issue later in 2009. Several Marin cities are considering CCE under an effort sponsored by the County, as are several cities in the San Joaquin Valley, under an effort sponsored by King's River Conservation District (KRCD). Given the potential for CCE to contribute to the City's GHG reduction goals and motivations regarding local control of our energy supply, the City will monitor market conditions, the efforts of other jurisdictions, and PG&E's ability to comply with their renewable energy requirements. Based on this information, the City should consider whether or not to reexamine CCE in the future.

Implementing Action:

- *Continue to consider CCE and to monitor the efforts of other jurisdictions and PG&E's ability to comply with their renewable energy requirements.*

d. Policy: *Identify and implement opportunities for increased wind generation and the use of other renewable energy technologies*

For centuries societies have harnessed the wind to generate clean, emissions-free power. Today the basic concept is the same though the technology is much improved. In fact, in the U.S. and other parts of the world we are beginning to see a resurgence of small wind turbines that can be used in the urban/suburban setting to generate electricity. Wind energy is now cost-competitive with grid energy and, like solar, small wind turbines can save customers money and protect us from rising energy costs.

In June 2007 the City of Berkeley became the first city in the nation to install a wind turbine for one of its buildings. The City's Shorebird Park Nature Center classroom utilizes a small, 1.8 kW wind turbine to offset some of its electricity needs. The wind turbine supplements the building's existing solar PV and solar thermal systems. The clean electricity the turbine supplies will eliminate about 900 pounds (408 kg) of GHG emissions from entering the atmosphere every year. Further, the tower is expected to be safe for area birds. The Golden Gate Chapter of the Audubon Society wrote a letter in support of the project.

The City of Berkeley hopes that the Shorebird Park Nature Center's wind turbine will serve as a pilot for the installation and utilization of wind energy systems on a local scale. Lessons learned can be applied to any future efforts to install appropriately sited wind turbines in the community. The City will work with various partners to consider and evaluate the feasibility of additional turbines that can serve as sources of clean, renewable, decentralized energy.

Implementing Actions:

- *Conduct a study to identify the wind energy generation potential in various parts of Berkeley (taking into consideration potential impact on wildlife) and identify opportunity sites where wind energy can best be implemented.*
- *Based on the study above and working with stakeholders, evaluate modifications to the building code that may be necessary to facilitate the installation of wind turbines within city limits.* Work with the State to modify the building code, if necessary.
- *Investigate the potential and possible sites for combined heat and power (CHP) systems in Berkeley.* Combined heat and power systems represent an efficient approach to generating power and thermal energy from a single fuel source such as natural gas. CHP systems provide onsite generation of electricity as well as waste-heat recovery that can be used for space conditioning (heating and cooling), hot water systems and other processes such as refrigeration and food processing. Such a system requires a large and steady demand for thermal energy in a central location. CHP systems usually have an "anchor site" such as a hotel or industrial operation, and "client sites" that can use the excess thermal energy. They are typically powered by natural gas but have much lower emissions than traditional separate systems because of the higher efficiencies.
- *Research the potential for a grid-connected wave energy system in the San Francisco Bay. Wave energy systems utilize the motion of waves to drive turbines that generate electricity.*
- *Evaluate the effectiveness of a green waste anaerobic digester for collected waste.* The methane captured by an anaerobic digester can be used to power vehicles, boilers, etc.

5. Goal: Increase Energy Efficiency and Renewable Energy Use in Public Buildings

The GHG emissions that result from energy and water use in municipal buildings account for about one percent of Berkeley's total community-wide emissions. As such, actions to reduce energy use in City government buildings will have a relatively minor impact on our community's overall carbon footprint in the long run. However, climate action in municipal buildings and in schools demonstrates leadership that extends beyond the magnitude of the amount of greenhouse gases reduced.

Along with community partners such as KyotoUSA, the City and the Berkeley Unified School District (BUSD) are consistently investigating the potential for additional energy efficiency and renewable energy actions. Outlined below are some of the ways in which the City government and BUSD are already showing leadership:

- The City partnered with the Smart Lights program to conduct lighting upgrades in the City's building at 1947 Center Street. This lighting retrofit alone is expected to save the City about $9,000 per year in energy costs and reduce electricity consumption by 64,000 kWh. The result is an annual reduction in greenhouse gas emissions of about 15 metric tons.
- The City's red and green traffic lights and orange pedestrian signal lights function with energy efficient LEDs (light-emitting diodes) at all of Berkeley's 127 intersections. LEDs emit a strong light but use far less energy than conventional incandescent bulbs. Making the switch to more energy efficient street signal lighting is saving the City $143,000 per year in taxpayer money and reducing annual greenhouse gas emissions by approximately 225 metric tons.
- The City is also working to reduce the energy it takes to heat and distribute water by increasing water efficiency in all of its facilities. Measures include:
    - Conducting regular audits of indoor and outdoor water use
    - Installing low-flow toilets and faucet aerators
    - Minimizing water leaks in plumbing
    - Implementing smart landscaping that requires less irrigation
- A number of City buildings/structures already have solar installations, including:
    - The corporation yard has a 20 kW solar PV system. The installation offsets 31,000 kWh of electricity annually

- The Berkeley West Campus Swimming Pool boasts a solar hot water system that offsets approximately 70% of the natural gas consumed to heat water for the showers

- The City's Shorebird Park Nature Center employs a combination of renewable energy technologies. The Nature Center is a straw-bale building that incorporates passive day lighting and thermal mass for heat retention, solar PV and solar hot water panels for domestic hot water and space heating and a 1.8 kW wind turbine to offset its conventional electricity load.
- The U.S. Green Building Council awarded LEED certification to the City's Shasta Hills Fire Station. Green design and construction elements featured in the project include landscaping that conserves water and reduces waste; diversion of more than 75% of the project's construction waste from the landfill; and reduced energy use through high-performance windows and efficient lighting, appliances and building systems.
- Washington Elementary recently became the first BUSD School to go solar. The school's 100 kW solar PV system will produce enough electricity to meet the needs of the main facility without increasing BUSD's energy costs. Conceived by the local volunteer group KyotoUSA, the initiative will not only reduce local GHG emissions, but also assist in educating students about renewable energy and its benefits.

a. Policy: *Continue to identify and implement opportunities for increased energy and water efficiency in public buildings*

Implementing Actions:

- *Maintain and continually update the City Capital Improvements Plan.* The plan serves as the City's performance-based guide for identifying and implementing energy and water saving measures in City buildings.
- *Ensure that the City and BUSD purchase high efficiency computer equipment and other office appliances and operate the equipment as energy efficiently as possible.* By activating sleep settings on employee computers the City's Department of Information Technology is reducing City government energy consumption by 238,680 kWh per year. This results in an annual reduction of 116,950 pounds (53,000 kg) CO_2e and an annual cost savings of approximately $32,500.
- *Replace the few remaining incandescent traffic signals with high-efficiency Light-Emitting Diode (LED) lamps.*
- *Consider replacing existing streetlights with high-efficiency LED lamps.*
- *Benchmark and track public building energy performance through ENERGY STAR's Portfolio Manager.*

- *Launch an on-bill financing pilot program with PG&E.* On-bill financing would enable the City and BUSD to pay for the upfront cost of a given set of energy saving measures through the cost savings achieved by those measures.
- *Establish an annual energy reduction target for each City department.* Each department would be responsible for initiating programs to achieve its target.
- *Draft and implement an Administrative Regulation for energy and water efficiency in all City buildings.* An Administrative Regulation would provide formal guidance to City employees regarding how to use energy and water in an efficient manner.

b. Policy: *Continue to actively identify and implement cost-effective opportunities to utilize renewable energy systems in public buildings*

Implementing Actions:

- *Require that re-roofing projects on City buildings evaluate the feasibility of incorporating "solar ready" features, including mounting posts for panels and roof penetrations for conduit and/or pipes.*
- *Install solar thermal systems on Berkeley Fire Stations to offset natural gas consumed for water heating.*
- *Identify potential sites for solar parking lot and solar bus stop canopies.*
- *Partner with KyotoUSA and other community groups and agencies to identify additional solar opportunities on BUSD schools.*

6. Goal: Enhance and expand marketing, outreach and education regarding building energy use

Personal choice underlies many of the building energy use-related changes that will have to occur in order for the community to achieve its GHG-reduction goal. As such, enhancing and expanding current education and outreach efforts is fundamental to this plan. Such efforts are aimed at providing community members with access to information that enables them to make informed choices.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness such ideas. See the chapter on Community Outreach & Empowerment for more.

a. Policy: *Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens regarding energy efficiency and renewable energy use*

Implementing Actions:

- *Include building energy use-related education materials in a welcome package for all new homebuyers/renters, including available rebates and incentives for energy measures.*
- *Partner with the Berkeley Board of Realtors on an outreach and education effort that targets new Berkeley homeowners.*
- *Coordinate outreach between City divisions that provide related services to the community, including energy services, child and low-income health programs, housing programs, and safety programs.*
- *The City's Office of Energy & Sustainable Development should continue to produce and distribute information at community festivals and to offer free energy education events and presentations for the public.*
- *Identify and catalogue existing energy efficiency showcases within the community. Showcase innovative projects on City and partner agency websites.*
- *Design and implement a "Lights Out at Night" campaign to reduce the amount of energy being wasted by local institutions (including the City government) and businesses.*
- *Launch an annual "Get Off Your Gas" contest to encourage Berkeley residents to reduce natural gas consumption during the winter months.* The Office of Energy and Sustainable Development is to manage the contest. Prizes will be awarded in several categories, including greatest amount of natural gas reduction from the previous year, lowest overall natural gas bill and most creative energy efficiency strategy.
- *Initiate a voluntary home energy and water-monitoring program. Energy and water monitoring in commercial and residential buildings has the potential to enhance the long-term value of the energy audits and upgrades outlined in this chapter.* The City should explore opportunities to work with PG&E, East Bay Municipal Utilities District and others to provide residents and business owners with personalized energy consumption reports. Such reports would not only help households and businesses to track consumption patterns over time, but could also be used to suggest targeted energy and water saving measures.

7. Goal: Prepare local residents for green collar job opportunities

Step one toward creating green collar job opportunities is a commitment to enhance demand for energy services such as building retrofits and solar installations. These services not only reduce energy consumption and GHG emissions, but also create increased demand for people that can do the work. Importantly,

this demand for labor is *local*, because it requires improving our *local* built environment. It cannot be outsourced. The City must work with neighboring cities and community agencies to connect local residents to emerging job opportunities. In doing so we will protect the environment and provide pathways to sustainable employment at the same time.

The City of Berkeley and several partners have already begun the task of preparing local residents for jobs in the emerging green economy. Together, through a cooperative effort called the *East Bay Green Corridor Partnership*, the Cities of Berkeley, Oakland, Richmond and Emeryville are joining with leaders from UC Berkeley and Lawrence Berkeley National Laboratory (LBNL) to design a regional program that supports green workforce development. The goal is to provide the training and education necessary to meet future workforce demand in the green economy and to continue to attract green energy investment in the region. The partnership works collaboratively to 1) identify regional employer demand, and 2) develop new technical and soft skills training and education programs to help meet the industry demand. The overarching vision is to develop Green Energy Education and Career Pathways that provide multiple entry points into the training and education system and that lead people into jobs with career ladders and benefits.

a. Policy: *Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages*[3]

Implementing Actions:

- *Identify projected demand for skilled labor associated with implementation of the Climate Action Plan and other sustainability strategies through partnerships with economic development agencies, local universities, community colleges, certified apprenticeship programs, workforce development and training programs, businesses, and community agencies.*
- *Integrate energy and climate-related education into the public school curriculum and after school learning programs and explore development of a high school Green Career Technical Academy by partnering with the Berkeley Unified School District, Berkeley High School and the Berkeley Technical Academy (B-Tech).* Berkeley High School's School of Justice and Ecology received funding to be a Community Partnership Academy incorporating career education and climate change education through their biology and environmental science courses. Students also take part in a range of hands-on activities and internships outside the classroom.

[3] For an in depth analysis of green jobs potential and policies see: Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment. This report is a case study specific to Berkeley and was funded by the City's Office of Energy and Sustainable Development.

- *Strengthen and expand job training partnerships and opportunities that prepare young adults, many with barriers to employment (e.g., lack of education, language/cultural barriers, etc.), to seize existing and future green collar job opportunities.* The East Bay Green Corridor Partnership and other community partners such as Rising Sun Energy Center are actively developing training in life and job readiness skills, career counseling, specific skilled labor training, job placement assistance, assistance in meeting apprenticeship program requirements, and long-term follow-up support for participants.
- *Assist Berkeley residents to enroll in pre-apprenticeship trades training programs, such as those that prepare students for jobs in green construction, energy retrofits, and solar photovoltaic installation.* Work with agencies such as Rubicon Workforce Services (the North County One-Stop Center), Berkeley Youth Alternative (the North County agency funded with Workforce Investment Act funds for youth), City of Berkeley Programs, and schools and community programs reaching out to South and West Berkeley youth to expose them to green job education and training opportunities.
- *Provide ongoing support for local green businesses and industries that provide green collar jobs.* The City can provide this support in several ways, including: utilizing procurement dollars and city contracts to support local green businesses; providing marketing assistance; and helping local green businesses access energy efficiency and renewable energy services.
- *Stimulate demand for energy services and an energy service workforce by strengthening and improving the administration and performance of the City's First Source Employment Ordinance and by developing additional provisions and incentives to encourage green businesses and contractors to hire local and provide high-quality employment.* The First Source Employment Ordinance will be strengthened to ensure that local workforce development efforts produce qualified candidates for jobs in the energy services sector. Berkeley's Department of Planning and Development and the Office of Economic Development will work together to explore incentives for businesses and contractors to hire local workers. Such incentives could include, but are not limited to, rebates on permits related to solar installation or energy efficiency improvements for contractors that hire local.
- *Consider developing and adopting a Local Hire Ordinance that would serve to create additional opportunities for local residents to get jobs.*

Chapter 5: Waste Reduction & Recycling

A. Solid Waste Management in Berkeley: An Overview

Efforts to achieve Zero Waste are an essential piece of reducing the emissions that cause global warming. Zero Waste means that all discarded material is recycled, composted or reused, and none is sent to landfills. Recycling and reducing consumption in homes, businesses and public institutions serve to decrease upstream, energy intensive production processes and the associated GHG emissions and to keep waste out of landfills where it releases methane (CH_4), a powerful greenhouse gas.

In March 2005, the Berkeley City Council adopted the goal of achieving Zero Waste by 2020. The resolution also reaffirms the City's commitment to the Alameda County-wide goal of achieving a 75% waste diversion rate by 2010. While the City has worked hard to create and implement several successful waste diversion programs, achieving the 75% diversion rate remains difficult due to several challenges, including the shrinking market for recyclables and declining revenues from waste fee collection.

In 2007, landfills reported receiving 102,000 tons (short tons) of refuse originating in Berkeley. The community's waste diversion rate was 59%.[1]

Increasing the City's diversion rate to achieve the City's Zero Waste goal and the associated GHG emissions reductions requires sustained collaboration across sectors to:

- **Eliminate solid waste at its source,** i.e., the point of production, through such efforts as promoting deconstruction and reuse of building materials and holding manufacturers responsible for their products and packaging through the entire product lifecycle.
- **Maximize recycling and composting** through expanding residential and commercial collection programs, increasing capacity at recycling and composting facilities, and enhancing public education and outreach.

The principle that guides the City's and its partners' waste diversion programs and policies is to ***strive to ensure the "highest and best use" of all discarded materials***. For some materials this may mean the reuse of the material for its original purpose, e.g., reusing building materials to build another structure. For others, such as organic

[1] A diversion rate for 2008 has not yet been finalized.

waste, this would mean ensuring that the materials are composted or used as mulch. Discarding materials in the landfill that could otherwise be reused or recycled is inconsistent with the principle of "highest and best use."

As is explained in Chapter 2 (Berkeley's GHG Emissions Estimates) of this report, despite the connection between solid waste management and climate protection, the Berkeley greenhouse gas emissions inventory' *does not* currently include the emissions that result from solid waste sent to the landfill or the upstream energy consumption associated with producing new materials. This is a barrier to counting increases or decreases in solid waste-related emissions against the community GHG emissions reduction target. This barrier notwithstanding, Berkeley should not let current constraints in the community-level emissions inventory methodology limit community waste diversion efforts.

The Climate Action Plan affirms the important connection between climate change and solid waste by including solid waste diversion actions below and an estimate for the scale of GHG reductions that could be achieved by implementing the actions. Further, the City is partnering with ICLEI, the organization that provides cities like Berkeley with an emissions inventory protocol, to update its community-level inventory methodology to include solid waste emissions. Once the update is complete Berkeley will measure and report these emissions in subsequent GHG emissions inventories.

B. Berkeley's Current Solid Waste Management Efforts

The City of Berkeley has long been a leader in the effort to divert solid waste from landfills. Berkeley was the first city in the nation to offer curbside recycling. In 1976 City Council established a 50% waste diversion goal, 13 years before the goal was mandated by the State through the California Integrated Waste Management Act (AB 939).

Today Berkeley is one of the few municipalities in California that owns its own waste management facility and manages fleet operations. This enables the City to directly operate and oversee the implementation of a progressive array of source reduction, recycling, and composting programs and policies. It also provides high-quality jobs for local residents.

The City's Solid Waste Management Division, a part of the Department of Public Works, operates many programs directly and contracts through private entities for other services. As for programs it operates directly, the City provides recycling collection for businesses as well as residential and commercial refuse and organic waste collection. The City operates the Transfer Station where the public can dispose of trash and recycle items such as electronics, mattresses, metals,

carpet padding, construction materials, and compostable waste. All the materials collected by City trucks are also processed at the Transfer Station. The City employs Urban Ore, Inc., a local reuse company, to salvage reusable items discarded by Transfer Station customers.

In collaboration with neighboring cities and community groups, the City's Solid Waste Management Division engages in innovative, targeted outreach and education efforts. For example, the Division provides a liaison to local restaurants to help them take better advantage of existing recycling and composting programs. The City also works closely with the Ecology Center and StopWaste.org on various public education campaigns. In addition, the City collaborates with the City of Albany to provide a local "Reuse Guide" to area residents. The booklet helps residents find businesses that buy, sell, trade, rent, and repair reusable goods.

The Ecology Center operates the City's residential curbside recycling program, including public outreach and education on the benefits of recycling.

The Community Conservation Center, Inc. (CCC) operates the City's materials recovery facility, sorting materials collected by the Ecology Center and the City, and preparing them for market. CCC also collects and processes scrap metal, batteries and compact fluorescent light bulbs, and a host of other discards.

In addition to activities directly operated or contracted out by the City, several private refuse and recycling companies do business in Berkeley. Four private refuse companies have non-exclusive franchises that allow them to collect dry rubbish from Berkeley businesses. These companies pay a franchise fee to the City and report their activities quarterly. Many other Berkeley businesses also have arrangements with private recycling companies that provide customized service.

In 2004 Berkeley adopted a far-reaching Environmentally Preferable Purchasing Policy (EPP) mandating that the City institute practices reducing waste generated from City government purchases. One example of this policy in action is the City government-wide practice of purchasing only 100% post-consumer recycled Process Chlorine Free paper. A related effort is the adoption by the Zero Waste Commission of an Extended Producer Responsibility (EPR) policy, joining in a statewide association of local governments to require the producers of products sold in California to reclaim discarded products, reduce packaging that ends as discards at the local level, and eliminate toxics from products and their waste.

UC Berkeley and the Berkeley Unified School District (BUSD) are also partners with the City to divert waste from the landfill and educate community members. For example, the University and the City work together to collect and divert discards during the time when students are moving out for the summer. City staff and UC representatives also worked together to encourage recycling and composting in sororities and fraternities.

On campus, UC Berkeley's Campus Recycling and Refuse Services (CRRS) manages a series of programs to increase recycling. These services include mixed

BERKELEY ESTIMATED WASTE STREAM PROFILE FOR 2008[2]				
	Landfilled Waste		Diverted Waste	
SECTOR	Tons	% of total landfilled waste	Tons	Diversion Rate by Sector
Self-Haul & Roll-Off Containers	38,534	39%	21,396	36%
Commercial & Multi-Family Buildings	20,126	20%	8,968	31%
Single-Family Residential	14,953	15%	19,716	57%
Private Refuse and Recycling Companies[3]	26,387	26%		
TOTAL	**100,000**	100%		

paper recycling in every office on campus; beverage container recycling in nearly every campus building; food waste collection in the dining halls; and green waste collection by the campus grounds service workers. Student Sustainability Education Coordinators oversee outreach to the student population to encourage greater reuse and recycling in residence halls. The University also requires its contractors to recycle all construction and demolition waste. The campus achieved a 50% diversion rate in 2008.

BUSD is also proactively implementing recycling and composting programs in all of its schools. It is saving an estimated $80,000 per year as a result of reduced waste collection-related costs.

As a result of these and other efforts in our community, the State calculated that Berkeley diverted an estimated 57% of its solid waste from the landfill in 2006, and 59% in 2007. The overall annual diversion rate includes materials diverted from the landfill through City collection programs and facilities as well as recycling services provide by the private sector. The diversion rate also includes independent actions by residents and businesses to reduce waste, such as stopping junk mail or changing production and packaging practices.

Of the tons of waste diverted as a direct result of City programs and facilities, the curbside recycling and residential green waste collection programs account for 48% of the estimated diversion. A combination of waste "self-hauled" to the transfer station by local community members and roll-off containers accounted for about 33% of the total diverted waste. Recyclables and organic waste collected from local businesses accounted for an additional 19%.[4]

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[2] Estimate for total tons of waste from Berkeley that were landfilled in 2008 is projected from data reported from landfills in first 3 quarters of 2008. Diversion estimates by sector are from the City's weigh-master database and invoices from contractors.

[3] The City does not currently have an estimate for total waste diverted from the landfill by private refuse and recycling companies.

[4] Numbers are estimated from the City 's weigh-master database and invoices from contractors. Numbers include only materials brought to the Berkeley Transfer Station from Berkeley sources.

C. Waste Reduction & Recycling Actions

The goals, policies, and actions outlined in this section focus on achieving greenhouse gas emissions reductions through eliminating waste at its source and maximizing recycling and composting in homes, businesses and institutions. The recommended actions build on existing waste mitigation efforts, including those outlined in the Berkeley Solid Waste Management Plan Update.

As previously mentioned, solid waste-related GHG emissions are not included in the current community emissions inventory. These emissions will be included in subsequent Berkeley inventories. For the purposes of this report, City staff employed the U.S. EPA's Waste Reduction Model[5] (WARM) to estimate the total GHG emissions that could be avoided by implementing the policies outlined in this chapter. ***Assuming Berkeley reduces the amount of solid waste it sends to the landfill by 50%, the community would avoid nearly 68,000 MTCO$_2$e per year by 2020.***

See Appendix A for a consolidated list of goals, policies and implementing actions related to waste reduction and recycling. The table also includes an implementation timeline and funding sources.

1. Goal: Increase residential recycling, composting, and source reduction

The City recently expanded its residential curbside waste diversion efforts by adding food scraps and compostable paper to its existing plant debris collection program and by increasing the frequency of green cart collection to weekly. To help increase participation in the program, the City distributed a small green pail to each single-family home for convenient collection of food scraps in the kitchen and for transporting food waste from the kitchen to the green cart.

The composting program is paying dividends. Collectively, Berkeley residents are shifting an additional 300 tons per month of food scraps, food related paper and garden trimmings to their green carts as compared to before the program was launched. Nearly 40% of households participate each week.

The City and its community partners can divert additional organic waste and other recyclables from the landfill in a number of important ways. See specific policies and actions that Berkeley can implement to achieve this goal below.

a. Policy: *Enhance recycling and composting outreach and assistance to single-family homes*

[5] To access the U.S. EPA's WARM Model visit: www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

The single-family residential waste stream accounts for about 15% (about 15,000 tons) of the waste sent to landfills from Berkeley. The main program designed to divert this waste from the landfill is the City's weekly curbside recycling and green waste collection. The current estimated diversion rate for this sector is 57%, the highest rate of any sector. However, a recent waste composition study shows that 50% of the remaining waste is compostable food and paper, and that about 13% of the remaining waste is recyclable. Obviously, there is significant potential to increase the diversion rate in this sector.

Implementing Actions:

- *Initiate a 'split-cart' program to increase convenience and recycling capacity for residents of single-family homes.* Wheeled split-carts would replace the existing blue bins provided to Berkeley residents. Split-carts have a center divider, allowing for the collection of a mix of plastic, glass, and aluminum containers on one side and recyclable paper and cardboard on the other side. In other cities with prior high participation, changing from bags and tubs to a split cart increased the tons recovered by 20%. Carts have the added advantage of freeing residents from the need to stock paper bags to set out paper.
- *Increase participation in the residential green cart program by enhancing education and outreach to residents on the topic of composting household organic waste and yard trimmings.* The Solid Waste Management Division's goal is to double current participation in the green cart program.
- *Integrate a "waste audit" into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center's California Youth Energy Services program.* This action is also included in the multi-family building-related actions outlined below.

b. Policy: *Target expanded recycling outreach and services to multi-family residential buildings, including apartment buildings, fraternities and sororities, and cooperative housing*

About 10% of Berkeley's landfilled waste is generated in multi-family buildings. The main programs that address this waste stream are the City's curbside recycling and commercial recycling programs. The City collects glass bottles, cans and plastic bottles mixed together, corrugated cardboard, newspaper, and mixed papers (office papers, packaging, junk mail, and catalogs) from apartment buildings of 10 units or more. Buildings with fewer units are served by the Ecology Center. Although the City offers free recycling service to all multi-family buildings, many buildings do not participate, or do not participate optimally. Others fully participate, including separating food waste for collection.

Implementing Actions:

- *Provide on-site assistance and containers for building managers to set up recycling and composting systems in existing buildings.*
- *Design model lease language that outlines the responsibility of building managers to provide recycling systems and of tenants to recycle waste.*
- *Organize tenant meetings to provide recycling education and training.*
- *Develop standards to ensure new and remodeled buildings are designed to include appropriate space and facilities for recycling and green waste receptacles/systems.*
- *Enact a local ordinance requiring managers of multi-family buildings to provide tenants with the opportunity to recycle, including the provision of the appropriate receptacles and tenant education.*
- *Integrate a "waste audit" into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center's California Youth Energy Services program.* The waste audit would be designed to educate tenants regarding what materials can and cannot be recycled and when and where to recycle.

2. Goal: Increase recycling, composting & waste reduction in the commercial sector

Local businesses can significantly reduce refuse bills through increased recycling and composting. The City collects glass bottles, various forms of plastic, aluminum cans, paper, and cardboard from commercial customers. Also offered is food waste collection for restaurants and food producers. The combination of these services can help a typical restaurant to reach 85-90% diversion. The City also provides a "green restaurant liaison" to help restaurants design convenient, space-efficient recycling and composting systems. This program is also available to offices and multi-family buildings. A common barrier to participation in recycling programs is lack of space to store recycling carts within the business.

The City and its community partners can work to increase commercial recycling, composting and waste reduction in a number of ways. See specific policies and actions below.

a. Policy: *Enhance recycling and composting outreach and assistance to local businesses*

Implementing Actions:

- *Provide on-site assistance and containers for building managers and owners to set up recycling and composting systems.*

- *Design model lease language that outlines the responsibility of building managers to provide recycling systems and of commercial tenants to recycle waste.*
- *Partner with the Chamber of Commerce, the Sustainable Business Association and other business associations to conduct expanded marketing and outreach to local business owners.*
- *Design and administer recycling and composting training sessions for local building maintenance companies.*
- *Refer large businesses to StopWaste.org's recycling partnership program, which provides free waste analysis and consulting services for waste reduction.*
- *Enact a local ordinance requiring managers of commercial buildings to provide commercial tenants with the opportunity to recycle, including the provision of shared storage containers and tenant education.*
- *Utilize the interaction between the City government and local businesses at the time a business license is issued to distribute resources and information regarding setting up recycling and composting systems.*
- *Design and implement a more effective space allocation ordinance to ensure that new and remodeled buildings provide adequate space for storage of recycled materials.*
- *Continue to promote participation in the Alameda County Green Business Program.* The Green Business program recognizes small businesses that comply with environmental standards and take additional steps to conserve resources and reduce waste. The program provides small businesses with a checklist where "green" measures are selected and a green business certification for businesses that undertake a certain amount of such measures. In 2004, there were 17 green certified businesses in Berkeley. In 2008 there were over 100.
- *Identify and implement opportunities to assist local businesses to aggregate purchasing power for the purchase of sustainable product alternatives such as compostable take-out fare and reusable bags.*
- *Work with franchised haulers, private recycling companies, and their customers to identify opportunities to recycle and reduce waste in the commercial sector.*

b. Policy: *Make recycling and composting mandatory at public events and provide more public recycling containers*

The City is implementing a policy to require waste reduction, recycling and composting at public events. The Solid Waste Division provides advice and loans recycling containers to sponsors of any event, large or small. As a result, in 2008, 60-90% of the waste discarded at major city events such as the Solano

Stroll, Earth Day, How Berkeley Can You Be, the Kite Festival and the Spice of Life Festival was recycled or composted.

Implementing Actions:

- *Continue to require recycling plans and to provide recycling containers and assistance to public event organizers upon request.*
- *Prepare a recycling guide for local event organizers/planners.*
- *Provide more public recycling containers on commercial corridors and in parks and public places and create a system for collecting these recyclables.*
- *Explore the feasibility of providing composting receptacles in the public right of way.*

3. Goal: Increase recycling of construction & demolition (C&D) debris

According to StopWaste.Org, construction and demolition (C&D) debris represents a significant portion of the total waste stream in Alameda County – over 21%. In fact, a typical new home produces approximately 17,000 pounds of C&D waste.[5] This waste generally consists of wood, drywall, metal, concrete, dirt and cardboard, most of which is recyclable. Once it is sent to the landfill, the organic materials break down and emit methane, a potent greenhouse gas.

Recycling C&D waste not only keeps it from ending up in the landfill, but also reduces the upstream energy consumption required to manufacture new construction materials. Further, businesses can often save money by taking their C&D debris to recycling and reuse facilities. Such facilities may have lower fees than landfills and may even buy back selected materials.

The City adopted an ordinance that requires a recycling plan as a condition of construction and demolition permits for projects over $100,000.00 in value, with a recycling report required at the time a large project closes. The Solid Waste Management Division must approve the plan and is currently working to enhance the ordinance to include stricter diversion goals for any project permitted by the City. The Division is also working to provide more convenient recycling of construction materials. *In order to increase the diversion of C&D debris from the landfill, the City requires increased capacity to review and enforce recycling plans and to educate contractors regarding their recycling options.*

In 2008 the City recovered 6,851 tons of construction waste from the Transfer Station. Construction waste diversion began in July 2008.

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[5] Based on waste studies for three residential developments in Alameda County. Compiled by Matthew J. Southworth, P.E. Assumes a house size of 2,000 square feet.

a. Policy: *Enhance C&D recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders*

Implementing Actions:

- *Promote deconstruction and reuse of building materials through written outreach materials such as a brochure on residential remodeling, and through direct consultations with builders.*
- *Pending site design and feasibility analysis, create capacity to process C&D materials at new Berkeley Transfer Station.* Until the new Transfer Station is built, the City is sending mixed C&D materials to an outside facility for recycling.

4. Goal: Expand local capacity to process recycled materials

Expanding local capacity to process recycled materials has the potential to reduce the vehicle miles traveled (and GHG emissions) associated with transporting materials elsewhere as well as to create local jobs in the waste management sector.

a. Policy: *Rebuild the Berkeley Transfer Station and material recovery facility into a state-of-the-art Zero Waste facility in order to increase local capacity to recover a high percentage recyclable materials*

The facilities at 2nd and Gilman Streets in Berkeley have been used for recycling and solid waste management services by the City of Berkeley and various partnering organizations since the early 1980's. The site includes the Transfer Station as well as the City's bin storage, truck parking and washing, household hazardous waste collection areas, salvage areas, and administrative offices of the Solid Waste Division, among other uses. The Ecology Center and materials recovery facility are also located on this site.

As recycling efforts have intensified over the years, the facilities that support waste diversion efforts are being strained by growing vehicle fleets, increased personnel, and the need to process more types of materials. The site at 2nd and Gilman has become an increasingly complex mix of activities and use of space. The facility requires major updating.

The City is committed to rebuilding its waste processing facilities in order to better meet a variety of needs and to reach the Zero Waste goal, including increased levels and types of material recovery, better traffic flow to reduce idling and waiting time, and more space for equipment maintenance. ***The City's goal is to design and build a state-of-the-art zero waste facility that utilizes resources efficiently and increases local capacity to divert waste from landfills.***

Implementing Actions:

- *Conduct a feasibility study that results in recommendations regarding the design of a rebuilt Transfer Station and material recovery facility as well as recommendations regarding what types of waste-processing equipment and material recovery systems to incorporate. The new facility should meet nationally recognized green standards.*
- *As part of the Transfer Station rebuild, examine the costs and benefits of installing a "single-stream" sorting system, or a sorting system that can accept both single and dual-stream recyclables.* Currently, residents must sort recyclables before the Solid Waste Management Division collects them. A single-stream system would enable residents to put all recyclables in one bin. Advantages of single stream recycling include reduced sorting by residents, reduced space required in buildings for multiple recycling receptacles (which is especially important in apartment buildings), and the use of one collection truck rather than two. However, a two-stream system makes it easier to sort recyclables into clean marketable materials, giving the City flexibility to sell these materials for their "highest and best use."

b. Policy: *Expand the types of materials that can be recycled locally and identify local markets for recycled products*

Implementing Actions:

- *Evaluate the feasibility of partnering with the East Bay Municipal Utility District to divert commercial food waste to its anaerobic digester. An anaerobic digester breaks down biodegradable waste (in the absence of oxygen) and captures the resulting methane and carbon dioxide.* The captured methane gases can be used as a renewable source of energy for vehicles or be converted into electricity, among other uses, and the material residue can be used for compost.
- *Expand the types of materials that are collected for recycling, such as rigid plastic packaging (e.g., yogurt containers), as soon as an environmentally sound market for the materials are found.* This will increase diversion and reduce confusion among the public about what items are recyclable.
- *Investigate additional options to sell recycled materials for domestic use, rather than for export.*

5. Goal: Expand efforts to eliminate waste at its source

a. Policy: *Encourage the use of reusable bags at local retail locations*

Implementing Actions:

- *Institute a ban on single-use plastic bags and establish a fee on paper shopping bags at Berkeley retail locations.*
- *Explore bulk purchase of reusable bags with the City's Office of Economic Development, coordinating with the Buy Local Berkeley program.* The City should work with community partners such as the Ecology Center to identify grant funds to purchase or subsidize reusable bags for citizens.

b. Policy: *Increase producer responsibility for product waste and packaging*

Current practice places the cost of dealing with product waste and packaging discards on local communities. "Extended Producer Responsibility" (EPR) is a strategy that holds manufacturers accountable for their products and packaging through their entire lifecycle. In this way, product producers are responsible for designing products to be durable or easily recyclable, taking back spent products from consumers and either reusing or recycling them, and/or contributing to recycling infrastructure. Given that Berkeley will not reach its Zero Waste goal without addressing the generation of waste by manufacturers and packagers, action to extend producer responsibility is of utmost importance.

The City government's Environmentally Preferable Purchasing policy addresses this issue for government operations, but the policy needs further traction among businesses in the community, in the region, and beyond. To further EPR and EPP efforts, the City will partner with other community entities and with other levels of government to take the actions below.

Implementing Actions:

- *Evaluate options and opportunities for extending producer responsibility for product waste at the local level.* These opportunities include expansion of retail businesses engaging in take-back programs and grant-funded education programs.
- *Support policies at the state level that provide incentives for efficient product design, reduced product and packaging waste, and elimination of toxics in the discard stream through mandatory compliance programs.*
- *In collaboration with the Chamber of Commerce and other business associations, enhance outreach and education to local businesses about the waste embodied in products and packaging and support local manufacturers' efforts to reduce packaging.*

c. Policy: *Continue to promote reuse and repair businesses and organizations*

Implementing Action:

- *Promote the utilization of reuse and repair businesses in outreach to businesses and residents*. Reuse and repair organizations in Berkeley include the Berkeley Tool Lending Library, the Alameda County Computer Resource Center, Urban Ore, and over 200 other reuse and repair and rental businesses cited in the Reuse Guide. Information about these entities should be integrated into the different types of outreach outlined below under Goal #8 (enhanced marketing and outreach).

d. Policy: *Reduce yard and garden waste produced by residents and businesses*

Implementing Actions:

- *Promote participation in StopWaste.Org's Bay Friendly Landscaping program*. Bay-Friendly Landscaping is a whole systems approach to the design, construction, and maintenance of the landscape in order to reduce waste and recycling materials, as well as reduce storm water runoff and create wildlife habitat, among other benefits.
- *Explore the feasibility of initiating a local "excess harvest program" in which residents are encouraged to donate excess produce from gardens and fruit trees to local food banks and homeless assistance programs.*

6. Goal: Revise the City solid waste disposal rate structure in order to maintain and enhance incentives, outreach programs and other activities designed to increase waste diversion

New programs and services to achieve Zero Waste require sustained, substantial funding. The City's Refuse Fund, which pays for Solid Waste Division services, is affected by a number of factors including the market price for recycled materials (declining in 2009) and increasing landfill fees. The City is currently updating its solid waste disposal rates. As it restructures its finances, the City will endeavor to maintain and expand incentives and programs to increase recycling and composting while also maintaining necessary operating revenue in an environment of increased waste diversion.

Implementing Actions:

- *Update solid waste disposal billing rates to cover costs of providing basic refuse, recycling and composting service to the community.* Analyze new rate structure options with the goal of maintaining and enhancing incentives to recycle.

- *Review the service impacts and operational and financial aspects of offering every-other-week residential refuse service.* As the amount of waste is reduced at given locations, there may be less need for weekly pick-up. The cost reductions available through reduced pick-ups could reinforce actions taken by residents and businesses to generate less waste.

7. Goal: Increase recycling, composting, and waste reduction in public institutions

Action to reduce waste and increase waste diversion in municipal buildings and in schools demonstrates important leadership for the community.

a. Policy: *Maximize waste reduction and recycling and composting at all City buildings, including leased buildings, and at all City events*

Implementing Actions:

- *Ensure that every City department is equipped with the appropriate recycling containers and undergoes basic training on how and where to recycle.*
- *Initiate a recognition program to encourage City departments to recycle 100% of recyclable materials.*
- *Ensure that all City departments coordinate event planning with the City's Solid Waste Management Division.* The Solid Waste Division will provide the appropriate recycling containers as well as compostable utensils, cups, plates, etc.
- *Limit the use of single-use plastic beverage bottles in City buildings and at City events.*
- *Track City government paper use and limit its consumption by making duplex the default setting for printers and by encouraging the electronic distribution of documents whenever possible.*

b. Policy: *Sustain and enhance waste diversion efforts at the Berkeley Unified School District*

Implementing Action:

- *Support BUSD efforts to identify a funding source for ongoing staffing in support of waste diversion systems in schools.*

8. Goal: Enhance and expand marketing, outreach, and education regarding waste reduction and recycling

Personal choice underlies many of changes that will have to occur in order for the community to achieve its Zero Waste and GHG-reduction goals. As such, enhancing and expanding current education and outreach efforts is fundamental to this plan.

The actions outlined below represent a strategic start rather than a comprehensive list of the things our community can do to affect behavior change. New and innovative ideas for creating social change happen all the time. The City and its partners will continue to seek and harness such ideas. See the chapter on Community Outreach & Empowerment for more.

a. Policy: *Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens regarding waste reduction and diversion*

Implementing Actions:

- *Incorporate information about waste reduction services into expanded marketing and outreach print and web-based materials, including City and partner agency newsletters, the City website, and door-to-door marketing.*
- *Include waste diversion resources and information in a "welcome basket" for new Berkeley homeowners and renters.*
- *Enhance the City Solid Waste Division website to serve as a one-stop web portal for waste diversion resources.*

Chapter 6: Adapting to a Changing Climate

A. Preparing for the Impacts

Despite our best efforts to reduce GHG emissions, some climate change is already occurring and additional change is inevitable. Even as we ramp up our efforts to mitigate heat-trapping emissions, *it is critical that our community start today to prepare for the impacts of a changing climate*. Waiting until the impacts grow more severe increases the risk of being poorly equipped to manage the public health, economic, quality of life and environmental consequences. We live in a region of the world that knows well the importance of preparedness. It is time we apply our preparedness doctrine to the risks associated with climate change.

New, more accurate information about the current and future effects of climate is becoming more and more available. Researchers at institutions such as UC Berkeley, Lawrence Berkeley National Labs (LBNL), the San Francisco Bay Conservation and Development Commission (BCDC), and the Union of Concerned Scientists are generating models that governments can and should incorporate into strategic and capital planning efforts.

For example, according to a report released by the California Climate Change Center,[1] if heat-trapping emissions continue unabated, the Sierra Nevada spring snow-pack could shrink by 90% by the end of the century. How will the shrinking snow-pack affect this region's water supply? How will it affect our electricity supply, which is largely generated through hydroelectric technology?

According to the SFBCDC, the San Francisco Bay rose by seven inches over the past 150 years. What would it mean for Berkeley if sea levels rose one meter by 2100, consistent with many scientists' projections? Is Berkeley's coastal development vulnerable to sea-level rise? Should Berkeley limit any new coastal development or redevelopment in order to avoid the hazards associated with sea-level rise?

Scientists also project that global warming will affect Californians' health by exacerbating air pollution and causing more extremely hot days. Extreme heat events increase the risk of dehydration, heat exhaustion, and respiratory distress, among other things. Children, the elderly, and people who are already ill are especially at risk. How will vulnerable members of Berkeley's population be affected? What is Berkeley doing to prepare?

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[1] "Our Changing Climate: Assessing the Risks to California," A summary report from the California Climate Change Center, July 2006.

It is imperative that our community finds answers to these and many other questions regarding vulnerability to climate change. This chapter is intended to further that pursuit.

B. Climate Adaptation Actions

The efficacy of the policies and actions outlined in this section rest on their being developed and implemented in partnership with other local governments and with relevant regional and state agencies. Partnering with other affected entities not only enables the pooling of resources, but also ensures that a consistent adaptive strategy is applied across boundaries.

Given the serious threat of sea level rise to California's water supply and coastal resources and the impact it would have on our state's economy, population and natural resources, in 2008 Governor Arnold Schwarzenegger issued Executive Order (EO) S-13-08 directing state agencies to enhance the State's management of climate impacts from sea level rise, increased temperatures, shifting precipitation and extreme weather events. As part of implementation of EO S-13-08, the California Resources Agency, along with the Cal/EPA, the Business Transportation and Housing Agency, the Department of Health and Human Services, and others, is developing the State's first comprehensive Climate Adaptation Strategy (CAS). Berkeley and other local governments should participate in the planning and implementation of the CAS. This will help each level of government better understand its role in developing robust adaptive strategies. Further, cooperation across levels of government will assist cities, counties, regional agencies and the state to become better informed regarding adaptation efforts already underway and the resources available to become more resilient to a changing climate.

See the table in Appendix A for a consolidated list of goals, policies and implementing actions related to climate adaptation.

1. Goal: Make Berkeley resilient to the impacts of climate change

a. Policy: *Launch and sustain a collaborative process for increasing Berkeley's and the region's preparedness for climate change impacts*

Implementing Actions:

- *In collaboration with neighboring cities and relevant regional and state agencies, conduct an assessment of Berkeley's (and the region's) vulnerability to climate change impacts.* A regional climate vulnerability assessment would serve to inventory the risk to infrastructure, public health, economy, and energy, urban forest and water resources. The assessment should be kept up to date based on emerging climate science. An accurate assessment will assist

our community and the region to prioritize resource allocation for adaptive management strategies.

- *Develop and implement a strategic plan for climate change adaptation*. Based on the findings of a vulnerability assessment, a coalition of local governments, with support from regional and state agencies, should put forth a preparedness vision, set goals, and design a plan of action for climate adaptation. An effective plan would serve as a blueprint for making the region more resilient to climate change and would dovetail with the state Climate Adaptation Strategy. The plan would include measures that:
  - Increase public awareness about the impacts of climate change on the community and on all species
  - Build strong partnerships across sectors (e.g., public health, environment, economic development, public works) and across the region so as to increase communication and reduce vulnerability
  - Increase the adaptive capacity of the region's infrastructure

The plan would serve as a first step toward a comprehensive adaptation policy for the region. Such a plan could benefit from the input of an "adaptive planning task force" consisting of scientists, engineers, insurance experts, local and regional policy makers and planners, emergency preparedness officials, public health officials and others.

b. Policy: *In preparation for the impacts of climate change on the region's water resources, partner with local, regional, and state agencies to encourage water conservation and efficiency and expand and diversify the water supply*

Implementing Actions:

- *Examine the potential of developing new, local groundwater sources for various purposes, including irrigation, showers, and toilets.*
- *Encourage water recycling and gray water use through the development of outreach materials and local guidelines that are consistent with the Building Code. Gray water is any water that has been used in a given building, except water from toilets.* Gray water can be reused for other purposes, especially landscape irrigation. Using gray water saves water (and the energy used to treat and transport it) by reducing fresh water use.
- *Partner with East Bay Municipal Utility District (EBMUD) to provide and market incentives for residents, businesses and institutions to conserve water. EBMUD offers a variety of water-saving programs and services to its residential, commercial, industrial and institutional customers.* Offerings include free water saving devices, rebates for

high-efficiency toilets, and grants for projects that demonstrate water-saving principles.

- *Encourage the use of water conservation technologies, such as waterless urinals and cisterns, through the development of local guidelines that are consistent with the Building Code.*
- *Partner with agencies such as EBMUD and StopWaste.org to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain.*
- *In collaboration with community partners, increase public awareness by including information on climate change impacts to water supplies and riparian and coastal habitats and on how residents and businesses can use water more efficiently in various newsletters and newspapers and on City and partner websites, among other places.*

c. Policy: *In preparation for rising sea-levels and more severe storms, partner with local, regional, and state agencies to reduce the property damage associated with flooding and coastal erosion*

As global temperatures continue to increase, the combination of rising sea levels and increasingly severe winter storms is expected to cause more frequent flooding and the associated coastal erosion and damage to infrastructure. Coastal cities such as Berkeley should increase preparedness through enhancing local capacity to manage stormwater and coastal floods.

Implementing Actions:

- *Use development review to ensure that new development does not contribute to an increase in flood potential.* This action is consistent with Policy S-27 in the Disaster Preparedness and Safety Element of the Berkeley General Plan.
- *Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems such as greenscapes.*
- *Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions.* Trees store rainwater, reducing runoff and delaying peak flows. Further, the exposed soil directly surrounding trees has higher infiltration ability than compacted soils. Tree roots loosen the soil and increase water penetration.
- *Maximize permeable surfaces in both greenscape and hardscape areas for retention and infiltration of stormwater.*
- *Encourage the development of green roofs by providing local outreach and guidelines consistent with the Building Code. Green roofs*

reduce the amount of stormwater runoff and delay the time at which runoff occurs.

d. Policy: *In preparation for more extreme heat events, partner with local, regional, and state agencies to protect and increase urban tree cover*

In addition to the many social, public health, and environmental benefits trees provide, an urban forest can help reduce local air temperatures by shading buildings and by shading paved and dark colored surfaces such as roads and parking lots that absorb and store heat. Also, because higher temperatures contribute to conditions conducive to air pollution formation, trees play an important role in improving local air quality.

Implementing Actions:

- *Expand local tree planning efforts and continue to maintain the health of existing trees and gain support for urban forestry efforts by providing local outreach and guidelines for residents, businesses and public institutions.*
- *Consider developing street tree master plans for sub-areas within the City.* Such plans would guide the selection of appropriate tree species for streets and open spaces and outline a regular maintenance and planting cycle to ensure that hazards to trees are minimized and that the local tree stock continues to increase.
- *Consider developing a vegetation and fuel management plan in parts of the City designated as high fire hazard areas.* The plan would reduce the risk of catastrophic wildfires, thereby protecting homes, wildlife and air quality as well as mitigating the impact on GHG emissions of the loss of trees due to wildfire.

Planning for Peak Oil

The same reasons that make communities like Berkeley uniquely capable of addressing the climate challenge also make communities well positioned to address "Peak Oil." As its name suggests, Peak Oil refers to the transition from many decades in which the available supply of oil grew each year to a period in which the rate of oil production enters it terminal decline. There is still debate about when the actual peak of oil production will occur (some believe it has occurred already), but there is little debate that it will occur.

Our community and region should care about the coming of Peak Oil and act quickly to prepare for it because it has implications for virtually every part of society. For the last 100 years or so, oil has been both cheap and convenient compared with other energy sources, and has thus become fundamental to our mobility, agricultural production, the production of plastics and chemicals, and our building energy needs. In short, we are addicted to oil and need to begin preparing to wean ourselves off of it.

On December 18, 2007 the Berkeley City Council passed a resolution acknowledging the enormous challenge that Peak Oil presents and directing the City Manager to "come up with a proposal for the City staff to consider the impact of sharply rising energy prices and oil depletion in future transportation and land use plans, in any updates to the General Plan, future budget processes, policies and practices, and the City of Berkeley's dependence on products that require substantial amounts of oil to produce and ship."

In fact, many of the strategies outlined in this plan reduce our vulnerability to the volatile oil market by reducing our overall dependence on oil as an energy source. Examples include land use and alternative transportation measures designed to reduce vehicle miles traveled and promote low-carbon fuels (see Chapter 3) and building energy use measures designed to increase energy efficiency and the utilization of renewable energy sources such as solar and wind (see Chapter 4).

As is addressed in Chapter 3 of this plan as well as in the Open Space & Recreation Element (Policy OS-8) and the Environmental Management Element (Policy EM-34) of the Berkeley General Plan, the community should also partner with the Berkeley Unified School District, UC Berkeley and other organizations to encourage local organic food systems. Local organic food systems reduce dependence on oil by reducing the miles food must travel and energy intensive agricultural inputs such as synthetic fertilizer.

City staff will work with city commissions and community groups such as Oil Independent Berkeley and Bay Localize to institutionalize City Council's directive.

In the meantime, we as individuals all have an immediate role to play:

- ✔ Buy local, organic produce
- ✔ Grow your own food by joining a community garden or planting a garden in your yard
- ✔ Conserve energy by driving less: Walk or bike to work, take public transit or buy an electric car
- ✔ Extend your community by getting involved with local groups working on the peak oil issue

Chapter 7: Community Outreach & Empowerment

A. Building a Climate Action Movement

From the beginning, implementing Measure G has been about more than just developing a Climate Action Plan. It has been about building a climate action *movement*.

A movement starts with leading edge, early adopters and builds toward a critical mass. As a result of ongoing outreach efforts by community-based organizations, City staff and elected officials, and powerful forces outside our community such as Mr. Gore's *Inconvenient Truth*, more and more residents in Berkeley and beyond are beginning to heed the call to action.

Because Berkeley is a diverse community it is important to involve all sectors in the local climate protection effort in a meaningful way, including those who may be historically left out or less oriented to action. Berkeley will achieve its GHG reduction goals only when the entire community plays a role.

B. Community Outreach & Empowerment Actions

The actions proposed in this section largely build on existing outreach, education, and empowerment efforts in the community. Their goal is to contribute to building a critical mass of Berkeley citizens and businesses engaged in a achieving a community-wide goal.

1. Goal: Mobilize the community at large to turn the climate plan into climate action

Significant ongoing outreach efforts are already underway in Berkeley. The City government, in cooperation with local residents, business leaders, and regional and local agencies, should work to enhance these efforts and further align them with the voter-mandated goal of achieving aggressive greenhouse gas emissions reductions.

a. Policy: *Establish an implementation framework that enables the City to more efficiently and effectively distribute information and resources to a wide range of community partners and to report progress on achieving the goals outlined in this plan*

Implementing Actions:

- *Design a climate action "stakeholder database" that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies*. Essentially serving as a contacts management database, the application will be searchable and include given stakeholders' contact information and areas of focus or expertise (e.g., green jobs development, energy services, recycling, economic development, etc.). The main goal of the database is to enable the efficient distribution of information and resources to a wide range of entities. For example, the database could be queried to consolidate the contact information of organizations that have expertise in water resource management. Such information would be useful when designing a community outreach effort to conserve water. The City will take the lead on developing the database, with the goal of eventually making it available on-line so as to be utilized by the broader community.
- *Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program*. One example may be a "Low Carbon Diet" working group, composed of various community members that take responsibility for building participation in the Low Carbon Diet (LCD) program. The Low Carbon Diet is a program based on a workbook that walks people through simple steps for reducing household GHG emissions (see more on the LCD program below).
- *Launch and maintain a web-based portal that enables:*
    - Community members, including individuals, households, and businesses, to quantify their own emissions baseline, pledge to achieve GHG emissions reductions, report actions taken to reduce GHG emissions, and report progress toward individual goals; and
    - The City to track and report progress toward achieving the goals outlined in the Climate Action Plan in a transparent and engaging way
- *Provide an annual report to City Council that highlights community climate protection actions and progress toward the Measure G goals.*

b. Policy: *Launch a coordinated outreach and education campaign, utilizing a range of tools, programs and partnerships, to mobilize and educate residents*

A climate action outreach and education campaign must be designed to effectively communicate the urgency of addressing the climate crisis while also empowering individuals, businesses, and institutions to be a part of the solution. An effective outreach campaign will benefit from the perspectives of many City departments and community agencies with expertise in community engagement.

For example, the City's Public Health Division is in regular contact with several types of community groups that will be impacted by climate change but that may not list the environment as their main focus. Such groups include youth and youth organizations; faith-based organizations; food, nutrition, and cultural organizations; and advocacy groups for low-income and other vulnerable populations. Such groups must be included in community outreach efforts to ensure broad input and participation in turning the plan into action.

Implementing Actions:

- *Promote the Berkeley Climate Action Pledge as a means by which individuals can commit to reducing their own emissions.* Approximately 1,000 people signed the Berkeley Climate Action Pledge since May 2007 (see Appendix to read the pledge). The pledge is a non-binding means of securing individual commitments to achieving a collective goal. Individuals who sign the pledge periodically receive helpful action ideas for how to fulfill their commitment. The City and its community partners should continue to promote the pledge and work to enhance the climate-related resources and information that individuals have access to once they have made their commitment.
- *Support local efforts to launch a "local carbon offset" project.* The project would include a web-based carbon calculator that would enable local businesses and residents to track their GHG emissions over time and contribute to local carbon reduction projects (e.g., solar in schools) in order to "offset" those emissions.
- *In collaboration with community partners, develop and implement a public information strategy that serves to highlight climate-related information and resources in multiple mailings, newsletters and local media outlets, including radio, television and news publications.* Examples include placing notices of upcoming events and climate action-related resources in local publications such as UC Berkeley's CalNeighbors newsletter, the City of Berkeley's Annual Report, Lawrence Berkeley National Laboratory's Science on the Hill newsletter and others. A public information strategy would also include partnering with local radio stations and newspapers to spotlight local community leadership and highlight opportunities for action.
- *Partner with Berkeley's network of neighborhood associations to hold various community workshops and events focused on reducing GHG emissions at the neighborhood level.*
- *Partner with the Ecology Center and others to promote the Low Carbon Diet program as means for helping households reduce their GHG emissions. The Low Carbon Diet is a "30-day program to lose 5,000 pounds" of CO_2.* The foundation of the program is a workbook that walks individuals through a step-by-step process, from calculating one's current

carbon footprint, to implementing emissions saving measures, to tracking one's progress along the way. The City is partnering with a number of community-based organizations to find ways to generate participation in this program community-wide.

- *In collaboration with community partners, launch a "Green Neighborhood Challenge" and""Green Star Household" program.* The challenge would utilize friendly competition and recognition as motivators for action. The Low Carbon Diet program could serve as the guide for neighborhood- level climate protection activities. The neighborhood that collectively reduces the most emissions through the Low Carbon Diet program wins. In combination with the "Green Neighborhood Challenge," households that have significantly reduced their GHG emissions could be recognized as "Green Star Households." Such recognition could serve as a source of pride for households that have made a conscious effort to achieve GHG reductions and contribute to a community-wide effort. Neighborhoods and households could track their progress on the web-based climate action portal outlined above.
- *Partner with PG&E to provide residents with monthly personalized energy consumption reports.* The reports would include an analysis of a given household or business's energy consumption patterns over time and resources and ideas for consuming less. Such "energy monitoring" reports have the potential to enhance the long-term value of the energy services outlined in the Building Energy Use chapter.
- *Educate Berkeley residents and employees about the significant environmental impact of air travel and about potential travel-mode alternatives.* Per passenger mile, air travel is the most carbon-intensive form of travel. The City can incorporate information about the impacts of air travel and alternatives into print and web-based outreach materials.
- *In partnership with the Berkeley Board of Realtors, design a "welcome package" for new homeowners and business owners that includes resources related to energy use, transportation choices, and waste diversion and reduction.*
- *Hold speaker series and other educational events at the Berkeley Public Library.* Given its educational mission and high volume of foot traffic, the library is an important resource for raising awareness about the climate issue and empowering community members to take action.
- *Partner with the Civic Arts Commission to encourage and fund art projects that serve to heighten awareness of the climate issue.* One example may be a GHG emissions reduction thermometer that tracks community

progress toward achieving the emissions reduction goal. Another potential project is commissioning local artists to design "artful bike racks"—bike racks that are painted or designed to serve as public art.

- *Partner with biologists, botanists, and other scientists to raise awareness regarding the impact of climate change on local ecosystems.*

2. Goal: Enhance outreach and incentives to the business community

Actions by Berkeley's business community are already showing results: The GHG emissions that result from energy consumption in the commercial sector decreased by 13% between 2000 and 2005. Maintaining and building on this remarkable trend requires ongoing, collaborative efforts to showcase effective climate action and to engage additional local businesses in the climate protection effort.

The Berkeley Chamber of Commerce, the Sustainable Business Alliance, local business improvement districts, the emerging Green Chamber of Commerce and others are leading the way at engaging local businesses in an effort to reduce GHG emissions and increase overall sustainability. The City and other organizations should continue to look to local business associations for ongoing leadership in the effort to achieve the Berkeley GHG reduction goal.

a. Policy: *Continue to showcase effective climate protection efforts in the business community and to engage additional businesses in the local climate protection effort*

Implementing Actions:

- *Continue to promote participation in the Alameda County Green Business Program and enhance the program's ability to efficiently administer the green business certification process and track GHG-related metrics.* The Green Business Program exists to provide recognition and assistance for local businesses that operate in an environmentally friendly manner. The program provides a checklist and inspections to verify that local businesses meet higher standards of environmental performance. The Berkeley community boasts a large number of businesses (over 100), including the Berkeley Chamber of Commerce, that are certified as green. The City is working with local business associations to promote participation in the program and to increase the efficiency of the certification process. Starting in 2009, the Green Business Program will provide guidance and metrics to assist businesses to measure GHG emissions reductions achieved by the measures they implement. Since program requires that businesses get re-certified every three years, this is an excellent way for businesses to monitor their emissions and set goals for reductions into the future.

- *Expand the local green economy through the East Bay Green Corridor Partnership*. In January 2008, the Cities of Berkeley, Emeryville, Richmond and Oakland joined with leaders from UC Berkeley and LBNL to launch a cooperative effort to lead the world in environmental innovation, emerging green business and industry, green jobs, and renewable energy. The partnership is serving as a conduit for sharing and implementing climate protection, economic development, and workforce development strategies on a regional scale.
- *In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign*. The goal of the campaign is to build a vibrant local economy by encouraging consumers and businesses to buy local. Shifting more consumer purchases to local businesses has the potential to increase tax revenue for the City, expand local investments in non-profits and local businesses, and create more local jobs while simultaneously reducing vehicle miles traveled.
- *Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups*. Examples of local existing efforts to recognize environmental leadership in the business community include the Green Gathering, Sustainability Summit, and Champions of Sustainability Awards. These three events have recently been integrated to focus community awareness on efforts to make Berkeley a world leader in building a sustainable community.

3. Goal: Enhance climate change-related education at local schools

Representatives from the City, the Berkeley Unified School District, UC Berkeley, Lawrence Berkeley National Labs, and local museums, among others, should identify opportunities for sharing resources that will help to increase climate awareness and education in local K-12 schools.

a. Policy: *Continue to showcase existing climate protection efforts in our schools and to expand opportunities students have to learn and take action on climate change*

Implementing Actions:

- *Integrate climate-related activities and education into existing after-school programs such as Berkeley LEARNS (Links Enrichment, Academics, and Recreational Needs to Students).*
- *Partner with Parent Teacher Associations (PTAs) to promote programs such as the Low Carbon Diet and to integrate climate-related information into school gatherings and fairs.*

- *In collaboration with community partners, support Berkeley High School's School of Social Justice and Ecology by providing internship opportunities and climate-related resources to integrate into its curriculum.*
- *In collaboration with UC Berkeley, provide internships and educational programs to K-12 students on topics related to climate science and on impacts of climate change on the community and local ecosystems.*

4. Goal: Increase awareness in the City government

The City government accounts for only one percent of our community's total greenhouse gas emissions. As a minor contributor to total emissions, actions in the City government will have a limited impact on Berkeley's overall emissions levels. However, actions by City government officials have symbolic value and demonstrate leadership that extends beyond the magnitude of actual emissions reduced.

a. Policy: *Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on how to achieve increased sustainability at home and in the workplace*

Implementing Actions:

- *Hold regular "brown bag" events for each City department on various topics related to the climate change issue and on actions employees can take to reduce their own GHG emissions.*
- *Establish a "Sustainability at Work and at Home" class as part of the required City of Berkeley Core Courses for City employees.* The class will cover existing sustainability related policies affecting employee duties, as well as training on how to increase resource efficiency throughout City operations and at home.
- *Establish energy consumption reduction targets for each City department and provide assistance in achieving those targets.*
- *Establish recycling and composting systems in each City building and recycling training for employees and maintenance staff.*

Chapter 8: Implementation, Monitoring & Reporting

A. Institutionalizing Climate Action

The preceding chapters illustrate where Berkeley's GHG emissions come from and set forth a series of policies and actions for achieving the community's aggressive emissions reduction targets. Extensive community and expert input went into developing the content of these chapters, but the component of Berkeley's climate action effort that matters most still lies ahead: Implementation.

Although significant GHG reduction policies and programs are already in place, the actions proposed in this plan, by necessity, far surpass the scale of existing efforts. Implementing the plan and ensuring that it results in real, additional GHG emissions reductions necessitates new and sustained resources, increased coordination across sectors, and a system for evaluating and reporting progress. In short, it requires institutionalizing climate protection efforts throughout the community.

This chapter outlines the main components of the process for turning this plan into action and identifies policies from earlier chapters that City staff recommends for short-term implementation, i.e., by the end of 2010.

The main components of the implementation process are summarized here and described in more detail immediately below:

1. Establish an implementation timeline for actions included in the Climate Action Plan
2. Establish, monitor, and report on indicators that enable the community to gauge progress toward the goals outlined in the Climate Action Plan and to continuously evaluate implementation priorities
3. Continue to identify funding opportunities and develop sustained revenue streams to support climate protection initiatives
4. Establish a stakeholder "infrastructure" that facilitates the efficient distribution of information to multiple community stakeholders and also enables community members to effectively report climate protection actions

1. Establish an implementation timeline for actions included in the Climate Action Plan

The Climate Action Plan reflects the City's current implementation priorities. It does so by including an'"implementation timeframe" for every implementing action included in the plan. The implementation timeframe designates each action for short, medium or long-term implementation (See Appendix A).

City staff generated the""package" of policies recommended for short-term implementation (see table at the end of this chapter for the list of short-term policy priorities) on the basis of several factors, including:

- *Estimated volume of GHG reductions that could be achieved from a given strategy.*
- *The likelihood of a given policy's success: Staff gauged the likelihood of success of a given policy by considering factors such as level of community support and consistency with the City's or relevant community agencies' priorities and readiness to implement.*
- *The estimated cost.*
- *The availability of funding (see more on estimated implementation costs and funding sources in the next section below).*
- *Expected benefits of implementation other than GHG emissions reductions, such as reduced local air pollutants due to less driving; cost savings associated with increased energy efficiency in buildings; the potential for creating local, green jobs; public health benefits; and consistency with efforts to prepare the community for Peak Oil; among others.*

Actions not included in the list of short-term measures are targeted for implementation in either the medium (2010 – 2015) or long-term (2015 – 2020). As circumstances change and as implementation of the plan moves forward, there may be cases where medium or long-term strategies become short-term priorities and vice-versa.

Several of the recommendations in the plan require Council approval separate from adoption of the Climate Action Plan and also require additional funding in order to be implemented. Implementation priorities will be reviewed annually by the City Council.

2. Establish, monitor, and report on progress indicators

For each goal outlined in the Climate Action Plan, the City is working to define, monitor and report on measurable indicators that assist the community in determining to what extent a given goal is being achieved. Regular, transparent

reporting on community progress toward achieving the goals outlined in this plan serves to:

- increase accountability for implementing agencies, including the City government;
- assist the City and its partners to evaluate the effectiveness of the policies and actions associated with each goal; and
- enable the City and the community as a whole to continuously evaluate implementation priorities and revise and build upon them as necessary.

City staff is currently working to do additional modeling of the relative contribution each strategy or group of strategies could make toward achieving the Measure G targets. The models are based on assumptions derived from a series of data points, such as past performance of a given program or set of programs, expected level of community participation and behavior change that may be associated with implementing a given program or set of programs, and peer-reviewed studies on the effects of various sustainability policies. This analysis will be used to do a more robust assessment of cost-effectiveness and to refine how the plan will be implemented over time.

Given the range of assumptions that can be made when modeling the emissions impact of a given strategy, it is often difficult to estimate with precision the GHG reductions that will occur upon implementation of the actions in this plan. There is considerable ongoing research by many organizations and research institutions into measuring the impacts of different GHG reduction strategies. City staff has made its best effort to make determinations regarding the strategies proposed in this plan based on the state of current information, but these estimates will need to be refined over time.

What is clear from initial analysis is that while the City of Berkeley can do a great deal on its own to reduce GHG emissions, the 2020 emissions reduction target will only be achieved with help from the state and federal levels. Examples of external policies that could help Berkeley achieve the local target include the Renewable Portfolio Standard, a standard set at the state-level that is designed to gradually increase the portion of electricity produced or purchased by PG&E and other utilities from renewable energy sources; vehicle fuel efficiency standards; low-carbon fuel standards; and Senate Bill 375 (Steinberg, 2008), which requires the California Air Resources Board to establish regional targets for reduction of GHG emissions due to transportation and land use and for regional Metropolitan Planning Organizations to develop plans for achieving those targets. The City will join with other stakeholders and local public agencies throughout the State to work with legislators at all levels of government to put such policies in place and to ensure their implementation.

Because of the difficulty associated with modeling *potential* emissions reductions with precision, it is especially important to monitor and report *actual* reductions over time, as well as other indicators, as part of the implementation process. A number of tools and practices exist that can enable the City and its community partners to track and report progress toward achieving the goals outlined in this plan. Steps the City and its partners will take to ensure transparent, sustained evaluation and continuous improvement of GHG reduction strategies include:

- *Provide annual reports to City Council in order to receive guidance on implementation priorities, resource allocation, and potential revisions to the City's GHG reduction target; to present updates on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization; and to report progress made on specific indicators and metrics to be used for tracking the implementation of actions in the plan, including:*
  - Estimated GHG reductions
  - Implementation costs
  - Costs savings and payback for given strategies
  - Other co-benefits of implementation
  - *Ongoing barriers to implementation*
- *Launch and maintain a web-based portal that enables the City to effectively and transparently communicate the goals outlined in the Climate Action Plan and progress toward achieving those goals*
- Track community-wide aggregate emissions by conducting greenhouse gas emissions inventories at least every other year

3. Continue to identify funding opportunities and develop sustained revenue streams to support climate protection initiatives

Implementing the Climate Action Plan requires significant investment. *However, a concerted effort to reduce GHG emissions will result in cost savings over time by reducing ongoing costs associated with energy consumption. Staff estimates that measures taken to achieve our 2020 goal could save the community nearly $500 million and that the cost of most of the measures recommended in the plan will be less than the amount saved.* Achieving a 35% reduction in building energy use through energy efficiency improvements and renewable energy use in the residential sector alone will result in cumulative savings that exceed costs by an estimated $28 million. A similar cost-benefit analysis for the commercial sector results in an estimated $75 million net savings for local businesses by 2020. See Appendix F to review staff's analysis and assumptions. These findings are consistent with a McKinsey &

Company study[2] of U.S. greenhouse gas reduction measures, which found that significant reductions could be achieved at no net societal cost. The challenge we face is overcoming market barriers that have prevented us from achieving these savings.

The benefits of saving money on energy and reducing greenhouse gas emissions are in addition to other societal benefits associated with these actions, such as reduced local air pollutants, improved public health due to more active mobility modes, less reliance on fossil fuels, and an increased demand for energy services and green jobs.

Estimated Budget for Actions Designated for Short-Term (FY 2009-2010) Implementation		
	FY 2009	**FY 2010**
Part 1: Budgeted and projected budgeted funding for measures that contribute to achieving Berkeley's climate protection goals[1]		
Building energy efficiency, renewable energy use and green workforce development measures (Chapter 4)	2,126,000	1,230,000
Sustainable transportation measures (Ch. 3)	916,000	2,153,000
Coordination, monitoring, outreach and reporting on implementation of Climate Action Plan	350,000	295,000
Subtotal	$3,392,000	$3,678,000
Part 2: Additional new targeted funding for climate plan implementation		
Building energy efficiency, renewable energy use and green workforce development measures	--	3,002,000
Coordination, monitoring, outreach and reporting on implementation of Climate Action Plan	--	64,000
Subtotal	--	$3,066,000
TOTAL	**$3,392,000**	**$6,744,000**

The majority of the costs will be made by individuals and the private sector as homeowners and business owners improve the energy efficiency of their buildings, as individuals make different choices about mobility and their everyday access to transportation alternatives, and as companies (such as PG&E) make additional needed investments in renewable energy resources and increased energy efficiency to reduce our dependence on fossil fuels.

Implementing the plan also requires sustained, strategic public investment by the City, by regional government agencies, and by the state and federal governments. Public funding will play an important role in helping to provide the education and outreach, services, incentives and capital projects that are needed to achieve the plan's goals.

Table 8.1 (above) illustrates the estimated annual City government and partner agency funding associated with implementing the actions in the plan designated for short-term implementation. Part 1 of the budget includes the combination of funding provided by the City *and* funding provided to the City by

[1] Part 1 of the budget includes the combination of funding provided by the City *and* funding provided to the City by non-City agencies (e.g., foundations, PG&E and state and federal government agencies) that is dedicated to programs and policies that the City is implementing that either directly or indirectly address GHG emissions.

[2] McKinsey&Company. Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? December 2007. Available at www.mckinsey.com/clientservice/ccsi/greenhousegas.asp.

Estimated Sources of Revenue for Implementation of Short-Term (FY 2009-2010) Actions		
REVENUE SOURCE	**FY 2009**	**FY 2010**
City of Berkeley General Fund	1,328,000	1,504,000
City fees & taxes	705,000	599,000
Existing grants*	1,359,000	1,574,000
Targeted grants*	--	2,802,000
American Recovery and Reinvestment Act stimulus funding (Energy Efficiency and Conservation Block Grant)**	--	265,000
TOTAL	**$3,392,000**	**$6,744,000**

* Included in the "Grants" and "Targeted Grants" rows are grants to the City and to non-City agencies (e.g., East Bay Energy Watch) that have a direct role in implementing the Climate Action Plan.

**The total Energy Efficiency and Conservation Block Grant is $1,015,500 over three years.

non-City agencies (e.g., foundations, PG&E and state and federal government agencies) that is dedicated to programs and policies that the City is implementing that either directly or indirectly address GHG emissions. Part 2 of the budget includes additional targeted funding the City will seek, with City Council's guidance and in collaboration with community partners, from outside agencies such as PG&E; regional, state and federal government agencies; and private foundations.

Table 8.2 (above) summarizes estimated funding for implementation of the Climate Action Plan by source.

City expenditures associated with the Solid Waste Management Division's (SWMD) operations are not included in the table below largely because it is difficult to isolate the staffing and other expenditures that are associated with the GHG reduction aspects of solid waste programs. The SWMD houses about 33 staff positions between residential and commercial recycling programs and Transfer Station personnel. In addition, as part of the implementation of the Climate Action Plan the SWMD plans to expand its capacity for community outreach and education.

In addition to maintaining City resources for implementation of the Climate Action Plan and seeking new sources of outside funding, this report also outlines various strategies that would be designed to both create disincentives for practices that are energy intensive (e.g., driving) and build sustained revenue for services and programs that help the City achieve its emissions reduction goal along with other important co-benefits. Such strategies include:

- *Redesigning the Residential Preferential Parking (RPP) Program so as to apply it citywide. Properly structured, the RPP could discourage multiple vehicle ownership and help fund alternative modes of transportation.*
- *Instituting a "Transportation Services Fee" (TSF) for new development.* A TSF would help fund projects and programs that mitigate the impacts of new development on transportation services and infrastructure.
- *Establishing an "Open Space Fee" on new development, or similar mechanism for the creation and enhancement of streetscapes, parks and other public open space. Increased amenities in the community make it more attractive for current residents and encourage appropriate transit-oriented development.*

See more on the above strategies in Chapter 3.

The City is also evaluating the feasibility, benefits, and drawbacks of initiating a "carbon tax" on residential, commercial and industrial electricity and natural gas consumption. The tax would be designed to fund GHG reduction strategies in Berkeley such as subsidized energy audits and energy efficiency upgrades for residents and businesses. Exemptions would be provided for special needs and low-income households. Instituting a "carbon tax" would require a two-thirds vote of the people.

Each of these strategies requires further vetting and development, especially to ensure social equity in any fee mechanisms or services. These strategies have the potential be innovative tools for generating *sustained* revenue for implementation of climate protection policies and actions. Sustained revenue is often the difference between a plan that gets implemented and a plan that does not.

4. Establish a stakeholder infrastructure for mobilizing the community and turning the plan into action

As is also emphasized in the Community Outreach & Empowerment chapter, no one entity in the community – not the City government, not industry or small businesses, and not residents – can achieve the GHG reduction targets alone. The targets will only be achieved through building a movement that achieves sustained action and coordination across stakeholders and sectors.

Building sustained coordination across a range of community entities requires developing a strong "stakeholder infrastructure," or network, that enables the City and other agencies to more efficiently and effectively distribute information and resources to a wide range of partners. To build and leverage such a network, the City is working with community partners to:

- *Design a climate action "stakeholder database" that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies.* The database will enable the efficient distribution of information and resources to a wide range of entities. It will be searchable and include given stakeholders' contact information and areas of focus or expertise (e.g., green jobs development, energy services, recycling, economic development, etc.).
- *Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program.* One example is a "Low Carbon Diet" working group, composed of various community members that take responsibility for building participation in the Low Carbon Diet (LCD) program. The Low Carbon Diet is a program based on a workbook that walks groups of neighbors or colleagues through simple steps for reducing household GHG emissions.

B. Climate Protection Policies Recommended for Short-Term Implementation

The following table (Table 8.3) represents the package of policies City staff recommends be targeted for short-term implementation (prior to the end of calendar year 2010). The table includes policies recommended on the basis of the factors already outlined above. While the table illustrates current short-term priorities, note that priorities can and do shift based on funding availability, advances in technology, new and better ideas, and others. Several actions associated with the policies in the table below can be implemented with funding budgeted by the City for fiscal years 2009-2010. However, implementation of some of the actions associated with the policies listed below is pending Council's approval of continuing the actions beyond the end of fiscal year 2010 (fiscal year ends June 30th). Staff will review policy priorities and resource allocations with City Council on an annual basis.

See corresponding chapters for additional details and background information regarding each of the policies included below. Note that each policy has one or more "implementing actions" associated with it. If a policy is included in the table below, then at least one of its associated implementing actions is targeted for short-term implementation. Refer to Appendix A for the list of more specific implementing actions associated with each policy.

TABLE 8.3: Recommended Short-Term Policy Priorities for Calendar Years 2009-2010

	GHG Reduction Policy	Discussion
Ch. 3: TRANSPORTATION & LAND USE		
1.	*Continue to expand and improve Berkeley's bicycle and pedestrian infrastructure*	The community expressed widespread support for more resources to be devoted to enhancing the safety, convenience and quality of Berkeley's bicycle and pedestrian infrastructure. The City's first Pedestrian Plan is nearing completion, and the Bicycle Plan will be updated in 2010.
2.	*Encourage development of housing (including affordable housing), retail services, and employment centers in areas of Berkeley best served by transit*	The City is currently working with community stakeholders to update the Downtown Area Plan, and the Southside Plan, and to provide zoning flexibility within the West Berkeley Plan. Land use policy that prioritizes access to transit and enhanced green and open spaces and promotes cycling and walking reduces VMT and creates several additional co-benefits.
3.	*Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing*	A dense network of car share vehicles has the potential to help reduce vehicle ownership and VMT while providing access to a motor vehicle when needed. There is significant community support for additional car share pods placed in strategic locations throughout the city. The first discounted car share program for affordable housing residents is being established at the Oxford Plaza in 2009.
4.	*Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley*	Increasing the frequency, reliability, and safety of local bus service is a key component of providing an alternative to the private vehicle. Support for enhanced bus service was a consistent theme of public comments associated with this plan.
5.	*Create additional strategic fees/taxes in order to build revenue for transportation demand management (TDM) efforts and to further discourage driving*	This policy includes a local Transportation Services Fee (TSF) as an implementing action. The TSF has the potential to create revenue for services such as an improved bicycle and pedestrian infrastructure and an expanded network of car sharing pods. The fee would include incentives for developments that take steps to reduce vehicle trips. Other mechanisms include an increase to the City's current 10 percent parking tax on off-street parking (requires voter approval), and parking price increases.
6.	*Partner with AC Transit, BART, and other employers to provide subsidized transit passes and fare-free zones*	Cost and convenience are important factors in people's choice to ride transit. The provision of subsidized transit passes (e.g., Easy Pass) and commuter benefits has the potential to significantly improve the mode share of buses and BART. There is significant community support for this policy and several employers already provide subsidized transit passes for their employees.

	GHG Reduction Policy	Discussion
7.	*Design and implement parking strategies to create disincentives for driving - especially single-occupancy commuting and, where possible, to build revenue for alternative transportation*	Research is emerging that establishes parking pricing strategies as having a significant impact on travel mode choice. Some parking strategies can also generate revenue for local sustainable mobility projects, such as expanding car share pods and improving the bicycle and pedestrian infrastructure. Successful implementation of this policy requires coordination with UC Berkeley and others.
8.	*Increase access to healthy and affordable foods for the community by supporting efforts to build more complete and sustainable local food production and distribution systems*	Community members and agencies expressed significant support for integrating local food issues into the climate plan. Growing, processing, and distributing food locally reduces GHG emissions by minimizing transport miles and also offers a host of additional health, social and economic benefits.
Ch. 4: BUILDING ENERGY USE		
1.	*Establish a standard for energy audits and energy improvements that provides thorough guidance on achieving deep, sustained energy savings in existing residential and nonresidential buildings*	City staff in the Office of Energy & Sustainable Development is already in the process of developing robust local standards for energy audits and upgrades. In combination with increased services and financial incentives, these standards will result in reduced energy consumption, substantial cost savings, improved building comfort, and increased demand for green jobs. New standards are subject to Council approval.
2.	*Improve local energy and green building standards for remodeling and new construction*	City staff in the Office of Energy & Sustainable Development is already in the process of developing energy standards for new construction and remodels that go beyond what is required by the State of California. New standards are subject to Council approval.
3.	*Develop and provide comprehensive energy services for local residents and businesses*	The City is currently developing increased services related to building energy use for residents and businesses. These services include financing assistance for energy improvements and personalized energy consultations for residents and businesses.
4.	*Simplify project review and permit approval process to encourage innovative green building measures*	The City strives to continually improve the service it provides to those seeking building permits. Planned service improvements include dedicating a building inspector to assist with green building questions and providing education materials related to green building.

	GHG Reduction Policy	Discussion
5.	*Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses*	The City's Office of Energy & Sustainable Development is implementing or developing several services related to this policy. These services include financing assistance for energy improvements, personalized energy consultations for residents and businesses and an on-line solar map that estimates solar energy potential for homes and businesses.
6.	*Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages*	Enhancing local demand for services such as energy retrofits and solar installations results in increased demand for skilled labor that can do the work. Through youth development and job training and placement programs, the City and its community partners seek to match local residents with high-quality green jobs.
7.	*Expand and better integrate programs for low-income households*	The goal of this policy is to provide an integrated and expanded suite of low-income programs that results in increased potential for energy and cost savings and health-related benefits as well as more cost-effective program delivery.
8.	*Identify and capture opportunities for energy and water savings in renter-occupied/leased units (residential and nonresidential)*	Several community members emphasized the need for this policy during the climate plan's public comment period. In the short-term the City will work with the Rent Board and other partners to implement strategies that enable both the building owner/landlord and the tenant to benefit from building improvements.
9.	*Continue to identify and implement opportunities for increased energy and water efficiency and utilization of renewable energy systems in public buildings*	Energy efficiency improvements and solar installations on schools and City buildings set an important example for the community. The City is working with the School District and other community partners to identify additional opportunities for energy and cost savings in public buildings.
Ch. 5: WASTE REDUCTION & RECYCLING		
1.	*Target expanded recycling outreach and services to multi-family residential buildings*	In the short-term, the City plans expanded outreach and assistance for multi-family building managers. Eventually the City will require building managers to provide tenants with the opportunity to recycle.
2.	*Enhance recycling and composting outreach and assistance to single-family homes*	The main action associated with this policy in the short-term is to initiate a 'split-cart' program to increase convenience of recycling for single-family homes.

	GHG Reduction Policy	Discussion
3.	*Enhance recycling and composting outreach and assistance to local businesses*	This policy can result in not only less waste being sent to landfills, but also cost savings due to lower refuse bills for local businesses.
4.	*Encourage the use of reusable bags at local retail locations*	The main implementation action associated with this policy is instituting a ban on single-use plastic bags and a fee on paper bags at Berkeley retail locations.
5.	*Make recycling and composting mandatory at public events and provide more public recycling containers*	The City already provides recycling and composting services at public events. The City is also working to provide more recycling containers along commercial corridors and in parks and other public spaces.
6.	*Expand the types of materials that can be recycled locally and identify local markets for recycled products*	The effort to expand the types of materials that can be recycled curbside or dropped off at the Transfer Station is ongoing and the feasibility of expanding the program is dependent upon the market for recyclable goods.
7.	*Increase producer responsibility for product waste and packaging*	"Extended Producer Responsibility" (EPR) is a strategy that holds manufacturers accountable for their products and packaging through their entire lifecycle. Implementing this policy requires the City to identify opportunities for extending producer responsibility for product waste at the state and local levels.
8.	*Enhance construction & demolition debris recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders*	Construction waste diversion began in July 2008 and in that year the City recovered 6,851 tons of construction waste from the Transfer Station. To achieve additional diversion the City is developing outreach materials and conducting consultations with builders.
9.	*Reduce yard and garden waste produced by residents and businesses*	The main action associated with this low-cost policy is promoting participation in StopWaste.Org's Bay-Friendly Landscaping program through written and web-based outreach materials.
10.	*Update solid waste disposal rates to cover costs of providing basic refuse, recycling and composting service to the community*	The City is currently updating its solid waste disposal rates. As it considers restructuring these finances, the City will endeavor to maintain and expand incentives and programs to increase recycling and composting while also maintaining necessary operating revenue in an environment of increased waste diversion.
11.	*Maximize waste reduction and recycling and composting at all City buildings, including leased buildings, and at all City events*	Action to reduce waste and increase waste diversion in municipal buildings and in schools demonstrates important leadership for the community.

	GHG Reduction Policy	Discussion
Ch. 6: ADAPTING TO A CHANGING CLIMATE		
1.	*In preparation for more extreme heat events, partner with local, regional and state agencies to increase urban tree cover*	Trees sequester carbon dioxide as well as provide a range of additional health and quality of life benefits to the community. Several community members voiced support for this policy during the plan's public comment period.
2.	*In preparation for the impacts of climate change on the region's water resources, partner with local, regional and state agencies to encourage water conservation and efficiency and expand and diversify the water supply*	Rising temperatures and droughts are having significant impacts on the availability of water supplies throughout the state. The community can and must prepare for increasingly constrained water resources through water conservation, recycling, and other methods.
3.	*In preparation for increasing sea-levels and more severe storms, partner with local, regional and state agencies to reduce the property damage associated with flooding and coastal erosion*	Impacts of warming temperatures include a rising sea level and increasingly severe winter storms. As a coastal city, Berkeley must increase its capacity to manage stormwater and coastal floods.
Ch. 7: COMMUNITY OUTREACH & EMPOWERMENT		
1.	*Establish an implementation framework that enables the City to more efficiently and effectively distribute information and resources to a wide range of community partners and to report progress on achieving the goals outlined in this plan*	The City is already working with several community partners to turn the climate plan into climate action. This includes the development of community "working groups" formed to mobilize around a specific component of this plan. The City is also launching a website to report on progress on achieving the goals of this plan.
2.	*Continue to showcase existing climate protection efforts in our schools and to expand the opportunities students have to learn about and take action on climate change*	Representatives from the City, the Berkeley Unified School District, UC Berkeley, Lawrence Berkeley National Labs, and local museums, among others, should identify opportunities for sharing resources that will help to build on existing climate awareness and education in local K – 12 schools.
3.	*Launch a coordinated outreach and education campaign, utilizing a range of tools, programs and partnerships, to mobilize residents*	A climate action outreach and education campaign must effectively communicate the urgency of addressing the climate crisis while also empowering individuals, businesses, and institutions to be a part of the solution.
4.	*Continue to showcase effective climate protection efforts in the business community and to engage additional businesses in the local climate protection effort*	Several local businesses are already leaders in the effort to integrate ecological consciousness into their business practices. The City is working with local businesses and business associations to support and showcase such efforts.

	GHG Reduction Policy	Discussion
5.	*Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on increasing sustainability at home and in the workplace*	Although the City government accounts for a very small portion of the total community emissions, climate action at the City government is a policy tool in and of itself. Such action demonstrates leadership that extends beyond actual emissions reduced.

Glossary

ABAG: Association of Bay Area Governments

AC Transit: The bus system for the East Bay

BAAQMD: Bay Area Air Quality Management District

BART: Bay Area Rapid Transit

BCDC: San Francisco Bay Conservation and Development Commission

BIG: Build It Green, a Berkeley-based non-profit that provides green building assistance

BRT: Bus Rapid Transit

BUSD: Berkeley Unified School District

C&D: Construction and demolition debris

CCA: Community Choice Aggregation (also known as Community Choice Energy) a term used to describe an arrangement that enables a local government to supply electricity to customers within its borders and involves the local government in the purchase and sale of the energy commodity

CEC: California Energy Commission

CECO: Commercial Energy Conservation Ordinance

CH_4: Methane, a powerful greenhouse gas

CO_2e: Carbon dioxide equivalent units, converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases on comparable terms

CPUC: California Public Utilities Commission

CYES: California Youth Energy Services, a program that employs local youth to promote energy awareness

EPP: Environmentally Preferable Purchasing, a City policy designed to require purchase of products and services that minimize environmental and health impacts, toxics, pollution, and hazards to worker and community safety

Fiscal year (FY): The City of Berkeley's fiscal year runs from July 1 – June 30.

GHG: Greenhouse Gas, the term used for gases that trap heat in the atmosphere. The principal greenhouse gases that enter the atmosphere as a result of human activity are carbon dioxide, methane, and nitrous oxide

GPR: GreenPoint Rated, a green building standard used in California for new residential projects

ICLEI: The International Council for Local Environmental Initiatives, a membership association of local governments focused on addressing the climate challenge

kW: A kilowatt, equal to 1,000 watts

kWh: A kilowatt hour (1,000 watt-hours), the work performed by one kilowatt of electric power in one hour

Kyoto Protocol: The United Nations Treaty that targets the reduction of greenhouse gas emissions

LBNL: Lawrence Berkeley National Laboratory

LED: Light emitting diode

LEED: Leadership in Energy and Environmental Design, a commonly used green building standard developed by the U.S. Green Building Council

LIEE: Low Income Energy Efficiency program

Measure G: The Berkeley ballot measure that established an 80% greenhouse gas emissions reduction target for Berkeley's community-wide emissions and directed the City to develop a plan for achieving that target and interim targets. The measure passed with 81% of the vote in November 2006

Metric ton: 1,000 kilograms (or 2204.6226 lbs.). Also known as a "tonne."

MTC: Metropolitan Transportation Commission

Peak Oil: A term used to describe the transition from many decades in which the available supply of oil grew each year to a period in which the rate of oil production enters it terminal decline

PG&E: Pacific Gas & Electric

PV: Photovoltaics, a solar power technology that converts sunlight into electricity

RECO: Residential Energy Conservation Ordinance

RPP: Residential Permit Parking

RSEC: Rising Sun Energy Center

Solar thermal: A technology that captures solar energy for heat

SR2S: Safe Routes to School program

StopWaste.Org: The Alameda County Waste Management Authority and the Alameda County Source Reduction and Recycling Board serving as one agency

Therm: 100,000 British Thermal Units (BTUs), equivalent to approximately 100 standard cubic feet of natural gas

Title 24 Energy Code: California's energy efficiency standards for residential and nonresidential buildings

UCB: University of California, Berkeley

VMT: Vehicle miles traveled

Zero Net Energy Buildings: A building that achieves maximum energy efficiency so that any remaining energy needs can be met through onsite renewable energy systems, such as solar water and space heating, solar electricity, or wind energy

Zero Waste: The City's goal to eliminate waste sent to the landfill by 2020. All of the community's discarded material would be recycled or reused

APPENDIX A: Consolidated Implementation Tables

Sustainable Transportation & Land Use: Implementation table

Key to Acronyms:

ACTIA	Alameda County Transportation Improvement Authority
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BUSD	Berkeley Unified School District
CMA	Congestion Management Authority
CMO	City Manager Office
COB	City of Berkeley
DP&D	Department of Planning & Development
DPW	Department of Public Works
GHG	Greenhouse gas
HHS	Department of Health & Human Services
OED	Office of Economic Development
MTC	Metropolitan Transportation Commission
RPP	Residential Preferential Parking
UCB	University of California, Berkeley
VMT	Vehicle Miles Traveled
ZAB	Zoning Adjustments Board

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
TLU 1. Goal: Increase density along transit corridors						
A. Encourage development of housing (including affordable housing), retail services, and employment centers in areas of Berkeley best served by transit						
1.	Conduct a "land use scenario study" in order to help visualize, quantify, and compare the impacts on VMT (and the associated GHG and local air pollutant emissions) of various land use scenarios	**COB DP&D**			**X**	
2.	Implement zoning adjustments to facilitate a mix of housing and commercial development (including retail services and employment centers) in certain transit-served areas (see chapter text for examples)	**COB DP&D**	COB	**X**	**X**	**X**
3.	In order to improve livability and reduce VMT in existing neighborhoods that are not well served by transit, consider where in-fill neighborhood-serving retail, that is oriented to basic daily needs such as "corner stores" and small markets, may be feasible.	**COB DP&D**			**X**	**X**
4.	Develop tools and guidance that the ZAB, Planning Commission and City Council can utilize in order to effectively consider and reduce the impact on GHG emissions of a given land use-related proposal (see chapter text for examples)	**COB DP&D**, COB DPW			**X**	
5.	Partner with UCB to assess and address unmet housing demand of UCB employees and students	**UCB**, COB DP&D, COB DPW			**X**	**X**
6.	Partner with UCB and BUSD to identify opportunities to site affordable housing near transit for faculty and staff	**UCB, BUSD, COB DP&D**			**X**	
7.	Provide enhanced assistance during the permit process for transit-oriented development projects	**COB DP&D**			**X**	
8.	Encourage the adaptive reuse and intensification of historic buildings in proximity to transit, when feasible and appropriate	**COB DP&D**		**X**		
TLU 2. Goal: Increase and enhance urban green and open space, including local food production, to improve the health and quality of life for residents, protect biodiversity, conserve natural resources, and foster walking and cycling						
A. Require new developments in specified areas to contribute to street-level open space on site or in the public realm						
1.	Establish and Open Space Fee or similar mechanism for the creation of new and enhancement of existing streetscapes and public open space	**COB DP&D**			**X**	
2.	Allow multi-unit residential projects to provide street-level public open space in lieu of some required on-site private open space	**COB DP&D**			**X**	
3.	Consider the feasibility of establishing policies that would discourage the removal of usable open space in private lots unless such open space would be provided elsewhere on site or the property owner agrees to pay an "Open Space Fee" or	**COB DP&D**			**X**	

Policy	Implementing Actions	Implementing Agencies	Funding Source	Implementation Timeline: Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
	similar mechanism which would be used to fund the maintenance of existing or the creation of new public open space					
B. Promote tree planting, landscaping, and the creation of green and open space that is safe, attractive and that helps to restore natural processes						
1.	Maintain and protect mature trees wherever possible and maximize tree planting as part of public open space and street improvements	**COB Dept. of Parks, Rec & Waterfront**	COB	X	X	X
2.	Consider developing street tree master plans for sub-areas within the City	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D			X	X
3.	Consider developing a tree preservation ordinance that would articulate strong standards for the preservation and replacement of trees in the public right of way	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D			X	
4.	Identify opportunities for tree planting and to maintain existing and create new public open spaces in order to increase community access to parks and plazas	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D			X	X
5.	Establish standards and guidelines to ensure that ecologically beneficial stormwater quality and retention features and water conservation features are integrated into the design of landscaping features on both public and private land	**COB DPW, COB DP&D, COB Dept. of Parks, Rec & Waterfront**			X	
6.	Encourage the development of green roofs by providing outreach and guidelines consistent with the building code	**COB DP&D**	COB	X		
C. Increase access to healthy and affordable foods for the community by supporting efforts to build more complete and sustainable local food production and distribution systems						
1.	Encourage and support existing community gardens as well as neighborhood initiatives to launch additional community gardens	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D	COB	X	X	X
2.	Include community gardens and orchards in the planning for the Santa Fe Right-of-Way	**COB DP&D**			X	
3.	Encourage local community gardens to donate excess produce to local food banks	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D			X	
4.	Continue to provide compost to community and school gardens	**COB Dept. of Parks, Rec & Waterfront,** COB DPW	COB	X	X	X
5.	In collaboration with local business associations and merchants, continue to expand and promote the ***Buy Local Berkeley Campaign***	**COB OED**	COB	X	X	X
6.	Consider developing and adopting a Buy Local Ordinance that would give preference to local businesses	**COB OED**	COB		X	

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
7.	In partnership with business associations and others, create incentives for restaurants that feature local, organic foods	**COB OED**	COB	X	X	X
8.	Support local educational institutions such as the Berkeley Unified School District, the Berkeley Adult School and UC Berkeley to continue educating students in growing and preparing their own food	**BUSD, Berkeley Adult School, UCB,** COB DP&D	COB	X	X	X
9.	Promote the purchase of food from local producers for schools, senior centers, after-school programs, the summer food program and others	**COB DP&D**	COB	X	X	X
10.	Support state and federal legislation that prioritizes local food production	**COB HHS**	COB	X	X	X
11.	Continue to make street space available for farmers markets and explore opportunities for additional markets in Berkeley so as to increase access to local, healthy food	**COB**	COB	X	X	X
12.	Encourage and provide guidelines consistent with the building code for buildings to incorporate rooftop gardens that can be used for food production	**COB DP&D**			X	
13.	Through the City's website and publications, encourage residents to grow food in home and community gardens using methods that reduce GHG emissions, such as using organic inputs and compost	**COB DPW**, COB DP&D	COB	X	X	X
14.	Through the City's website and publications, make information available to the public to facilitate consideration of a less carbon-intensive diet, such as eating less meat and choosing vegetarian or vegan options instead	**COB DPW, COB DP&D**	COB		X	X
15.	Support local efforts to provide training to residents in farming and gardening techniques				X	X
16.	Work with East Bay Municipal Utility District to consider a program that would provide reduced water rates for community gardens as an incentive for residents to utilize community garden space to grow their own food	**EBMUD, COB Dept. of Parks, Rec & Waterfront**			X	
17.	Identify opportunities to open up City-owned vacant land to encourage local food production for local consumption	COB DP&D, COB Dept. of Parks, Rec & Waterfront			X	
18.	Support the development of local food distribution and processing facilities	**COB OED**	COB	X	X	X
19.	In collaboration with AC Transit, identify opportunities to improve public transportation options to local food markets	**AC Transit**, COB DPW			X	
20.	Work with community partners to identify methodologies for better tracking and reporting on the rate of local food production and consumption and the associated cost and GHG impacts, and other indicators	**COB DP&D**			X	

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
TLU 3. Goal: Manage parking more effectively to minimize driving demand and to encourage and support alternatives to driving						
A. Design and implement parking strategies to create disincentives for driving - especially for single-occupancy commuting – and, where possible, to build revenue for transportation services						
1.	Encourage UC Berkeley, the City's largest employer, to reduce its plans to build new parking spaces and to also revise its parking policies and programs to better encourage, support, and invest in alternatives to driving.	**COB DPW, UCB**	COB, UCB	**X**		
2.	Identify neighborhoods in which increased parking rates would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses	**COB DPW**	COB	**X**		
3.	Identify neighborhoods in which extending parking meter hours of enforcement would effectively discourage driving and generate new revenue while not having a significant negative effect on local businesses	**COB DPW**			**X**	
4.	Consider the establishment of Parking Benefit Districts, which would receive a portion of parking revenues generated in the area	**COB DPW**	COB	**X**		
5.	Redesign the Residential Preferential Parking (RPP) program so as to apply it citywide. Utilize the revenue to design programs and infrastructure that make alternative transportation options more accessible, convenient and attractive	**COB DPW**, COB City Attorney's Office			**X**	
6.	Structure RPP permit costs so that each additional permit acquired by a given household escalates in cost	**COB DPW**			**X**	
7.	Consider setting RPP prices based on the fuel efficiency of the vehicle for which the permit is being acquired	**COB DPW**, COB City Attorney's Office				**X**
8.	Install RPP permit holder-exempt parking meters in some RPP zones	**COB DPW**, COB City Attorney's Office			**X**	
9.	Mark on-street parking rates equivalent to or higher than off-street (parking lot) parking rates	**COB DPW**			**X**	
10.	Raise on- and off-street parking rates as appropriate	**COB DPW**	COB	**X**		
11.	Consider putting an increase to the City's 10 percent tax on off-street parking revenue on the ballot	**COB DPW**			**X**	
12.	"Un-bundle" prices for housing and parking so that parking spaces require separate payment and are not included in the rent or purchase price of a unit	**COB DP&D**	COB	**X**		
13.	In certain popular destinations such as the Downtown, employ parking information signage to direct motorists to available off-street parking	**COB DPW**				**X**

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
14.	Ensure that local employers are abiding by state requirements to participate in the parking cash-out program	**COB DPW**	COB	X		
15.	Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles	**COB CMO**			X	
TLU 4. Identify opportunities for generating sustained revenue for implementing community transportation demand management programs						
A. Create additional strategic fees/taxes in order to build revenue for transportation demand management (TDM) efforts and to further discourage driving alone						
1.	Institute a "Transportation Services Fee" for new development and utilize funds in part for alternative transportation programs that reduce vehicle trips and traffic congestion	**COB DP&D, COB DPW**	COB	X	X	
2.	Institute an "In-Lieu Parking Fee" on new development and utilize funds in part for alternative transportation programs that reduce parking demand	**COB DP&D**, COB DPW	COB	X	X	
3.	Encourage UC Berkeley to implement a "Transportation Services Fee" on new off-campus projects to mitigate the transportation impacts associated with new development. Fee revenue would go towards funding alternative transportation programs	**UCB,** COB DPW			X	
4.	Conduct a feasibility analysis of a City of Berkeley "congestion pricing" program	**COB DPW**				X
5.	Support development of a regional "climate mitigation fee" applied to either gasoline or vehicle registration	**COB DPW**			X	
TLU 5. Goal: Accelerate implementation of the City's Bicycle & Pedestrian Plans						
A. Continue to expand and improve Berkeley's bicycle and pedestrian infrastructure						
1.	Integrate bicycle boulevards and pedestrian networks into broader alternative transportation system and identify mobility gaps that could be addressed through additional bicycle/pedestrian infrastructure	**COB DPW**	MTC, other grants	X	X	X
2.	Extend Bicycle Boulevard network	**COB DPW**	BAAQMD, other grants	X	X	X
3.	Improve cross-jurisdictional bicycle route connections through signage, bikeway route modification where warranted, and physical improvements	**COB DPW**	COB	X		
4.	Identify opportunities to modify City streets to better serve the safety and needs of pedestrians and cyclists	**COB DPW**			X	
5.	Identify and implement opportunities to improve the flow of cycling along bicycle boulevards, consistent with public safety, including consideration of replacing stop signs with yield signs at traffic circles on bicycle boulevards	**COB DPW**			X	

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
6.	Continue to create additional bicycle parking throughout the community, including near transit centers and other key destinations and as part of any new development projects	**COB DPW**	COB, BAAQMD	X	X	X
7.	Provide adequate sidewalk width, pedestrian crossing time, "count down" signals, and universal access signal features at all signalized crosswalks	**COB DPW**	COB, Safe Routes to Schools	X	X	X
8.	Evaluate the need for new mid-block pedestrian crosswalks where there are high volumes of pedestrians and a long distance between intersections	**COB DPW**			X	
9.	Regularly update the Bicycle and Pedestrian Plans, including updating indicators of pedestrian and cyclist safety	**COB DPW**	COB	X		
10.	Consider establishing a network of bicycle rental stations	**COB DPW**			X	
B. Partner with local and regional organizations and agencies to promote and market cycling and walking as an attractive alternative to driving						
1.	Secure marketing firm to design a community-wide marketing campaign to increase the mode share of bicycles and walking (and other forms of alternative transportation)	**COB DPW**	COB	X	X	
2.	Enhance bicycle and pedestrian safety outreach and education for cyclists, walkers and drivers	**COB HHS**, various community agencies	Caltrans Office of Traffic Safety	X		
3.	Promote participation in such bicycle promoting events as Bike To Work Day	**511.org**, COB DPW	COB	X		
4.	Promote the use of bicycle delivery services and bicycle cargo trailers to local businesses and residents	**COB DPW**, various community agencies			X	
C. Partner with BART, AC Transit and other transit service providers to improve bicycle access on trains and buses and at stations and stops						
1.	Expand and improve bicycle parking at all Berkeley BART stations and bus stops	**BART, AC Transit, COB DPW**	BART and AC Transit	X		
2.	Increase the capacity for bicycles on BART trains by removing some seats and making other changes to select cars	**BART**, COB DPW			X	
D. Continue to incorporate bicycles into municipal operations						
1.	Maintain and expand the Bicycle Fleet Pool available for City employees and encourage more City staff persons to take advantage of it	**COB DPW**			X	
2.	Continue to supply secure bicycle parking near City Hall and other City employment sites	**COB DPW**	COB	X		
3.	Consider other bicycle fleet programs such as electric bicycles, cargo bikes, and mileage reimbursement for employee's personal bicycle use for work trips	**COB DPW**			X	
TLU 6. Goal: Make public transit more frequent, reliable, integrated and accessible						

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
A. Partner with AC Transit to expand and enhance AC Transit bus service in Berkeley						
1.	Integrate bus routes into broader alternative transportation system, identify gaps in bus service routes and potential scenarios for addressing such gaps, and improve frequency and reliability of bus service where required	**AC Transit**, COB DPW	AC Transit, MTC, other grants	X	X	X
2.	Improve access to public transportation in the Berkeley hills	**AC Transit**, COB DPW				X
3.	Encourage more efficient payment systems such as "proof of payment" and level boarding to speed bus transit service	**AC Transit**, COB DPW			X	
4.	Ensure that transit buses are fuel-efficient, utilize alternative fuels, and are appropriately sized	**AC Transit**, COB DPW	AC Transit	X	X	X
5.	Install real-time transit signage at bus stations and stops	**AC Transit**, COB DPW	AC Transit	X	X	
6.	Install and improve bus shelters and benches, and ensure that they are safe, well lit, and well- maintained	**AC Transit**, COB DPW	AC Transit	X	X	
7.	Improve bus flow by removing certain stop signs and on-street parking spaces, by timing signals, and by creating "queue-jumper" lanes where delay occurs regularly	**AC Transit**, COB DPW			X	
8.	Work with AC Transit and BART to implement the recommendations of the South and West Berkeley Community Based Transportation Plan, which calls for transit service to meet MTC "Lifeline" service standards in low-income areas.	**AC Transit, BART, COB DPW**				X
9.	Enhance sustainable mobility options for seniors and the disabled by providing "universal access" level boarding (e.g., roll-on/roll-off boarding for wheelchairs) on buses and shuttles that easily accommodates wheelchairs, walkers, and other individuals with mobility impairments	**AC Transit**, COB DPW			X	
B. Partner with AC Transit, BART and other community stakeholders to consider opportunities for Bus Rapid Transit or light rail systems along certain major transportation corridors (e.g., San Pablo and University Avenues and the Telegraph Ave./Downtown route currently under consideration)						
1.	Continue timely assessment and development of proposed East Bay Bus Rapid Transit (BRT) system	**COB DP&D, COB DPW, AC Transit**	AC Transit	X	X	
C. Partner with BART to expand and enhance BART service in Berkeley						
1.	Improve the pedestrian, cyclist and transit connectivity at the Downtown Berkeley BART station by implementing the Downtown BART Plaza and Transit Area Design Plan	**BART**, COB DPW			X	
2.	Extend service hours and provide direct service from Berkeley to San Francisco in the evenings	**BART**				X

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
3.	Work with BART to install solar electric systems on Berkeley BART stations	**BART**			X	
D. Partner with AC Transit, BART, UC Berkeley and other employers to provide subsidized transit passes and fare-free zones						
1.	Conduct a Citywide Mobility Study that analyzes the feasibility, efficacy, design, and benefits of providing free bus and BART passes, fare-free zones, and/or shuttles for individuals who live, work, and/or study in Berkeley	**COB DPW**, COB DP&D		X		
2.	Negotiate conditions of approval for all new residential multi-family developments to provide free or subsidized transit passes for tenants	**COB DP&D**			X	
3.	Provide incentives for and eventually require all businesses to provide free or subsidized transit passes for employees	**COB DPW**			X	
4.	Encourage UC Berkeley to require that transportation alternatives be provided for employees for new on- and off-campus building projects	**UCB,** COB DPW			X	
5.	Consider establishing Easy Pass programs for employees of businesses in specific transportation corridors, such as the San Pablo Avenue corridor and the corridor from Downtown Berkeley to Telegraph Ave. to Downtown Oakland and San Leandro	**AC Transit**, COB DPW			X	
6.	Study feasibility of providing fare-free zones in specified travel corridors or citywide	**AC Transit**, COB DPW			X	
7.	Encourage and eventually require all eligible Berkeley employers to enroll in the Alameda County Congestion Management Agency (CMA) Guaranteed Ride Home Program	**Alameda County CMA, COB DPW**	COB	X		
E. Expand and integrate community shuttle bus networks						
1.	Partner with BART, AC Transit, Bayer, Wareham Properties, UC Berkeley, LBNL, Alta Bates and others to design an integrated short-route shuttle bus system, including feeder or 'last mile' shuttles or bus service that would help customers access BART without driving	**COB DPW, BART, AC Transit, various community partners**	COB, AC Transit, BAAQMD, BART, others		X	
2.	Continue to enhance mobility options for people with disabilities by expanding existing paratransit, car share, and taxi services	**East Bay paratransit, COB DPW**			X	
F. Encourage additional passenger rail service and ridership in Berkeley						
1.	Pursue joint marketing strategies with Capital Corridor/Amtrak to promote trains as a convenient form of transportation	**Capital Corridor/Amtrak, COB DPW**			X	
2.	Improve bicycle and pedestrian access to passenger rail line, including installing additional signage	**COB DPW**	COB	X		

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
G. Continue to partner with other agencies to establish a ferry service to San Francisco and other locations						
1.	Expand bus and other transit service to any ferry terminal established at or near the Berkeley Marina so that there is consistent, coordinated, reliable transit service in conjunction with the ferry	**AC Transit**, COB DPW				**X**
H. Support state and regional efforts to launch a high-speed rail system						
1.	Encourage state, regional, and local policy makers to support the development of a high-speed rail system that links all major California cities, including connecting service to Berkeley	**CA High Speed Rail Authority, COB**				**X**
2.	Ensure that high-speed rail is fully integrated into existing transit services such as BART and AC Transit	**CA High Speed Rail Authority, COB, BART, AC Transit**				**X**
TLU 7. Enhance and expand car sharing and ridesharing programs						
A. Make car sharing convenient and available to all Berkeley residents by providing additional incentives and by removing disincentives to car sharing						
1.	Require that developers of new residential and commercial projects of a certain size (to be specified) make spaces available for car share vehicles (provide decreased parking requirements in return)	**COB DP&D**, COB DPW	COB	**X**	**X**	**X**
2.	Enhance outreach to promote increased car sharing	**COB DPW**			**X**	
3.	Integrate car share pods into broader mobility system by placing more car share pods adjacent to the existing transit network and in neighborhoods underserved by public transportation	**COB DPW**	COB	**X**	**X**	**X**
4.	Designate on-street parking spaces for car share vehicles	**COB DPW**			**X**	**X**
5.	Encourage car share companies to site vehicles in private driveways by modifying business license and zoning requirements	**COB DP&D**, COB DPW			**X**	
6.	Provide car share subsidies for low-income residents	**COB DPW**			**X**	
B. Provide incentives and remove disincentives to ride sharing						
1.	Market existing discounted parking for car and vanpools and site such parking spaces near transit when feasible	**COB DPW**	COB	**X**	**X**	**X**
2.	In collaboration with community partners, include web and phone-enabled ridesharing programs in comprehensive marketing and outreach effort	**COB DPW**			**X**	
3.	In collaboration with community partners, market and enhance existing casual carpool program	**COB DPW**			**X**	

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
C. Expand capacity and service of local taxi fleets to provide an alternative to single-occupancy driving						
1.	Integrate information about the role of taxi services in marketing and outreach efforts	**COB DPW**			**X**	
2.	In collaboration with regional agencies and local taxi companies, consider studying feasibility of establishing a discounted zone-based fare or flat fees, especially for travel to/from transit stations	**COB DPW**			**X**	
3.	Support shared taxi use, including real-time dispatch and routing	**COB DPW**			**X**	
TLU 8. Goal: Encourage the use of low-carbon vehicles and fuels						
A. Create incentives for high-efficiency vehicles, including electric vehicles and plug-in hybrids in the community						
1.	Evaluate opportunities to reduce parking rates in City-owned garages for vehicles that achieve a certain high threshold of fuel-efficiency	**COB DPW**			**X**	
2.	Evaluate opportunities to create additional free parking and charging stations for electric and plug-in hybrid vehicles	**COB DPW**, various community partners	COB	**X**	**X**	**X**
3.	Provide incentives in City parking and transportation demand management policies for developers and business owners that provide plug-in locations for electric vehicles and plug-in hybrids	**COB DP&D, COB DPW**			**X**	**X**
4.	Include information about electric vehicles in broader marketing campaign	**COB DPW**, various community partners			**X**	
B. Provide leadership in building a market for plug-in hybrids						
1.	Purchase (City government) plug-in hybrids when they become available and partner with car share organizations to provide plug-in hybrids to car share pods throughout the city	**COB DPW**	COB	**X**	**X**	**X**
C. Encourage the responsible production of low-carbon bio-fuels						
1.	Initiate efforts to convert local restaurant grease into bio-fuel for City-owned and private vehicles	**COB DPW, community partners**			**X**	
2.	Partner with local organizations and bio-fuel providers to educate the community on the role responsibly produced bio-fuels can play to reduce local emissions	**COB DP&D, community partners**			**X**	**X**
TLU 9. Goal: Enhance and expand outreach, marketing, and education regarding land use and transportation						
A. Work with regional and local community partners to provide sustained outreach and education to Berkeley citizens and visitors regarding alternative forms of transportation						
1.	Launch a marketing and branding campaign that informs local consumers of their alternative transportation options	**COB DP&D, COB DPW**			**X**	
2.	Include transportation-related education materials in a welcome package for all new homebuyers/renters	**COB DP&D, COB DPW**			**X**	**X**

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
3.	Consider expanding existing TravelChoice-Berkeley program	**TransForm**, COB DPW				X
4.	Sustain and expand existing Safe Routes to School program	**TransForm, COB DPW, COB HHS**	Caltrans	X	X	X
5.	Design and implement a monthly 'Berkeley Car-Free Day' campaign	**COB DPW**				X
6.	Actively promote and participate in the annual Bike to Work Day	**511.org, COB DPW**	COB	X	X	X
7.	In collaboration with local businesses and community partners, identify incentives for telecommuting				X	
8.	Partner with hotels, motels, and other visitor destinations to provide visitors with information regarding public transit and bicycle facilities	**COB DPW**, various community organizations			X	X
9.	Partner with local business associations to market the "Buy Local" campaign	**COB OED**	COB	X	X	X
TLU 10. Goal: Green City government vehicle fleets and increase employee alternative transportation options						
A. Increase fuel efficiency and use of alternative fuels in City government fleet						
1.	Retire underused and inefficient City fleet vehicles	**COB DPW**	COB	X	X	
2.	Replace additional City fleet vehicles with City CarShare vehicles	**COB DPW**			X	
3.	Partner with City CarShare to integrate plug-in hybrid vehicles into the City's fleet	**COB DPW**	COB, City CarShare	X	X	
4.	Purchase plug-in hybrids for City and fleet when available	**COB DPW**			X	
5.	Ensure that bio-fuel utilized by the City fleet is responsibly produced and creates a GHG emissions reduction benefit when analyzed from a lifecycle perspective. Investigate using recycled grease from local restaurants as a fuel alternative	**COB DPW**		X	X	
6.	Consider increasing bio-fuel mix used by the City from B20 to B50 or higher	**COB DPW**			X	
7.	Increase the fuel and route efficiency of Office of Solid Waste trucks by converting trucks to low-emission engines; utilizing route-efficiency software; utilizing a higher percentage bio-fuel or other low-carbon fuel	**COB Solid Waste Management Division**	Waste disposal fees	X		
8.	Institute a purchasing policy that requires the procurement of low-emissions vehicles whenever new vehicles need to be acquired	**COB Finance Dept. (Purchasing), COB DPW**			X	

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
B. Encourage the use of alternative transportation for City employees and elected officials						
1.	Continue to supply City employees with the Easy Pass (formerly Eco-Pass). Work to include BART ridership as part of the Easy Pass benefit	**COB DPW**	COB	**X**	**X**	**X**
2.	Continue to supply City employees with pre-tax transit subsidies such as Commuter Check	**COB DPW**	COB	**X**	**X**	**X**
3.	Continue to offer deeply discounted carpool and vanpool monthly parking permits at City parking facilities	**COB DPW**	COB	**X**	**X**	**X**
4.	Except in cases where certain City staff persons have no alternative to driving to and from work (e.g., emergency personnel who work overnight), phase out free parking assigned to City staff for privately owned vehicles	**COB CMO**			**X**	
5.	Consider phasing out free parking assigned to City Councilmembers	**COB CMO**			**X**	

Building Energy Use: Implementation Table

Key to Acronyms:

BAAQMD	Bay Area Air Quality Management District
BIG	Build It Green
BUSD	Berkeley Unified School District
CEC	California Energy Commission
CESC	Community Energy Services Corporation
COB	City of Berkeley
DoIT	Department of Information Technology
DP&D	Department of Planning & Development
EBMUD	East Bay Municipal Utility District
LBNL	Lawrence Berkeley National Laboratory
PG&E	Pacific Gas & Electric Company
RSEC	Rising Sun Energy Center
SD Fee	City of Berkeley Sustainable Development Fee
UCB RAEL	University of California, Berkeley Renewable & Appropriate Energy Laboratory
U.S. EPA	United States Environmental Protection Agency
U.S. DOE	United States Department of Energy

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
BEU 1. Goal: Make green building business as usual in the new construction & remodel market						
A. Improve local energy and green building standards						
1.	Establish and continually ratchet up minimum energy standards for residential and nonresidential buildings that exceed the current Title 24 energy code for various building types specific to Berkeley's climate zone	**COB DP&D**	SD Fee, other COB funds	**X**	**X**	**X**
2.	Require that new projects achieve a minimum point level on an appropriate green building checklist (e.g., GreenPoint Rated Checklist for residential buildings or LEED checklist for nonresidential) and report projected GHG emissions	**COB DP&D**			**X**	
3.	Expand and eventually require the monitoring, testing and commissioning of residential and non-residential building systems to ensure that buildings in Berkeley are performing as intended	**COB DP&D**			**X**	
4.	Require that all new multi-unit buildings be "sub-metered" to enable monitoring of energy and water consumption on a unit-by-unit basis	**COB DP&D**			**X**	
B. Simplify project review and permit approval process to encourage innovative green building measures						
1.	Dedicate a Senior Green Building Inspector to make it easier to use green building technologies under the building code and provide upfront coordination and assistance for builders committed to achieving a high level of green building	**COB DP&D**	SD Fee	**X**		
2.	Identify funding sources and other incentives that can subsidize City permit fees for innovative or pilot green building projects	**COB DP&D**			**X**	
3.	Adopt a green building curriculum and provide ongoing training for zoning and building permit plan-checkers in the City's Planning Department to enable them to be knowledgeable about the latest green building techniques	**COB DP&D**, BIG, StopWaste.org	SD Fee, StopWaste. Org	**X**	**X**	**X**
4.	Increase green building throughout the region by sharing best practices with other area cities through such entities as the Green Building Public Agency Council (PAC)	**COB DP&D**	COB	**X**	**X**	**X**
C. Identify and develop financial incentives and low-cost financing tools to enable increased green building in the private sector						
1.	Develop and catalogue financing options for consumers	**COB DP&D**, BIG, StopWaste.Org			**X**	
D. Enhance outreach to encourage developers to adopt national green building and energy performance standards, such as ENERGY STAR, GreenPoint Rated and LEED						
1.	Highlight existing green buildings and cutting edge green technologies through green building tours	**BIG,** COB DP&D	BIG, Grants	**X**	**X**	**X**

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
2.	Highlight existing green buildings in Berkeley through case studies made available at the City's Permit Service Center and on City and partnering agency websites	**BIG**, COB DP&D			**X**	
3.	Working with partner organizations and nearby jurisdictions, identify a sponsor and launch a green building awards competition	**COB DP&D**, BIG, StopWaste.Org			**X**	
4.	Expand the green building display in the City's Permit Service Center and utilize it to showcase innovative green build materials and practices	**COB DP&D**			**X**	
BEU 2. Goal: Enhance energy services and standards and reduce costs of energy upgrades for existing residential properties						
A. Establish a standard for home energy audits and energy improvements that provides thorough guidance on achieving deep, sustained energy savings in existing residential buildings						
1.	In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing residential buildings that is designed to facilitate deep, cost-effective reductions in energy use	**COB DP&D,** several community partners	SD Fee	**X**		
2.	Phase in energy standards for existing residential buildings by requiring compliance in order to take advantage of certain incentives and financing and by triggering a compliance requirement at certain events such as major renovations, point of sale, and condo conversions.	**COB DP&D,** several community partners			**X**	**X**
3.	Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley's energy standard so that they can serve the market	**COB DP&D, CESC, PG&E, RSEC**	PG&E ratepayer funds, grants	**X**	**X**	**X**
4.	Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options to assist property owners and tenants to comply with the local energy standard	**COB DP&D, regional partners and cities**	PG&E ratepayer funds, grants	**X**	**X**	**X**
5.	Partner with the Berkeley Association of Realtors and other real estate professional groups in an effort to conduct targeted outreach and education to new Berkeley homeowners	**COB DP&D**, Berkeley Association of Realtors, others	PG&E ratepayer funds, grants	**X**	**X**	**X**
B. Develop and provide comprehensive energy services for local residents						
1.	In collaboration with PG&E and state and federal government, provide financial incentives for compliance with local energy standards	**COB DP&D**, PG&E, other government agencies and cities			**X**	**X**
2.	Launch the Smart Solar Program	**COB DP&D**, U.S. DOE, UCB RAEL, BIG, CESC, PG&E	U.S. DOE, COB, PG&E	**X**		
3.	Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy	**COB DP&D**, UCB RAEL	U.S. EPA, BAAQMD, fees	**X**	**X**	**X**

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
	efficiency improvements					
4.	Explore the feasibility of amending the existing program allowing a rebate of a portion of the City of Berkeley's transfer tax for seismic safety upgrades to also include major energy efficiency and solar improvements				X	
5.	Partner with Rising Sun Energy Center and other community partners to implement a 3-tier energy efficiency and job-training program	**RSEC,** COB DP&D	PG&E ratepayer funds	X		
6.	Develop targeted energy services for home-based care facilities	**COB DP&D**, PG&E			X	
7.	Partner with East Bay Municipal Utility District (EBMUD) to identify additional opportunities for distribution of free water saving devices and education	**COB DP&D**, EBMUD	EBMUD	X	X	
8.	Rather than having ratepayer funds for energy efficiency and other energy saving programs (Public Goods Charge) be distributed through utilities, consider the feasibility and effectiveness of having those funds given directly to the City or some other agency or organization	**California Public Utilities Commission,** COB, PG&E			X	
C. Expand and better integrate programs for low-income households						
1.	Conduct a "gap analysis" or baseline study to determine how to effectively expand and enhance energy services for low-income clients	**COB DP&D**, COB Housing Dept, PG&E, various community partners	PG&E ratepayer funds	X		
2.	Combine the delivery of City and agency programs with other income-qualified assistance programs	**COB DP&D**, COB Housing Dept, PG&E, various community partners			X	
3.	Develop and implement Green LEEP (Low-income Energy Efficiency Program)	**COB DP&D**, COB Housing Dept, PG&E, various community partners			X	
4.	Develop and implement the Rental Housing Energy Efficiency Loan (RHEEL) program	**COB DP&D**, COB Housing Dept, PG&E, various community partners			X	
5.	Partner with agencies such as GRID Alternatives to provide low-cost solar installations to low-income households	**COB DP&D**, COB Housing Dept, Grid Alternatives			X	
D. Identify and capture opportunities for energy and water savings in renter-occupied units						
1.	Work with the Rent Board to explore ways in which the cost of high quality energy and water efficiency measures can be paid for by both property owners and tenants	**COB Rent Board**, COB DP&D, building owners	PG&E ratepayer funds	X		
2.	Work with community partners to design a program that would require that upon vacancy, an energy rating system is applied to rental units so as to inform future occupants of the costs and relative energy	**COB Rent Board**, COB DP&D, building owners, COB Housing Dept			X	

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
	and water efficiency associated with the unit					
3.	Develop and market a green landlord database	**COB DP&D**, COB Rent Board			X	
BEU 3. Goal: Enhance energy services and standards for existing commercial properties						
A. Establish a standard for energy audits and energy improvements in nonresidential buildings that provides thorough guidance on achieving deep, sustained energy savings						
1.	In collaboration with energy service providers, community stakeholders and local governments in the region, develop and phase in a local energy standard for existing nonresidential buildings that is designed to facilitate deep, cost-effective reductions in energy use	**COB DP&D**, several community partners	SD Fee		X	
2.	Phase in energy standards for existing nonresidential buildings by requiring compliance in order to take advantage of certain incentives and financing; and by triggering a compliance requirement at certain events such as major renovations and point of sale or lease.	**COB DP&D**, several community partners			X	X
3.	Consider requiring that a "cool roof" be installed anytime the roof of a commercial building is being built of re-roofed	**COB DP&D**			X	
4.	Require all fluorescent lamps, magnetic ballasts, and incandescent lamps be retrofitted for higher efficiency technology for commercial building permits to be issued	**COB DP&D**			X	
5.	Engage and train energy service providers (e.g., organizations that can conduct comprehensive energy audits and upgrades) to become well versed in Berkeley's energy standard so that they can serve the market	**COB DP&D, CESC, PG&E, RSEC**	PG&E ratepayer funds, grants	X	X	X
6.	Provide a suite of energy-saving programs, resources, education, incentives, rebates and financing options to assist property owners and tenants to comply with the local energy standard	**COB DP&D, regional agencies and cities**	PG&E ratepayer funds, grants	X	X	X
7.	Partner with property management firms and real estate professional groups in an effort to conduct targeted outreach and education to building owners	**COB DP&D**, property managers, real estate professionals	SD Fee		X	X
B. Develop and provide comprehensive energy services for local businesses						
1.	In collaboration with PG&E and state and federal government, provide financial incentives for compliance with local energy standards	**COB DP&D**, PG&E, other government agencies			X	X
2.	Launch the Smart Solar Program	**COB DP&D**, U.S. DOE, UCB RAEL, BIG, CESC, PG&E	U.S. DOE, COB, PG&E ratepayer funds	X		
3.	Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the	**COB DP&D**, UCB RAEL	U.S. EPA, BAAQMD, fees	X	X	X

Policy	Implementing Actions	Implementing Agencies	Funding Source	Implementation Timeline: Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
	program to include financing for other renewable energy systems and energy efficiency improvements					
4.	Enhance the Smart Lights program energy audit process to make it more comprehensive	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X	X	
5.	Develop and implement the Berkeley Cleaner Solar program	**COB DP&D**			X	
6.	Improve marketing of energy-related rebates for small businesses	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X	X	X
7.	Market Demand Response Programs where appropriate	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X	X	X
C. Identify opportunities for energy savings in renter-occupied/leased commercial buildings						
1.	Develop model lease provisions that would encourage commercial landlords and tenants to share the liability and benefit of energy saving measures	**COB DP&D**, COB Rent Board			X	
2.	Develop and market a green landlord database	**COB DP&D**, COB Rent Board			X	
3.	Encourage commercial building owners to use Portfolio Manager for energy tracking	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X		
D. Expand energy saving opportunities for large commercial properties						
1.	Partner with local community agencies to encourage large commercial businesses to retire old HVAC systems	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X	X	X
2.	Partner with local community agencies to implement commissioning and re-commissioning for new development, major renovations, and existing buildings	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds		X	X
3.	Improve marketing of rebates	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds		X	X
4.	Market Demand Response programs to large businesses in order to reduce high-carbon peak load	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds	X	X	X
5.	Encourage local large businesses to track the energy consumption in their facilities through ENERGY STAR Portfolio Manager	**COB and partnering East Bay jurisdictions and agencies**	PG&E ratepayer funds		X	X
BEU 4. Goal: Increase residential and commercial renewable energy use						
A. Implement targeted assistance and outreach to increase decentralized solar installations in homes and businesses						
1.	Launch the Smart Solar Program	**COB DP&D**, U.S. DOE, UCB RAEL, BIG, CESC, PG&E	U.S. DOE, COB, PG&E ratepayer funds	X		

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
2.	Provide Berkeley FIRST (Financing Initiative for Renewable and Solar Technology) financing for solar photovoltaic energy systems and if feasible, expand the program to include financing for other renewable energy systems and energy efficiency improvements	**COB DP&D**, UCB RAEL	U.S. EPA, BAAQMD, fees	**X**	**X**	**X**
3.	Launch an on-line Solar Map	**COB DP&D**, COB DoIT, CH2M Hill (Contractor)	U.S. DOE	**X**		
4.	Identify funding sources to subsidize and eliminate solar permit fees (including solar thermal) for residential dwellings and lower fees for solar permits for commercial buildings	**COB DP&D**			**X**	
B. Partner with the State government and utilities to green the energy mix that supplies the region's grid electricity						
1.	Support the California Air Resources Board recommendation to increase the Renewable Portfolio Standard to 33 percent by 2020. Urge PG&E to achieve that standard	**COB and partnering cities and agencies**	COB	**X**		
2.	Urge Congress to maintain tax credits for renewable power developers	**COB and partnering cities and agencies**	COB	**X**		
3.	Urge the State to revise net metering rules to enable residential and commercial customers to earn refunds for excess energy generated	**COB and partnering cities and agencies**	COB	**X**		
4.	Urge the State to allow utilities to count decentralized energy sources toward the RPS requirement and to raise the RPS a commensurate amount	**COB and partnering cities and agencies**	COB	**X**		
C. Consider Community Choice Energy						
1.	Continue to consider CCE and to monitor the efforts of other jurisdictions and PG&E's ability to comply with their renewable energy requirements	**COB DP&D**, COB City Manager's Office			**X**	
D. Identify and implement opportunities for increased wind generation and the use of other renewable energy technologies						
1.	Conduct a study to identify the wind energy generation potential in various parts of Berkeley (taking into consideration potential impact on wildlife) and identify opportunity sites where wind energy can best be implemented	**COB DP&D**			**X**	
2.	Based on the study above and working with stakeholders, evaluate modifications to the building code that would be necessary to facilitate the installation of wind turbines within City limits. Work with the State to modify the building code, if necessary	**COB DP&D**				**X**
3.	Investigate the potential and possible sites for combined heat and power (CHP) systems in Berkeley	**COB DP&D**			**X**	
4.	Research the potential for a grid-connected wave energy system in the San Francisco Bay	**COB DP&D**				**X**

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
5.	Evaluate the effectiveness of a green waste anaerobic digester for collected waste	**COB DPW**			X	
BEU 5. Goal: Increase energy efficiency and renewable energy use in public buildings						
A. Continue to identify and implement opportunities for increased energy and water efficiency in public buildings						
1.	Maintain and continually update the City Capital Improvements Plan	**COB DP&D**	COB	X	X	X
2.	Ensure that the City and BUSD purchase high efficiency computer equipment and other office appliances and operate the equipment as energy efficiently as possible	**COB DoIT, BUSD**	COB, BUSD	X		
3.	Replace the few remaining incandescent traffic signals with high-efficiency Light Emitting Diode (LED) lamps	**COB DPW**			X	
4.	Consider replacing existing streetlights with high-efficiency LED lamps	**COB DPW**			X	
5.	Benchmark and track public building energy performance through ENERGY STAR's Portfolio Manager	**COB DP&D**	COB	X	X	X
6.	Launch an on-bill financing pilot program with PG&E	**COB DP&D**			X	
7.	Establish an annual energy reduction target for each City department	**COB DP&D**			X	
8.	Draft and implement an Administrative Regulation for energy and water efficiency in all City buildings	**COB DP&D**			X	
B. Continue to actively identify and implement cost-effective opportunities to utilize renewable energy systems in public buildings						
1.	Require that re-roofing projects on City buildings evaluate the feasibility of incorporating "solar ready" features, including mounting posts for panels and roof penetrations for conduit and/or pipes	**COB DP&D**			X	
2.	Install solar thermal systems on Berkeley Fire Stations to offset natural gas consumed for water heating	**COB DP&D**			X	
3.	Identify potential sites for solar parking lot and solar bus stop canopies	**COB DP&D**				X
4.	Partner with KyotoUSA and other community groups and agencies to identify additional solar opportunities on BUSD schools	**BUSD,** KyotoUSA, COB DP&D			X	
BEU 6. Goal: Enhance and expand marketing, outreach, and education regarding building energy use						
A. Work with regional and local community partners to provide sustained outreach and education regarding energy efficiency and renewable energy use						
1.	Include building energy use-related education materials in a welcome package for all new homebuyers/renters	**COB DP&D,** Berkeley Board of Realtors (BBOR)			X	

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
2.	Partner with the Berkeley Board of Realtors on an outreach and education effort that targets new Berkeley homeowners	**COB DP&D,** BBOR			X	
3.	Coordinate outreach between City divisions that provide related services to the community, including energy services, child and low- income health programs, housing programs, and safety programs	**Various City Departments**	COB	X	X	X
4.	The City's Office of Energy & Sustainable Development should continue to distribute information at community festivals and other events	**COB DP&D**	COB	X	X	X
5.	Identify and catalogue existing energy efficiency showcases within the community	**COB DP&D**			X	
6.	Design and implement a "Lights Out at Night" campaign to reduce the amount of energy being wasted by local institutions (including the City government) and businesses	**COB DP&D**				X
7.	Launch an annual "Get Off Your Gas" contest to encourage Berkeley residents to reduce natural gas consumption during the winter months	**COB DP&D**	PG&E ratepayer funds	X	X	
8.	Initiate a voluntary home energy-monitoring program	**COB DP&D,** PG&E			X	
BEU 7. Goal: Prepare local residents for green collar job opportunities						
A. Prepare and promote our local workforce for local and regional green jobs that offer stable employment, career growth and living wages						
1.	Identify projected demand for skilled labor associated with implementation of the Climate Action Plan and other sustainability strategies through partnerships with economic development agencies, local universities, community colleges, certified apprenticeship programs, workforce development and training programs, businesses, and community agencies	**COB, UCB, local schools, community colleges, community agency partners, local business and industry partners**	Federal grants, investment from private companies	X	X	X
2.	Integrate energy and climate-related education into the public school curriculum and after school learning programs and explore development of a high school Green Career Technical Academy by partnering with the Berkeley Unified School District, Berkeley High School and the Berkeley Technical Academy (B-Tech)	**COB, UCB, LBNL, BUSD, Berkeley Technical Academy, industry partners**	Grants	X	X	X
3.	Strengthen and expand job training partnerships and opportunities that prepare young adults, many with barriers to employment (e.g., lack of education, language/cultural barriers, etc.), to seize existing and future green collar job opportunities	**East Bay Green Corridor Partnership,** RSEC, other community partners	COB, federal grants, federal funding through the Workforce Investment Act	X	X	X
4.	Assist Berkeley residents to enroll in pre-apprenticeship trades training programs, such as those that prepare students for jobs in green construction, energy retrofits, and solar photovoltaic installation	**COB, local schools, community agency partners, local business and industry partners**		X	X	X

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
5.	Provide ongoing support for local green businesses and industries that provide green collar jobs	**COB, business associations**	COB	X	X	X
6.	Stimulate demand for energy services and an energy service workforce by strengthening and improving the administration and performance of the City's First Source Employment Ordinance and by developing additional provisions and incentives to encourage green businesses and contractors to hire local and provide high-quality employment	**COB,** energy service providers	COB, federal and state grants	X		
7.	Consider developing and adopting a Local Hire Ordinance that would serve to create additional opportunities for local residents to get jobs	**COB and several community partners**			X	

Waste Reduction & Recycling: Implementation Table

Key to Acronyms:

BUSD	Berkeley Unified School District
COB	City of Berkeley
DP&D	Department of Planning & Development
DPW	Department of Public Works
OED	Office of Economic Development
RSEC	Rising Sun Energy Center
SWMD	Solid Waste Management Division

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
WRR 1. Goal: Increase residential composting, recycling, and source reduction						
A. Enhance recycling and composting outreach and assistance to single-family homes						
1.	Initiate a 'split-cart' program to increase convenience and recycling capacity for residents of single-family homes	**COB SWMD**, Ecology Center	Waste collection fees, grants	**X**		
2.	Increase participation in the residential green-cart program by enhancing education and outreach to residents on the topic of composting household organic waste and yard trimmings	**COB SWMD**, StopWaste.Org	Waste collection fees, grants, regional program funds	**X**	**X**	
3.	Integrate a "waste audit" into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center's California Youth Energy Services program	**COB SWMD, Rising Sun Energy Center**				**X**
B. Target expanded recycling outreach and services to multi-family residential buildings, including apartment buildings, fraternities and sororities, and cooperative housing						
1.	Provide on-site assistance and containers for building managers to set up recycling and composting systems	**COB SWMD**, StopWaste.Org	Waste collection fees, grants	**X**	**X**	
2.	Design model lease language that outlines the responsibility of building managers to provide recycling systems and of tenants to recycle waste	**COB SWMD**, building managers, StopWaste.Org			**X**	
3.	Organize tenant meetings for the purpose of providing recycling resources and training	**COB SWMD**	Waste collection fees, grants	**X**	**X**	
4.	Develop standards to ensure new and remodeled buildings are designed to include appropriate space and facilities for recycling and green waste receptacles/systems	**COB SWMD**	Waste collection fees, grants	**X**		
5.	Enact a local ordinance requiring managers of multi-family buildings to provide tenants with the opportunity to recycle, including the provision of the appropriate receptacles and tenant education	**COB SWMD**, building managers, potential requirement at state-level			**X**	
6.	Integrate a "waste audit" into local efforts to conduct residential energy audits, such as the Rising Sun Energy Center's California Youth Energy Services program	**COB SWMD, RSEC**				**X**
WRR 2. Goal: Increase recycling, composting & waste reduction in the commercial sector						
A. Enhance recycling and composting outreach and assistance to local businesses						
1.	Provide on-site assistance and containers for building managers and owners to set up recycling and composting systems	**COB SWMD**	Waste collection fees, grants	**X**	**X**	
2.	Design model lease language that outlines the responsibility of building managers to provide recycling systems and of commercial tenants to recycle waste	**COB SWMD**, building managers, StopWaste.Org, local business associations			**X**	
3.	Partner with the Chamber of Commerce, the Sustainable Business Association and other business associations to conduct expanded marketing and outreach to local business owners	**COB SWMD**, business associations	Grants, in-kind contributions	**X**		

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
4.	Design and administer recycling and composting training sessions for local building maintenance companies	**COB SWMD**			X	
5.	Refer large businesses to StopWaste.Org's recycling partnership program, which provides free waste analysis and consulting services for waste reduction	**COB SWMD**, StopWaste.Org	StopWaste. Org	X		
6.	Enact a local ordinance requiring managers of commercial buildings to provide commercial tenants with the opportunity to recycle, including the provision of shared storage containers and tenant education	**COB SWMD**, building managers, potential requirement at state-level			X	
7.	Utilize the interaction between the City government and local businesses at the time a business license is issued to distribute resources and information regarding setting up recycling and composting systems	**COB SWMD, COB Finance Dept.**	COB	X		
8.	Design and implement more effective space allocation ordinance to ensure that new and remodeled buildings provide adequate space for storage of recycled materials	**COB SWMD, COB DP&D**	COB Refuse Fund, grants	X		
9.	Continue to promote participation in the Alameda County Green Business Program	**COB SWMD, COB OED, Alameda County Green Business Program**	Grants, other COB funding	X	X	X
10.	Identify and implement opportunities to assist local businesses to aggregate purchasing power for the purchase of sustainable product alternatives such as compostable take out fare and reusable bags	**COB SWMD**, COB OED			X	
11.	Work with franchised haulers, private recycling companies, and their customers to identify opportunities to recycle and reduce waste in the commercial sector	**COB SWMD**	COB Refuse Fund	X	X	X
B. Make recycling and composting mandatory at public events and provide more public recycling containers						
1.	Continue to require recycling plans and to provide recycling containers and assistance to public event organizers upon request	**COB SWMD**, COB Health and Human Services Dept.	COB Refuse Fund, grants	X	X	X
2.	Prepare a recycling guide for local event organizers/planners	**COB SWMD**, StopWaste.Org	COB Refuse Fund	X		
3.	Provide more public recycling containers on commercial corridors and in parks and public places and create a system for collecting these recyclables	**COB SWMD**, COB Parks, Rec. & Waterfront Dept.	COB Refuse Fund, grants	X	X	
4.	Explore the feasibility of providing composting receptacles in the public right of way	**COB SWMD**, COB Parks, Rec. & Waterfront Dept.			X	
WRR 3. Goal: Increase recycling of construction & demolition (C&D) debris						
A. Enhance C&D recycling outreach and assistance to improve enforcement of existing ordinance and convenience of compliance for local builders						
1.	Promote deconstruction and reuse of building materials through written outreach materials such as a brochure on residential remodeling and through direct consultations with builders	**COB DP&D, COB SWMD**	COB Refuse Fund, grants	X	X	

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
2.	Pending site design and feasibility analysis, create capacity to process C&D materials at new Berkeley Transfer Station	**COB SWMD**				**X**
WRR 4. Goal: Expand local capacity to process recycled materials						
A. Rebuild the Berkeley Transfer Station and material recovery facility into a state-of-the-art Zero Waste facility in order to increase local capacity to recover a high percentage of recyclable materials						
1.	Conduct a feasibility study that results in recommendations regarding the design of a rebuilt Transfer Station and material recovery facility as well as recommendations regarding what types of waste-processing equipment and material recovery systems to incorporate	**COB DPW**			**X**	
2.	As part of the Transfer Station rebuild, examine the costs and benefits of installing a "single-stream" sorting system, or a sorting system that can accept both single and dual-stream recyclables	**COB SWMD**			**X**	
B. Expand the types of materials that can be recycled locally and identify local markets for recycled products						
1.	Evaluate the feasibility of partnering with EBMUD to divert commercial food waste to its anaerobic digester	**COB SWMD, East Bay Municipal Utility District,** StopWaste.Org			**X**	
2.	Expand the types of materials that are collected for recycling as soon as a local, environmentally sound market for the materials is found	**COB SWMD**	COB Refuse Fund	**X**	**X**	**X**
3.	Investigate additional options to sell recycled materials for domestic use, rather than for export	**COB SWMD**	COB Refuse Fund	**X**	**X**	**X**
WRR 5. Goal: Expand efforts to eliminate waste at its source						
A. Encourage the use of reusable bags at local retail locations						
1.	Institute a ban on plastic bags and establish a fee on paper shopping bags at Berkeley retail locations	**COB SWMD**	COB Refuse Fund	**X**		
2.	Explore bulk purchase of reusable bags with the City's Office of Economic Development (OED), coordinating with the Buy Local Berkeley program	**COB OED, COB SWMD, local business associations**	Grants	**X**		
B. Increase producer responsibility for product waste and packaging						
1.	Evaluate options and opportunities for extending producer responsibility for product waste at the local level	**COB SWMD**, COB Finance Dept. (Purchasing)	COB	**X**	**X**	**X**
2.	Support policies at the state level that provide incentives for efficient product design, reduced product and packaging waste, and elimination of toxics in the discard stream through mandatory compliance programs	**COB SWMD**	COB	**X**	**X**	
3.	In collaboration with the Chamber of Commerce and other business associations, enhance outreach and education to local businesses about the waste embodied in products and packaging and support local manufacturers' efforts to reduce packaging	**COB SWMD, StopWaste.Org, business associations**	Regional agency funding	**X**		

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
C. Continue to promote reuse and repair businesses and organizations						
1.	Promote the utilization of reuse and repair businesses in outreach to businesses and residents	**COB SWMD, various reuse/repair organizations**			**X**	
D. Reduce yard and garden waste produced by residents and businesses						
1.	Promote participation in StopWaste.Org's Bay Friendly Landscaping program	**StopWaste.Org, COB DP&D, COB Parks, Rec. & Waterfront Dept.**	StopWaste. Org	**X**		
2.	Explore the feasibility of initiating a local "excess harvest program" in which residents are encouraged to donate excess produce from gardens and fruit trees to local food banks and homeless assistance programs	**COB SWMD, Community Gardening Collaborative**, community partners			**X**	
WRR 6. Revise the City solid waste disposal rate structure in order to maintain and enhance incentives, outreach programs and other activities designed to increase waste diversion						
1.	Update solid waste disposal billing rates to cover costs of providing basic refuse, recycling and composting service to the community	**COB SWMD**	COB Refuse Fund	**X**		
2.	Review the service impacts and operational and financial aspects of offering every-other-week residential refuse service	**COB SWMD**			**X**	
WRR 7. Goal: Increase recycling, composting, and waste reduction in public institutions						
A. Maximize waste reduction and recycling and composting at all City buildings, including leased buildings, and at all City events						
1.	Ensure that every City department is equipped with the appropriate recycling containers and undergoes basic training on how and where to recycle	**COB SWMD**, all City departments	COB Refuse Fund	**X**		
2.	Initiate a recognition program to encourage City departments to recycle 100 percent of recyclable materials	**COB SWMD**, all City departments			**X**	
3.	Ensure that all City departments coordinate event planning with the City's Solid Waste Management Division	**COB SWMD**, all City departments	COB Refuse Fund, grants	**X**		
4.	Limit the use of single-use plastic beverage bottles in City buildings and at City events	**COB City Manager's Office**	COB	**X**		
5.	Track City government paper use and limit its consumption by making duplex the default setting for printers and by encouraging the electronic distribution of documents whenever possible	**COB Finance Dept., COB Dept of Information Technology, COB SWMD**	COB	**X**		
B. Sustain and enhance waste diversion efforts at the Berkeley Unified School District						
1.	Support BUSD efforts to identify a funding source for ongoing staffing in support of waste diversion systems in schools	**BUSD, COB SWMD**			**X**	
WRR 8. Goal: Enhance and expand marketing, outreach, and education regarding waste reduction and recycling						
A. Work with regional and local community partners to provide sustained outreach and education regarding waste reduction and diversion						
1.	Incorporate information about waste reduction services into expanded marketing and outreach print and web-based materials, including City and partner agency	**COB SWMD**, StopWate.Org, various community partners	COB Refuse Fund, grants	**X**		

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
	newsletters, the City website, and door-to-door marketing					
2.	Include waste diversion resources and information in a "welcome basket" for new Berkeley homeowners and renters	**COB SWMD**			X	
3.	Enhance the City Solid Waste Division website to serve as a one-stop web portal for waste diversion resources	**COB SWMD**, StopWaste.Org			X	

Adapting to a Changing Climate: Implementation Table

Key to Acronyms:

COB	City of Berkeley
DP&D	Department of Planning & Development
DPW	Department of Public Works
EBMUD	East Bay Municipal Utility District

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
ADP 1. Goal: Make Berkeley resilient to the impacts of climate change						
A. Launch and sustain a collaborative process for increasing Berkeley's and the region's preparedness for climate change impacts						
1.	In collaboration with neighboring cities and relevant regional and state agencies, conduct an assessment of Berkeley's (and the region's) vulnerability to climate change impacts	**COB DP&D, State Climate Action Team, various regional and community partners**			**X**	
2.	Develop and implement a strategic plan for climate change adaptation	**COB DP&D, various state, regional and community partners**			**X**	
B. In preparation for the impacts of climate change on the region's water resources, partner with local, regional, and state agencies to encourage water conservation and efficiency and expand and diversify the water supply						
1.	Examine the potential of developing new, local groundwater sources for various purposes, including irrigation, showers, and toilets				**X**	
2.	Encourage water recycling and gray water use through the development of outreach materials and local guidelines that are consistent with the Building Code	**EBMUD, COB DP&D**	EBMUD, COB	**X**		
3.	Partner EBMUD to provide and market incentives for residents, businesses and institutions to conserve water	**EBMUD, COB DP&D,** various community partners	EBMUD, COB	**X**		
4.	Encourage the use of water conservation technologies, such as waterless urinals and cisterns, through the development of local guidelines that are consistent with the Building Code	**COB DP&D**, EBMUD			**X**	
5.	Partner with agencies such as EBMUD and StopWaste.org to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain	**EBMUD, StopWaste.Org, COB DP&D**, various community partners	StopWaste. Org, EBMUD, COB	**X**		
6.	In collaboration with community partners, increase public awareness by including information on climate change impacts to water supplies and riparian and coastal habitats and on how residents and businesses can use water more efficiently in various newsletters and newspapers and on City and partner websites, among other places	**EBMUD, COB DP&D, StopWaste.Org,** various community partners	StopWaste. Org, EBMUD, COB	**X**		
C. In preparation for rising sea-levels and more severe storms, partner with local, regional and state agencies to reduce the property damage associated with flooding and coastal erosion						
1.	Use development review to ensure that new development does not contribute to an increase in flood potential	**COB DP&D**	COB	**X**		
2.	Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems such as greenscapes	**COB DP&D, COB DPW, COB Dept. of Parks, Rec & Waterfront**	COB	**X**	**X**	**X**

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
3.	Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D	COB	**X**	**X**	**X**
4.	Maximize permeable surfaces in both greenscape and hardscape areas for retention and infiltration of stormwater	**COB DP&D, COB DPW, COB Dept. of Parks, Rec & Waterfront**	COB	**X**	**X**	**X**
5.	Encourage the development of green roofs by providing local outreach and guidelines consistent with the Building Code	**COB DP&D**	COB	**X**		
D. In preparation for more extreme heat events, partner with local, regional and state agencies to protect and increase urban tree cover						
1.	Expand local tree planning efforts and continue to maintain the health of existing trees by providing local outreach and guidelines for residents, businesses and public institutions (same as above)	**COB Dept. of Parks, Rec & Waterfront,** COB DP&D	COB	**X**	**X**	**X**
2.	Consider developing street tree master plans for sub-areas within the City	**COB Dept. of Parks, Rec & Waterfront**			**X**	
3.	Consider developing a vegetation and fuel management plan in parts of the City designated as high fire hazard areas	**COB Dept. of Parks, Rec & Waterfront**			**X**	

Community Outreach & Empowerment: Implementation Table

Key to Acronyms:

BAAQMD	Bay Area Air Quality Management District
BUSD	Berkeley Unified School District
COB	City of Berkeley
DP&D	Department of Planning & Development
EBMUD	East Bay Municipal Utility District
LBNL	Lawrence Berkeley National Laboratory
OED	Office of Economic Development
PTA	Parent Teacher Association
UCB	University of California, Berkeley

Lead implementing agency is in **BOLD**. Where possible, City staff identified a funding source for all short-term implementing actions.

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
COE 1. Goal: Mobilize the community at large to turn the climate plan into climate action						
A. Establish an implementation framework that enables the City to more efficiently and effectively distribute information and resources to a wide range of community partners and to report progress on achieving the goals outlined in this plan						
1.	Design a climate action "stakeholder database" that identifies the many stakeholders that are playing or will play a role in implementing local climate protection strategies	**COB DP&D**	BAAQMD, grants	X		
2.	Establish community working groups that take ownership for mobilizing a given group of individuals or sector of the community or for promoting a given climate protection program	**COB DP&D**, various community partners	BAAQMD, grants	X	X	X
3.	Launch and maintain a web-based portal that enables reporting and tracking of GHG reduction efforts on both an individual and community-wide basis	**COB DP&D**	BAAQMD, grants	X	X	X
4.	Provide an annual report to City Council that highlights community climate protection actions and progress toward the Measure G goals	**COB DP&D**	COB	X	X	X
B. Launch a coordinated outreach and education campaign, utilizing a range of tools, programs and partnerships, to mobilize residents						
1.	Promote the Berkeley Climate Action Pledge as a means by which individuals can commit to reducing their own emissions	**COB DP&D**	COB	X		
2.	Support local efforts to launch a "local carbon offset" project	**Ecology Center, KyotoUSA, COB DP&D**	Grants	X	X	
3.	In collaboration with community partners, develop and implement a public information strategy that serves to highlight climate-related information and resources in multiple mailings, newsletters and local media outlets, including radio, television and news publications	**COB DP&D, COB City Manager's Office**, local media outlets, various community partners	COB	X	X	X
4.	Partner with Berkeley's network of neighborhood associations to hold various community workshops and events focused on reducing GHG emissions at the neighborhood level	**COB DP&D, COB City Manager's Office**, various community partners	COB	X	X	X
5.	Partner with the Ecology Center and others to promote the Low Carbon Diet program as means for helping households reduce their GHG emissions	**Ecology Center**, COB DP&D	Grants, COB	X	X	X
6.	In collaboration with community partners, launch a "Green Neighborhood Challenge" and "Green Star Household" program	**COB DP&D**, various community partners			X	
7.	Partner with PG&E to provide residents with monthly personalized energy consumption reports	**COB DP&D**, PG&E			X	
8.	Educate Berkeley residents and employees about the significant environmental impact of air travel and about potential travel-mode alternatives	**COB DP&D**			X	

				Implementation Timeline		
Policy	Implementing Actions	Implementing Agencies	Funding Source	Short Term (2009-10)	Medium Term (2010-2015)	Long Term (2015-2020)
9.	In partnership with the Berkeley Board of Realtors, design a "welcome package" for new homeowners and business owners that includes resources related to energy use, transportation choices, and waste diversion and reduction	**COB DP&D**, Berkeley Board of Realtors			X	
10.	Hold speaker series' and other educational events at the Berkeley Public Library	**Berkeley Public Library**, COB DP&D	COB	X	X	X
11.	Partner with the Civic Arts Commission to encourage and fund art projects that serve to heighten awareness of the climate issue	**Civic Arts Commission**, COB DP&D			X	
12.	Partner with biologists, botanists, and other scientists to raise awareness regarding the impact of climate change on local ecosystems	**COB DP&D, UCB, LBNL**, other community partners			X	X
COE 2. Goal: Enhance outreach and incentives to the business community						
A. Continue to showcase effective climate protection efforts in the business community and to engage additional businesses in the local climate protection effort						
1.	Continue to promote participation in the Alameda County Green Business Program and enhance the program's ability to efficiently administer the green business certification process and track GHG-related metrics	**Green Business Program, COB OED**	COB, various other funding sources	X	X	X
2.	Expand the local green economy through the East Bay Green Corridor Partnership	**Office of the Mayor, COB OED, neighboring cities, UC Berkeley, LBNL**	COB, various other funding sources	X	X	X
3.	In collaboration with local business associations and merchants, continue to expand and promote the Buy Local Berkeley Campaign	**Local business associations, COB OED**	COB, various other funding sources	X	X	X
4.	Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups	COB OED, local business associations, other community partners	COB, various other funding sources	X	X	X
COE 3. Goal: Enhance climate change-related education at local schools						
A. Continue to showcase existing climate protection efforts in our schools and to expand the opportunities students have to learn about and take action on climate change						
1.	Integrate climate-related activities and education into existing after school programs such as Berkeley LEARNS (Links Enrichment, Academics, and Recreational Needs to Students)	**COB Dept. of Parks. Rec & Waterfront, BUSD**	COB, BUSD	X		
2.	Partner with Parent Teacher Associations (PTAs) to promote programs such as the Low Carbon Diet and to integrate climate-related information into school gatherings and fairs	**BUSD, PTAs, COB DP&D**			X	X
3.	In collaboration with community partners, support Berkeley High School's School of Social Justice and Ecology by providing internship opportunities and climate-related resources to integrate into its curriculum	**COB DP&D**, other City departments			X	X

				Implementation Timeline		
Policy	**Implementing Actions**	**Implementing Agencies**	**Funding Source**	**Short Term (2009-10)**	**Medium Term (2010-2015)**	**Long Term (2015-2020)**
4.	In collaboration with UC Berkeley, provide internships and educational programs to K – 12 students on topics related to climate science and on impacts of climate change on the community and local ecosystems	**UCB, COB DP&D, BUSD**			**X**	**X**
COE 4. Goal: Increase awareness in the City government						
A. Launch a sustained effort to increase awareness in the City government regarding the climate issue and to provide training on how to achieve increased sustainability at home and in the workplace						
1.	Hold regular "brown bag" events for each City department on various topics related to the climate change issue and on actions employees can take to reduce their own GHG emissions	**COB DP&D**, other City departments	COB	**X**	**X**	**X**
2.	Establish "Sustainability at Work and at Home" class as part of the required City of Berkeley Core Courses for City employees	**COB and various local higher education institutions**			**X**	
3.	Establish energy consumption reduction targets for each City department and provide assistance in achieving those targets	**COB DP&D**, all City departments			**X**	
4.	Establish recycling and composting systems in each City building and recycling training for employees and maintenance staff	COB Solid Waste Management Division			**X**	

Appenidx B:

The Berkeley Climate Action Pledge

I, _____, will address the climate crisis by taking responsibility for my greenhouse gas emissions. I pledge to reduce my greenhouse gas emissions by at least 10% within one year and 2% every year after that.

_____

Name:

_____

Signature:

_____

Address:

_____

Email Address:

Take the pledge today!

Email your pledge to

MeasureG@ci.berkeley.ca.us

or take the pledge on-line at www.BerkeleyClimateAction.org

Appendix C

My Very Own Climate Action Plan

The City of Berkeley will reach its greenhouse gas (GHG) emissions reduction target only when every individual does his/her part to save energy, reduce waste and drive less. Put together your own climate action plan using some of the steps listed below. For additional ideas and resources, visit the City's climate action website at: **www.BerkeleyClimateAction.org**

Easy Actions	Estimated Percent of Average Household's GHG emissions reduced	Pounds of GHGs eliminated each year
Replace one out of every five (non-commute) auto trips with bike, bus, walking or BART every week	6%	530
Replace your drive to work with a bike, bus, walking, or BART commute one day per week	5%	445
Replace all incandescent and halogen light bulbs with Compact Fluorescents (CFLs) and turn off unused lights	3%	265
Upgrade to a water-saver (2.5 gallons per minute) showerhead	3%	265
Dry your clothes on the line during the warmest half of the year	2%	180
Dry your clothes on an indoor drying rack during the other half of the year	2%	180
Turn your water heater down to 120 degrees	2%	180
Wash clothes in cold water rather than hot	2%	180
Replace your 20 year old refrigerator with a new ENERGY STAR model	2%	180
Plug all electronics into power strips and switch off when not in use (including cell phone and other chargers, TV, VCR/DVD, stereos, etc.)	1%	90
Watch half as much TV each day	1%	90
Keep car tires inflated (significantly improves your gas mileage)	1%	90
Get a FREE Home Energy Audit from CYES, for more info visit: www.risingsunenergy.org	2%-10%	180-900

Intermediate Actions	Estimated Percent of Avg. Household's GHG emissions reduced	Pounds of GHGs eliminated each year
Join a car sharing organization rather than purchasing (or keeping) a second car for your household	10-20%	890-1800
Apply weather stripping to doors and windows	5%	445
Upgrade your attic insulation to 12 inches	5%	445
Reduce amount of weekly waste by at least one garbage bag (buy products with less packaging, bring your own bag to the grocery store, compost your food scraps and yard clippings etc.)	2-5%	180-445
Join a Low Carbon Diet group to teach friends, neighbors, family and/or community members about some of the tips on this handout as well as those featured in "The Low Carbon Diet" by David Gershon. For more info: www.ecologycenter.org	10-50% or more	890-4430 and up

Advanced Actions	Estimated Percent of Avg. Household's GHG emissions reduced	Pounds of GHGs eliminated each year
Sell your car (it is the single biggest source of most Berkeley residents' greenhouse gas emissions) and, if desired, join a car share organization.	30-45%	2660-4000
Install a solar photovoltaic system	15-40%	1330-3550
Install a solar hot water system	10-15%	900-1330
Replace old single-pane windows with dual-pane windows	10%	900
Start a Low Carbon Diet group and get 5-10 others involved (see intermediate section for more info)	10-50%	890-4430 and up

Percentages and other numerical values are approximations based off of national and local averages. They are here to give you a rough estimate of the impacts of your actions.

Appendix D

CalCAP

UC Berkeley's Climate Action Partnership

The Cal Climate Action Partnership (CalCAP) is a collaboration of faculty, administration, staff and students working to reduce greenhouse gas (GHG) emissions at UC Berkeley. Facilitation of CalCAP activities is part of the responsibilities of the campus *Office of Sustainability*. CalCAP's focus is to develop a strategy and methods for significantly reducing UC Berkeley's GHG footprint without compromising the operations and mission of the University.

Cal's Climate Action Target: To Reduce UC Berkeley's Greenhouse Gas Emissions to 1990 Levels by 2014

Greenhouse Gas Emissions Reduction Target

The UC Berkeley campus has committed to reducing its greenhouse gas (GHG) emissions to reach 1990 levels by the year 2014 – a goal that is six years earlier than State of California and the UC requires. The eventual target of CalCAP is to achieve climate neutrality – defined in the *UC Policy on Sustainable Practices* as reducing GHG emissions through mitigation strategies so as to have a net zero impact on the Earth's climate.

Greenhouse Gas Emissions Inventory

UC Berkeley reports on ten emissions sources that include: electricity consumption, steam use, natural gas consumption, the university fleet, student commuting, faculty and staff commuting, business air travel, fugitive emissions from coolants, solid waste, and water use. Greenhouse gas inventories reveal that electricity and steam usage account for over 70% of campus emissions and close to 80% of our emissions are associated with campus buildings. The majority of the remaining emissions come from campus related travel. The campus reports its GHG inventory annually to both the California Climate Action Registry (CCAR) and the American College and University Presidents Climate Commitment (ACUPCC) and makes it available to the public. Third party verification of the inventory is completed as part of the CCAR reporting process.

Climate Planning & Emissions Mitigation Strategies

The *2009 Climate Action Plan* documents how the campus plans to reduce its GHG emissions by one-third and eventually achieve climate neutrality. The Plan examines how far the campus has come in the last two years to meet its ambitious emissions reduction goal and begins to explore areas that still need deeper

analysis, decision-making, and implementation. Over the last year, the campus has begun implementation of some reduction projects and committed to additional energy efficiency GHG reduction projects through a Strategic Energy Plan. These new projects, along with other infrastructure and behavioral projects identified in the *2007 CalCAP Feasibility Study,* are predicted to accomplish about half of what is needed to meet the 2014 target. The 2009 Climate Action Plan identifies new potential strategies to accomplish the 2014 target and expands the discussion on climate neutrality. The Plan calls for the campus to make its next interim GHG reduction target for the year 2020 or 2025 by 2011.

For More Information contact UC Berkeley's Office of Sustainability
sustainability@berkeley.edu; 510-642-0074
http://sustainability.berkeley.edu/calcap/sustain

CONTACT:
Kira Stoll
Office of Sustainability
stoll@berkeley.edu
510-642-0074

Appendix E

EMISSION SCENARIO PROJECTIONS (metric tons)

SECTOR & SCENARIO	% reduc 2000-2005	% reduc 2000-2050	2000	2005	2010	2015	2020	2025	2030
80% Reduction from 2000 Levels									
Residential									
Electricity	10.9%	80.0%	45,806	40,822	37,304	33,786	30,268	26,751	23,233
% reduction below 2000 levels				10.9%	18.6%	26.2%	33.9%	41.6%	49.3%
Natural Gas	14.0%	80.0%	129,971	111,777	102,246	92,714	83,183	73,651	64,120
% reduction below 2000 levels				14.0%	21.3%	28.7%	36.0%	43.3%	50.7%
SUBTOTAL EMISSIONS (tons)			175,778	152,599	139,550	126,501	113,451	100,402	87,353
% reduction below 2000 levels				13.2%	20.6%	28.0%	35.5%	42.9%	50.3%
							62,326		
Commercial									
Electricity	13.2%	80.0%	70,636	61,302	56,061	50,819	45,577	40,336	35,094
% reduction below 2000 levels				13.2%	20.6%	28.1%	35.5%	42.9%	50.3%
Natural Gas	14.2%	80.0%	112,416	96,444	88,226	80,008	71,790	63,572	55,354
% reduction below 2000 levels				14.2%	21.5%	28.8%	36.1%	43.4%	50.8%
SUBTOTAL EMISSIONS (tons)			183,053	157,746	144,286	130,827	117,367	103,908	90,448
% reduction below 2000 levels				13.8%	21.2%	28.5%	35.9%	43.2%	50.6%
							65,685		
Transportation									
Gasoline	3.9%	80.0%	175,888	169,031	154,159	139,286	124,413	109,541	94,668
% reduction below 2000 levels				3.9%	12.4%	20.8%	29.3%	37.7%	46.2%
Diesel	0.7%	80.0%	97,145	96,512	87,948	79,383	70,818	62,253	53,688
% reduction below 2000 levels				0.7%	9.5%	18.3%	27.1%	35.9%	44.7%
SUBTOTAL EMISSIONS (tons)			273,033	265,544	242,106	218,669	195,231	171,794	148,356
% reduction below 2000 levels				2.7%	11.3%	19.9%	28.5%	37.1%	45.7%
TOTAL EMISSIONS	8.9%	80.0%	631,863	575,889	525,942	475,996	426,050	376,104	326,157
Percent of 2000 Emissions				91.1%	83.2%	75.3%	67.4%	59.5%	51.6%

	% reduc 2000-2005	% increase 2005-2050	2000	2005	2010	2015	2020	2025	2030
Business As Usual Forecast									
Residential									
Electricity	10.9%		45,806	40,822	41,639	42,471	43,321	44,187	45,071
% increase above 2005 levels		16%		10.9%	2%	4%	6%	8%	9%
Natural Gas	14.0%		129,971	111,777	114,013	116,293	118,619	120,991	123,411
% increase above 2005 levels		16%		14.0%	2%	4%	6%	8%	9%
SUBTOTAL EMISSIONS (tons)			175,778	152,599	155,651	158,764	161,939	165,178	168,482
% increase above 2005 levels		16%		13.2%	2%	4%	6%	8%	9%
Commercial									
Electricity	13.2%		70,636	61,302	62,896	64,531	66,209	67,931	69,697
% increase above 2005 levels		20.63%		13.2%	2.53%	5.00%	7.41%	9.76%	12.04%
Natural Gas	14.2%		112,416	96,444	98,951.1	101,523.8	104,163.4	106,871.7	109,650.3
% increase above 2005 levels		20.63%		14.2%	2.53%	5.00%	7.41%	9.76%	12.04%
SUBTOTAL EMISSIONS (tons)			183,053	157,746	161,847	166,055	170,373	174,802	179,347
% increase above 2005 levels		20.63%		13.8%	2.53%	5.00%	7.41%	9.76%	12.04%
Transportation									
Gasoline	3.9%		175,888	169,031	172,412	175,860	179,377	182,965	186,624
% increase above 2005 levels		16.3%		3.9%	2.0%	3.9%	5.8%	7.6%	9.4%
Diesel	0.7%		97,145	96,512	98,442.7	100,411.6	102,419.8	104,468.2	106,557.6
% increase above 2005 levels		16.3%		0.7%	2.0%	3.9%	5.8%	7.6%	9.4%
SUBTOTAL EMISSIONS (tons)			273,033	265,544	270,855	276,272	281,797	287,433	293,182
% increase above 2005 levels		16.3%		2.7%	2.0%	3.9%	5.8%	7.6%	9.4%
TOTAL EMISSIONS			631,863	575,889	588,353	601,091	614,109	627,414	641,011
Percent of 2000 Emissions				91.1%			97.2%		
Percent increase above 05 GHGs					2.1%	4.2%	6.2%	8.2%	10.2%

Summary of Targets, Projected Savings, Total Costs and Direct Savings

	Target Reduction				Projected Performance					Colateral Benefits
	Therms (1,000)	mWh	Motor fuels (1,000 gals.)	Metric tons	Metric tons	Share of Target	Savings ($1,000)*	Costs ($1,000)*	Benefit to Cost	
Residential 2020 Reduction	**6,338**	**58,724**	**-**	**48,000**	**55,032**	**29%**	**$ 289,080**	**$ 260,114**	**1.11**	**Climate protection, jobs, productivity, housing affordability and preservation, comfort, energy security, quality of life, air quality and public health**
Energy Efficiency					45,475	24%	$ 240,168	$ 169,791	1.41	
Local renewables					9,557	5%	$ 48,912	$ 90,323	0.54	
Commercial 2020 Reduction	**5,791**	**92,826**	**-**	**53,000**	**46,967**	**25%**	**$ 162,989**	**$ 87,489**	**1.86**	
Energy Efficiency					44,912	24%	$ 153,387	$ 68,065	2.25	
Local renewables					2,055	1%	$ 9,602	$ 19,423	0.49	
Transportation 2020 Reduction	**-**	**-**	**9,242**	**87,000**	**87,000**	**46%**	**$ 18,925**	**na**	**na**	
Total	**12,129**	**151,550**	**9,242**	**188,000**	**188,999**	**101%**	**$ 470,994**	**$ 347,603**	**na**	

* Net present value

Appendix F

Summary of Targets, Projected Savings, Total Costs and Direct Savings Assumptions

Targets and Coefficients

	Basline				Sources/notes
	Therms	kWh	Gal	metric tons	
Residential 2005 Actual	19,942,725	183,664,927		152,000	Climate Action Plan
Residential 2020 Reduction	6,338,459	58,724,048		48,000	Climate Action Plan
Commercial 2005 Actual	17,207,085	275,808,000		158,000	Climate Action Plan
Commercial 2020 Reduction	5,790,645	92,826,396		53,000	Climate Action Plan
Transportation 2005 Actual			28,258,245	266,000	Climate Action Plan
Transportation 2020 Reduction			9,242,358	87,000	Climate Action Plan

General Assumptions

		Sources/notes
Metric tons/unit		
Therms	0.00559062	12.325 lbs/therm ICLEI
kWh	0.00022226	.49 lbs/kwh ICLEI
kWh PV	0.00049896	CEC Clean Power Estimator
gasoline	0.00941318	ICLEI
Annual kWh per AC CEC kW of PV	1,607	PV Watts @NREL.gov less 10% for discounted 1% annual performance degradation
PV Measure Life	25	
Cost per therm solar thermal	$ 53	$8,000 for 64 sf system @ 2.5 therms/sf + 5% for maintenance
Solar Thermal measure life	25	
Cost inflation	2%	NA. Offset by increased energy costs.
Discount Rate	5%	

RESIDENTIAL ASSUMPTIONS

		Sources/notes			
Gas efficiency measure life	30	Change formula manually			
Electric efficiency measure life	10	Change formula manually			
Avoided cost per therm	$1.38	PG&E 1/1/09			
Avoided cost per kWh	$0.13	PG&E 1/1/09. 1.19 small, .98 large. Assumes more small in Berkeley			
Avoided cost per PV kWh	$0.15				
Cost per PV CEC AC kW plus maintenance	$12,000	Clean Power Estimator ($11) plus discounted inverter			
Annual PV performance degradation	0.00%	Deduct of 5% (discounted lifetime) from PV Watts production values			
Therm inflation	4%				
kWh inflation	3%				
Single Familyt Units	21,854	2000 census			
Multifamily Units	24,962	2000 census			
Relative usage	Therms	Elec			
Single Family Intensity	66%	64%	CA Statewide Residential Appliance Saturation Study, 6/2004.		
Multifamily intensity	34%	36%	CA Statewide Residential Appliance Saturation Study, 6/2004.		
Energy per dwelling unit					
Single Family	575	5,088	Calculation		
Multifamily	296	2,903	Calculation		
Reduction	40%	30%	BKi		
Cost/single family	10,000		Retrofit costs per CA Building Performance Contractors Assoc.		
Cost/multifamily	2,000		Retrofit costs per CA Building Performance Contractors Assoc.		
PV installed capacity (CEC AC kW)	1,338	PG&E and CSI thru 2008			
Total PV potential (CEC AC kW)	5,300	CH2M Hill Solar Map: 2.363 MM sf structurally unshaded less 30% tree shaded x 85% residential. 1/2 PV; 1/2 thermal. For PV x 10/watts sf * 81% for CEC AC. For thermal, 2.6 therms/sf.			
Solar thermal potential (therms)	1,600,000	CH2M Hill.			
Energy efficiency market penetration	80%				
Solar PV market penetration	70%				
Solar thermal market penetration	70%				

COMMERCIAL ASSUMPTIONS

		Sources/notes			
Gas efficiency measure Life	15	Change formula manually			
Electric efficiency measure Life	10	Change formula manually			
Avoided cost per therm	$1.15	PG&E 1/1/09. 1.19 small, .97 large. Assumes more small in Berkeley			
Avoided cost per kWh	$0.15	2011 Estimated from CECS and Quest			
Avoided cost per PV kWh	$0.18				
Cost per PV AC kW with maintenance	$12,000	Clean Power Estimator plus discounted inverter			
Annual PV performance degradation	0.00%	Deduct of 5% (discounted lifetime) from PV Watts production values			
Therm inflation	4%				
kWh inflation	3%				
Cost/first year therm saved	$ 7.00	QuEST			
Cost/first year kWh saved	$ 0.80	QuEST			
PV installed capacity (CEC AC kW)	275	PG&E and CSI thru 2008			

Appendix G

RESOLUTION NO. 64,480–N.S.

ADOPTING THE PROPOSED NEGATIVE DECLARATION FOR THE BERKELEY CLIMATE ACTION PLAN AND ADOPTING THE BERKELEY CLIMATE ACTION PLAN

WHEREAS, pursuant to the California Environmental Quality Act (CEQA) staff conducted an Initial Study (Exhibit A) to determine whether the Climate Action Plan would have any significant effects on the environment and found that no significant effects would occur; and

WHEREAS, staff prepared a Negative Declaration (Exhibit A) for the Climate Action Plan, which was posted on the City's website and distributed to the public library and the Permit Service Center as well as noticed in newspapers and through email distribution lists; and for which the public comment period was open from April 24 to May 26, 2009; and

WHEREAS, the amendments to the Climate Action Plan approved by City Council on May 5, 2009, did not affect the analysis or the conclusions of the Initial Study of the Climate Action Plan; and

WHEREAS, the City Council has considered the initial study and proposed Negative Declaration together with comments received during the public review process, and finds on the basis of the whole record that there is no substantial evidence the Climate Action Plan may have a significant adverse effect on the environment, and that the Negative Declaration reflects the lead agency's independent judgment and analysis; and

WHEREAS, the weight of scientific authority has concluded that greenhouse gas emissions caused by human activity are altering the Earth's climate; and

WHEREAS, we recognize that the impacts associated with climate change, including shrinking water resources, rising seas, and extreme heat events, put our residents at serious risk and require immediate action at all levels; and

WHEREAS, the impacts of global warming often affect poor and minority communities disproportionately; and

WHEREAS, local governments and the communities they represent are uniquely capable of reducing the main sources of greenhouse gas emissions through policies that increase access to sustainable mobility modes, increase energy efficiency and reduce waste; and

WHEREAS, action taken to reduce greenhouse gas emissions have several important co-benefits, including improved public health through reduced local air pollution, cost savings associated with increased energy efficiency, improved access to more active mobility options, increased preparedness for peak oil due to less reliance on fossil fuels, and the creation of local green jobs; and

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WHEREAS, the problem of global warming will not be resolved without leadership from local governments and the communities they represent and without collaboration across all levels of government; and

WHEREAS, in September of 2006 the Governor signed Assembly Bill 32 (Nunez), the Global Warming Solutions Act that requires California to reduce its greenhouse gas emissions to 1990 levels by 2020 and directs the California Air Resources Board to develop a Scoping Plan for achieving that target; and

WHEREAS, in December 2008 the California Air Resources Board approved the AB 32 Scoping Plan that contains the main strategies that California will use to reduce the emissions that cause climate change and that also recognizes the important role local governments must play in achieving the state's targets; and

WHEREAS, in November 2006, 81 percent of Berkeley voters endorsed local ballot Measure G that established a target of reducing Berkeley's community-wide emissions by 80 percent by 2050 and directed the Mayor to develop a plan for achieving that target; and

WHEREAS, City staff developed the Berkeley Climate Action Plan through an extensive community process that enabled widespread community input and engagement; and

WHEREAS, the Berkeley Climate Action Plan contains specific and prioritized strategies for aggressively reducing local greenhouse gas emissions; and

WHEREAS, development and implementation of the Berkeley Climate Action Plan has the potential to positively affect climate policy at all levels of government.

NOW THEREFORE, BE IT RESOLVED that the Berkeley City Council hereby adopts the proposed Negative Declaration for the Climate Action Plan and adopts the Berkeley Climate Action Plan.

The foregoing Resolution was adopted by the Berkeley City Council on June 2, 2009 by the following vote:

Ayes: Anderson, Arreguin, Capitelli, Maio, Moore, Wengraf, Worthington, Wozniak and Bates.

Noes: None.

Absent: None.

Tom Bates, Mayor

Attest:

Deanna Despain, CMC, City Clerk

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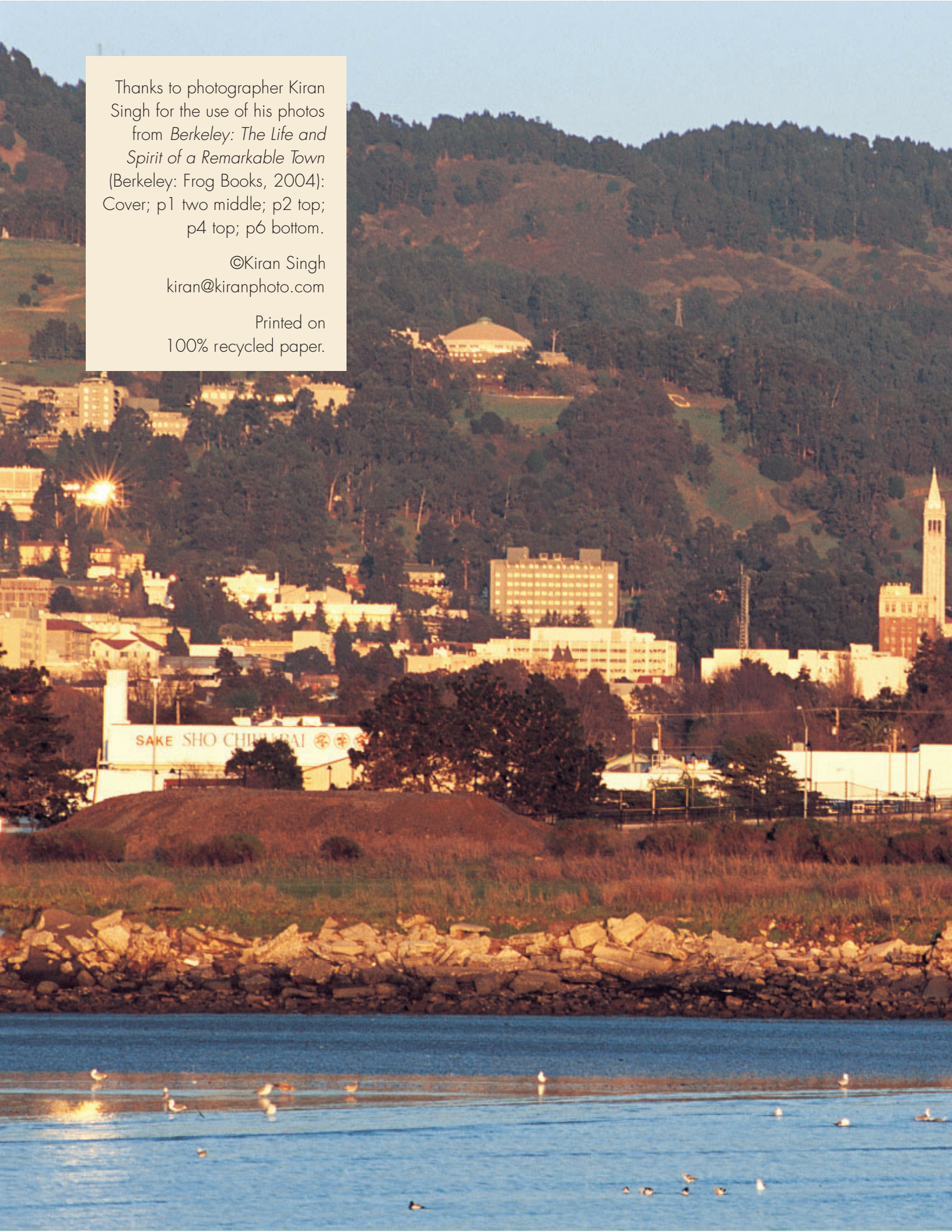

Thanks to photographer Kiran Singh for the use of his photos from *Berkeley: The Life and Spirit of a Remarkable Town* (Berkeley: Frog Books, 2004): Cover; p1 two middle; p2 top; p4 top; p6 bottom.

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