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,[46] if heat-trapping emissions continue unabated, the Sierra Nevada spring snow-pack could shrink by 90 percent 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?

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

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

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 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. <u>Policy</u>: 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

<u>Implementing Actions:</u>

- *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. <u>Policy</u>: 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.

<u>Implementing Actions:</u>

- *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. <u>Policy</u>: In preparation for more extreme heat events, partner with local, regional, and state agencies to 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.

<u>Implementing Actions:</u>

- *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.

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