



Union of
Concerned
Scientists

Preparing for Climate Change Impacts in Los Angeles

Strategies and Solutions for Protecting Local Communities

THE CLIMATE IS CHANGING and the effects are apparent all over California. Higher temperatures, more extreme wildfires, and rising sea levels are some of the most significant impacts already affecting California; these changes—at least partly due to global warming—could have devastating effects on the regional economy, urban infrastructure, public health, recreation, tourism, agriculture, and the environment.

Burning oil and gas and clearing forests are overloading Earth's atmosphere with carbon dioxide and other heat-trapping gases that act like an extra blanket warming the planet. The latest research projects the Los Angeles region to be 3°F to 4°F warmer by mid-century (UCLA 2012), creating more frequent and intense heat waves that pose particular risk to Los Angeles's most vulnerable communities. While some amount of warming in the next few decades is already locked in as a result of past emissions, the choices society makes *today* will determine how much hotter it becomes in the second half of the century.

California historically has been a pioneer in addressing global warming, with leading researchers from the state's universities and research labs providing the science on climate change and state officials taking policy action to reduce carbon emissions. The state's successes over the years have set an example for other states and the federal government to follow. With the effects of global warming already starting to be felt, however, Los Angeles and other California communities must now make an additional choice: how to best prepare for, and protect against, the changes that cannot be avoided.



Local and Statewide Vulnerabilities

Extreme Heat

More frequent extreme heat days (defined in Los Angeles as days with daytime maximum temperatures above 92°F) present the greatest potential health threat (see Figure 1, p. 2). High temperatures can lead to dehydration, heat exhaustion, and even deadly heat stroke. Very hot weather

can also aggravate existing medical conditions, such as diabetes, respiratory disease, kidney disease, and heart disease. New research has found Los Angeles County has the largest number of residents in the state who will be exposed to extreme heat and be at greatest risk of heat-related health problems due to factors

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such as other preexisting health conditions, lack of air conditioning, or working outdoors in unshaded areas (City of Los Angeles 2012; Pacific Institute 2012).

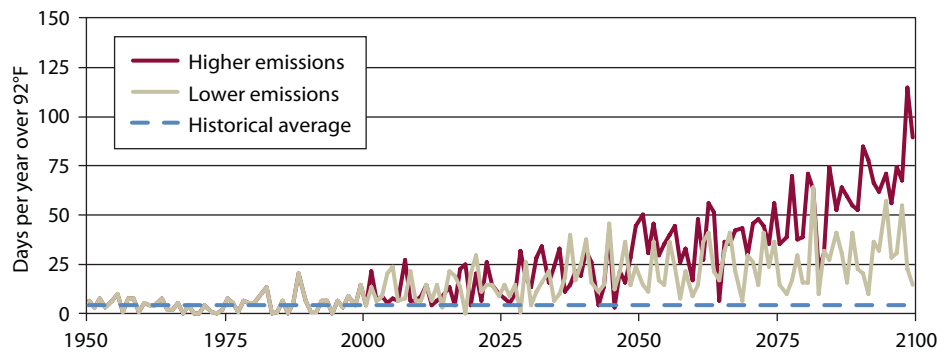
Preparation and protection strategies:

Communities can reduce the risks associated with extreme heat by improving heat-health warning systems, planting more shade trees in urban areas, identifying and checking on residents that are most vulnerable to heat-related illness, and providing public cooling centers.

Air Pollution

While much improved in recent years, Los Angeles still suffers from some of the worst air pollution in the nation, and our warming climate will make it more challenging to improve or even maintain air quality in the region. For example, warming temperatures increase concentrations of ground-level ozone, an ingredient in smog, which is formed when nitrogen oxides and volatile organic compounds react in the presence of heat and sunlight. Those reactive compounds are produced by vehicles and power plants that burn fossil fuels as well as by the manufacturing and use of paints and solvents. Climate change-induced ozone increases in California could result in nearly

FIGURE 1: Number of Extreme Heat Days per Year for Downtown Los Angeles



Under the higher-emissions scenario (i.e., with emissions increasing at current rates), Los Angeles could experience 21 days per summer with highs above 92°F between 2020 and 2060, and 59 such days between 2070 and 2099—more than 14 times the historical average. Under the lower-emissions scenario, the number of dangerously hot days would be up to 50 percent lower (CNAP/CCCC n.d.). Heat projections for other California communities can be found online at <http://cal-adapt.org/temperature/heat>.

443,000 additional cases of serious respiratory illnesses. These and other ozone-related health impacts could cost more than \$729 million (in 2008 dollars) in 2020 alone (UCS 2011).

Particulate pollution is also a significant problem for Los Angeles; combustion of fuels in cars, trucks, trains, and ships emits tiny particles of hydrocarbons, metals, and other toxics that, when inhaled, can cause serious health problems. Particulate pollution is projected to worsen as wildfires—which generate large amounts of smoke and ash—become

more frequent and intense (Pacific Institute 2012).

Preparation and protection strategies:

Air quality officials should adjust their regional plans to account for additional ground level ozone and particulate matter, and strengthen policies that reduce emissions from cars, trucks, and other mobile sources.

Water Shortages

Most of California's precipitation falls in the northern part of the state during the winter while the greatest demand for water comes from users in the southern part of the state during the spring and summer. As temperatures rise, more winter precipitation is projected to fall as rain instead of snow, and the snow that does fall will melt earlier. Thus, California communities relying on Sierra Nevada snowmelt for water supply face significant challenges: if heat-trapping emissions continue unabated, the Sierra Nevada spring snowpack could decrease by as much as 32 to 79 percent (Cayan et al. 2008). In addition, sea level rise threatens aging coastal water supply infrastructure and levees in the Sacramento-San Joaquin Delta.



Extreme heat, ground-level ozone, and particulate pollution will all increase in a warming world, making outdoor workers, people with respiratory problems, and those who lack air conditioning more vulnerable to illness.

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Preparation and protection strategies:

The Los Angeles Department of Water and Power is already taking into account potential supply disruptions from its major water sources in future planning discussions (LADWP 2010). Strengthening water conservation measures—such as climate-appropriate landscaping, rain gardens, improving water use efficiency in households and agriculture, and improving water infiltration into the soil through permeable surfaces—also helps (Ekstrom and Moser 2012).

Electricity Disruptions

California’s electricity system faces multiple challenges in a warming world. Higher temperatures are projected to increase electricity demand, mostly due to greater use of air conditioning in homes and businesses. At the same time, the potential for reduced snowpack and earlier spring melt is projected to reduce electricity supply from the state’s high-elevation hydropower reservoirs in the summer when electricity demand is highest. Compounding these problems is the fact that much of the state’s critical electricity infrastructure—including transmission lines bringing power to metropolitan Los Angeles—is located in areas that are projected to be more vulnerable to damage from wildfires (see Figure 2).

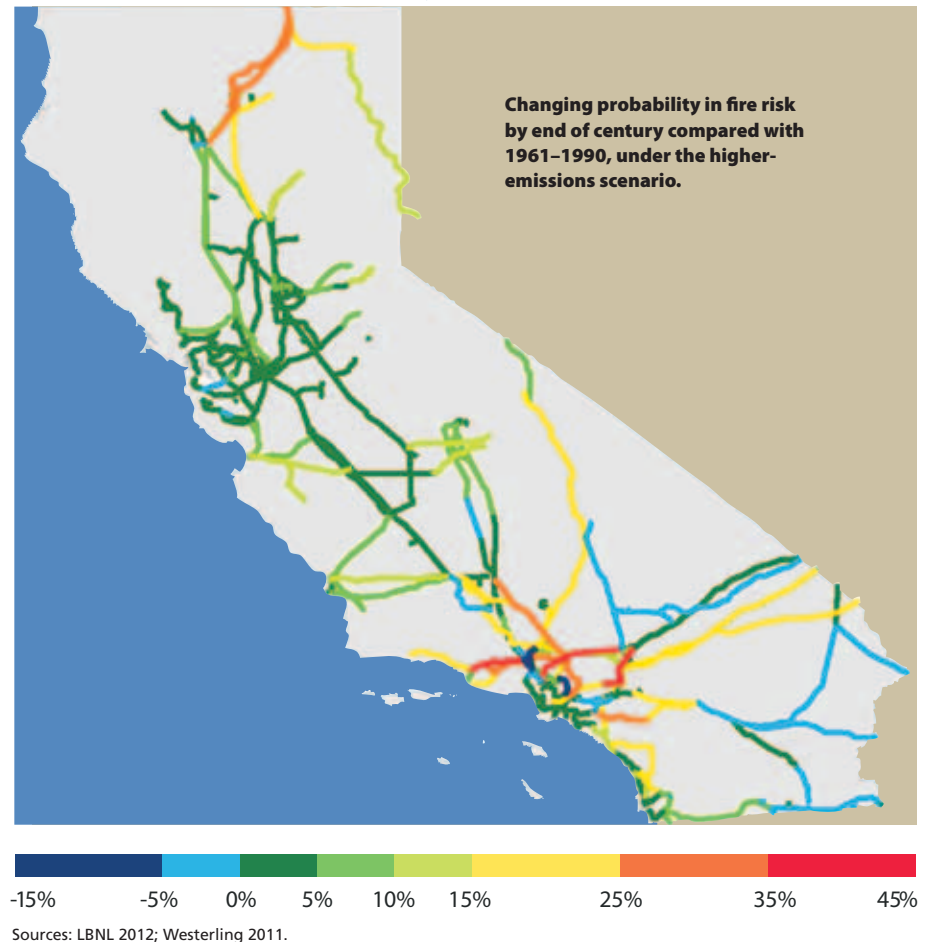
Preparation and protection strategies:

Introducing more locally produced and distributed sources of electricity, such as wind and solar power, can reduce the risk of supply disruptions. These renewable resources also generate far less air pollution compared with fossil fuel-fired power plants, and because they generate no carbon emissions during operation they can help reduce global warming overall. Fire officials are adjusting fire management plans based on the expected need to battle more frequent and more intense wildfires during longer fire seasons.

Sea Level Rise

California’s coastal communities are home to about 32 million people and contribute billions of dollars in revenue

FIGURE 2: Wildfire Risk to Electricity Transmission Lines



Transmission lines bringing power to metropolitan Los Angeles are located in areas that are projected to be more vulnerable to damage from wildfires.

related to industry, shipping, and tourism. Sea level along the state’s coast has already risen about seven inches in the last century (1900–2000), and could rise an additional 10 to 18 inches by 2050. Higher sea levels will compound the effects of coastal storms, increasing the chances for coastal flooding. Studies indicate that extreme weather and flooding conditions that pose major threats to our coast will be more common—for example, today’s “100-year flood” could become an annual event as early as 2050.

Preparation and protection strategies:

Port authorities are beginning to make

use of sea level projections in decisions regarding future infrastructure placement or upgrades. Mapping sea level rise with greater precision can highlight specific risks such as coastal storm flooding or damage to roads needed by first responders and citizens during flooding emergencies. Updating hazard mitigation plans, improving disaster preparedness, flood-proofing homes, restoring coastal wetlands, replenishing beaches, and rethinking long-term land use plans in light of physical threats to the coast and differences in social, economic and infrastructure vulnerabilities can help decision makers prioritize action.

Working Together for a Safer Climate Future

Over the years, California has developed plans that keep residents prepared for earthquakes, terrorism, infectious diseases, and other dangers. Today, the state must also prepare for climate change impacts that can no longer be avoided. A number of communities have already made progress in developing preparation plans and policies (Finzi Hart et al. 2012); state officials have produced the California Adaptation Planning Guide as a resource to help local governments and regional community coalitions with these efforts (State of California 2012).

But at the same time, we can—and must—redouble our efforts to minimize the risks of future warming by taking more action to reduce heat-trapping emissions. The biggest challenge in achieving this goal—in California and across the country—is the unrelenting effort of polluting industries to maintain the status quo. The Union of Concerned Scientists recommends that policy makers not only eschew these calls for delay, but also push for strong, science-based policies that bring the steep, swift emissions cuts we need. The economic and public health costs of inaction are too high—for both current and future generations of Californians—to wait any longer.

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heat-trapping emissions.**



California policy makers should push for strong, science-based solutions that will bring the steep, swift emissions cuts we need to avoid the worst consequences of climate change.

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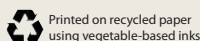
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Citizens and Scientists for Environmental Solutions



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Union of Concerned Scientists

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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This fact sheet draws largely from data presented in the state's third major assessment on climate change (California Climate Change Center 2012). For more information on California's changing climate, or to download an electronic version of this fact sheet, visit www.ucsusa.org/CA-climate-prepared.