

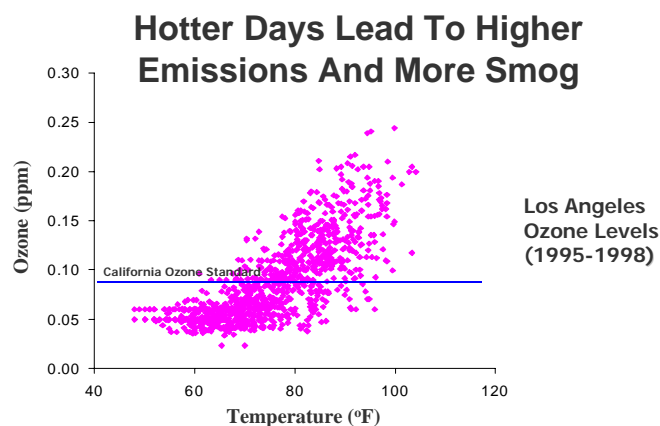
FACT SHEET (updated 7/2007)
**Air Quality and Health Impacts of Greenhouse Gas Emissions
 and Global Warming**

Global warming is well recognized by scientists around the world as a serious public health and environmental concern. As atmospheric concentrations of greenhouse gases rise globally, temperatures on earth are increasing. While the greenhouse effect has been beneficial to maintain global temperatures compatible to human life, recent increases in average temperatures due to human activities are causing great alarm. Hotter temperatures due to global warming are expected to lead to increased weather extremes including heat waves, and increase the difficulty of attaining air quality standards.

How Does Global Warming Affect Air Quality?

Californians already experience the worst air quality in the nation, with more than 95 percent of Californians living in areas with unhealthy air according to the California Air Resources Board. Over 100 days were recorded as unhealthy for ozone pollution in 2004 (based on California's own health-based air quality standards) in the South Coast Air Basin and the San Joaquin Valley, and some years experience even more unhealthy days. Unfortunately, global warming is expected to slow progress toward attainment of clean air goals -- by increasing levels of emissions, by accelerating the chemical processes that generates smog, and by increasing summertime stagnation episodes where hot air idles for days at a time.

Hotter Days Facilitate Ozone Formation: Higher temperatures, strong sunlight and a stable air mass are ideal for formation of ground- level ozone. Ozone (O₃) is an extremely reactive gas that essentially attacks lung tissue by reacting chemically with it. It is the primary ingredient of smog and very harmful to breathe. U.S. EPA and state studies designed to examine the impacts of increased temperatures from global warming have determined that global warming will likely lead to an increase in peak ozone levels. A recent State-sponsored analysis of public health impacts of global warming found that higher temperatures could dramatically increase the number of days favorable to ozone formation. The analysis found the number of days conducive to ozone formation could increase 75%-85% in the high ozone areas of Los Angeles and the San Joaquin Valley by the end of the century under a medium-high emissions scenario.



Hotter Days Lead To More Smog Emissions: Hotter summer weather leads to increased emissions of ozone precursors, particulate matter and toxic air contaminants from increased energy production, electricity use, fuel evaporation and other sources. During hot summer days, air conditioners are utilized more frequently, leading to increased demand for electric power production and an associated increase in smog-forming pollutants, such as nitrogen oxide (NO_x) emissions (3% increase per degree Fahrenheit). One study suggested that California would need at least 10% more electricity on peak demand summer days in 2100 for air conditioning alone.

Heat Waves And Public Health: The heat waves in Europe during summer 2003 provide a case study of heat-related impacts on public health. Temperatures were the hottest on record and 18 degrees Fahrenheit above the 30-year average. These extreme temperatures resulted in 23,000 excess deaths in six Western European countries. Studies in England, Wales and the Netherlands suggest that 20-40% of these deaths can be attributed to increased ozone and particle levels.

What are the Health Effects of Air Pollution?

According to the California Air Resources Board the annual health impacts of exceeding state health-based standards for ozone and particulate matter include:

- 8,800 premature deaths
- 6,100 hospital admissions for respiratory disease
- 1,500 hospital admissions for cardiovascular disease
- 210,000 cases of asthma and lower respiratory symptoms
- 4.7 million school absences due to respiratory conditions, including asthma
- Reduced lung function growth rate in children

Recent research has indicated that the number of premature deaths may actually be higher than these levels. Sensitive groups, including seniors, people with heart or lung disease, children and infants are the most vulnerable to the harmful effects of air pollution. Low-income communities and communities of color may also have a higher risk of pollution-related health impacts due to the multiple pollution sources located in these communities and their often limited access to health care.

California Actions To Curb Greenhouse Gas Emissions Will:

Help Slow The Pace of Global Warming: Actions to curb greenhouse gas generation are critically needed now. The American Lung Association of California is playing an active role in the implementation of AB 32, landmark legislation passed in 2006 that establishes a statewide cap on greenhouse gas emissions in California. AB 32 addresses global warming that is expected to worsen smog and smog related health impacts, including asthma attacks, hospitalizations and emergency room visits for lung illnesses and premature deaths. Under AB 32, the California Air Resources Board is responsible for tracking emissions of greenhouse gases, developing a plan to achieve a 25 percent reduction by 2020 and adopting the various regulations that will drive California toward meeting the goals of the legislation. In addition to AB 32 implementation, the lung association will support efforts to establish a “low carbon fuel standard” that limits the greenhouse gas equivalent emissions from transportation fuels and fosters the development and usage of alternative fuels. The lung association will continue participating in the ongoing work of the Global Warming Action Coalition to guide implementation of the new law and to continue its leadership role in organizing health organizations in support of strong global warming regulatory efforts to reduce related lung health impacts.

Reduce -Fuel Related -Emissions: Actions to control greenhouse gases from vehicles will reduce direct emissions of criteria and toxic pollutants emitted from the transportation sector. An important byproduct of California's motor vehicle greenhouse gas regulations (adopted pursuant to AB 1493) will be reduced pollution emissions from the transportation, delivery and sale of gasoline (called "upstream emissions") due to reduced petroleum use. Upstream emissions are a significant portion of vehicle emissions that contribute to unhealthy air, and can be expected to account for up to 25% of vehicle-related emissions by 2020. Given California's extreme air quality situation, all feasible emission reductions, including upstream emission reductions from the petroleum fuel cycle, are needed to make progress toward improved air quality.

Promote The Drive Toward Cleaner Technologies: California's actions to control greenhouse gases from motor vehicles and other sources will encourage continued development of alternative fuels and cleaner advanced technologies such as those powered by natural gas, electricity and fuel cells.

Resources For More Information:

American Lung Association of California Position Statement, Air Quality and Health Impacts of Greenhouse Gases and Global Warming, Approved June 5, 2004

<http://www.californialung.org/press/GHGGlobalWarmingPosStmnt60504pdf.pdf>

California Climate Change Center: Possible Scenarios of Climate Change in California: Summary and Recommendations, December 2005

<http://www.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SD.PDF>

Franco, G. and A. Sanstad, "Electricity Demand and Climate Change in California", California Climate Change Center, February 2006. www.energy.ca.gov/2005publications/CEC-500-2005-201/CEC-500-2005-201-SF.PDF

IPCC (Intergovernmental Panel on Climate Change), 2001. Climate Change 2001: The Scientific Basis. Working Group I of the IPCC, World Meteorological Organization-U.N. Environment Program, Geneva, Switzerland, www.ipcc.ch

Jerrett, M., et al., November 2005, "Spatial Analysis of Air Pollution and Mortality in Los Angeles". *Epidemiology*, Vol. 16, No. 6

Morris, M. Gery, M. Liu, G. Moore, C. Daly, and S. Greenfield. 1989. Sensitivity of a regional oxidant model to variations in climate parameters. In *The Potential Effects of Global Climate Change on the United States*, app. F, Air Quality. Washington, DC: U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation

National Assessment Synthesis Team, *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. US Global Change Research Program, Washington DD, 2000, www.uwgcrp.gov

National Research Council of the National Academies, 2001. *Climate Change Science: An Analysis of Some Key Questions*. National Academy Press, Washington DC, www.nap.edu

Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution
(California Air Resources Board and American Lung Association of California) November 2007
<http://www.californialung.org>

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