

UNION OF CONCERNED SCIENTISTS

26 Church Street • Cambridge, Massachusetts 02238 • (617) 547-5552

September 1988

Dear Sponsor:

This is the hottest year in recorded history.

Across the globe, weather stations have been measuring temperatures that, day after day and place after place, have been hotter than ever before.

And the heat of 1988 does not seem to be a simple fluke. Five of the ten hottest years on record have occurred in the past decade.

From the Alps to Alaska, glaciers are shrinking.

From the Sahara to the Gobi, deserts are advancing.

From the Midwest to Ethiopia, drought is devastating agriculture.

And from the Louisiana bayous to the canals of Venice, the seas are steadily encroaching upon the land.

Scientists cannot yet be positive that these phenomena are the result of steadily increasing temperatures, but they are certainly consistent with the disastrous climatic changes projected from a phenomenon called the "greenhouse effect."

It is probably too late to stop some of the predicted climatic changes, because we have already polluted our atmosphere to an appalling degree.

But it is not too late to prevent the worst disasters -- if we act very, very quickly.

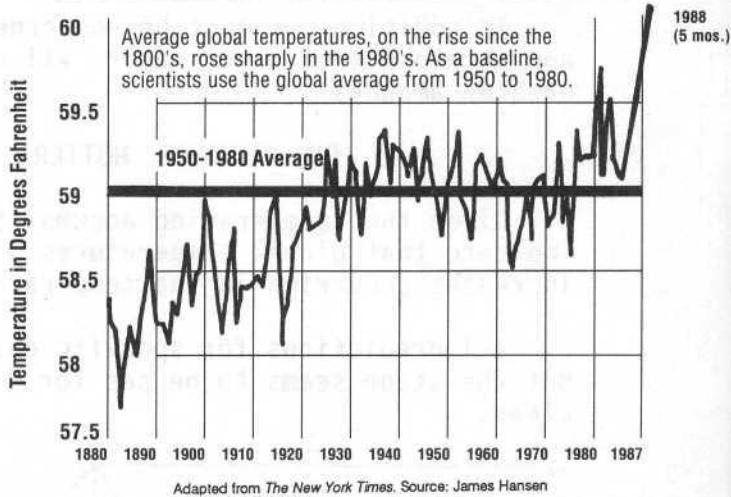
THE GREENHOUSE CRISIS

The trend of global warming that is emerging in the eighties is believed by many scientists to be the result of this greenhouse effect. First described nearly a century ago, it has been the subject of much scientific discussion.

Today the evidence is mounting that the beginning of a **greenhouse crisis** may be upon us -- a period of unparalleled global temperature increases caused by the accumulation of unnaturally high levels of certain gases in our atmosphere.

These gases trap the heat of the sun, keeping the earth warm in much the same way that a glass greenhouse protects plants. But if the gases become too

Record Warmth in the 1980's



Adapted from *The New York Times*. Source: James Hansen and Sergej Lebedeff

concentrated, too much heat will be trapped, causing the temperature to rise.

Various gases are causing the greenhouse crisis, among which carbon dioxide (CO_2) is the most common. For millions of years, the level of carbon dioxide was fairly constant, balanced in a smoothly running biological and geological cycle.

For the past century, however, the use of coal, oil, natural gas, and gasoline by industrial civilization has pumped CO_2 into the atmosphere at ever higher rates. At the same time, we have destroyed vast forests that once absorbed CO_2 and gave off the oxygen needed for life.

The result has been an accelerating climb in the levels of carbon dioxide in our atmosphere.

And now the effects of other greenhouse gases have begun to rival those of CO_2 . Since these other gases trap much more heat per molecule, a continuing increase in their levels in the atmosphere could be devastating.

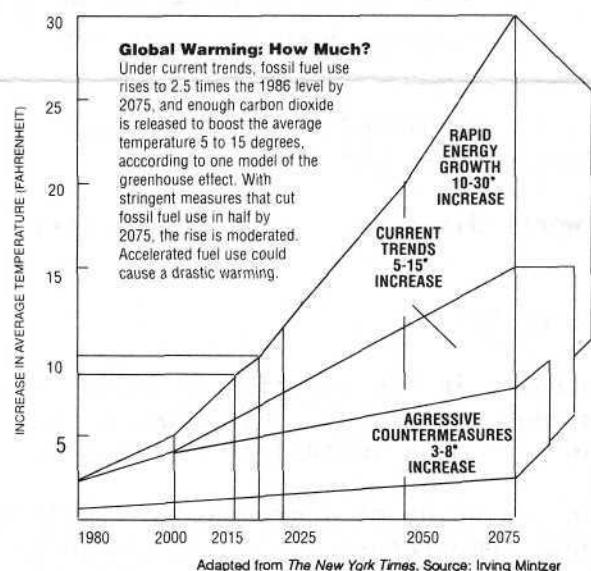
These gases include the chlorofluorocarbons (CFC's) used in foam packaging, insulation, refrigerators, air conditioners, and elsewhere. CFC's are also destroying the high-altitude ozone layer, the loss of which could lead directly to increasing rates of skin cancer and worldwide damage to animal and plant life.

In addition, we must be concerned about methane (CH_4), nitrous oxide (N_2O), and stratospheric water vapor, all of which are being detected in greater and greater amounts.

OUR CLIMATE: HOTTER, MORE UNCERTAIN, MORE UNSTABLE

Given the accelerating accumulation of these gases, most projections indicate that global temperatures will rise steadily, with the greatest increases occurring in the temperate and polar regions.

All predictions for specific changes in our climate are extremely uncertain. But the stage seems to be set for disaster, even if the details are not yet clear.



For the U.S., the worst-case predictions are that, in twenty-five years, Boston could regularly experience temperatures like those of the nation's capital; Washington could have weather similar to today's Houston; and Houston could have a climate, perhaps, like that of the Amazon delta. Other projections indicate changes of the same magnitude, but occurring over a longer period of time.

While people living in the northern U.S. might dream of warmer winters, many animals and plants will be unable to adapt, and entire species may disappear. Rapid temperature increases could also mean catastrophic consequences for agriculture and the forest industry.

And, if the projections of the greenhouse experts come true, weather can be expected to change in ways beyond the range of our experience, bringing extreme abnormalities of heat, cold, drought, and flood.

Computer models project a drying effect for continental interiors, so the deserts of Arizona might someday stretch into the farm belt of Nebraska and Kansas. While it cannot yet be determined if the recent droughts of the Plains, Midwest, and inland South are the result of global warming, they certainly are in line with the predictions.

For coastal areas, many projections show increasing hurricanes and winter storms that would produce devastating blizzards, floods, and storm surges.

And some believe that the temperature changes could divert the Gulf Stream, which now moderates Europe's climate, bringing on a catastrophic chill, even as the rest of the world bakes. London, which is at the same latitude as Labrador, could become a snowy city with disastrous winters and cold summers.

THE OCEANS RISE UP

But that may be the least of London's worries. It sits on the Thames River estuary, whose tides, even now, must be controlled by a multi-billion-dollar dam. So London is threatened by another consequence of the greenhouse effect: the rise of the oceans.

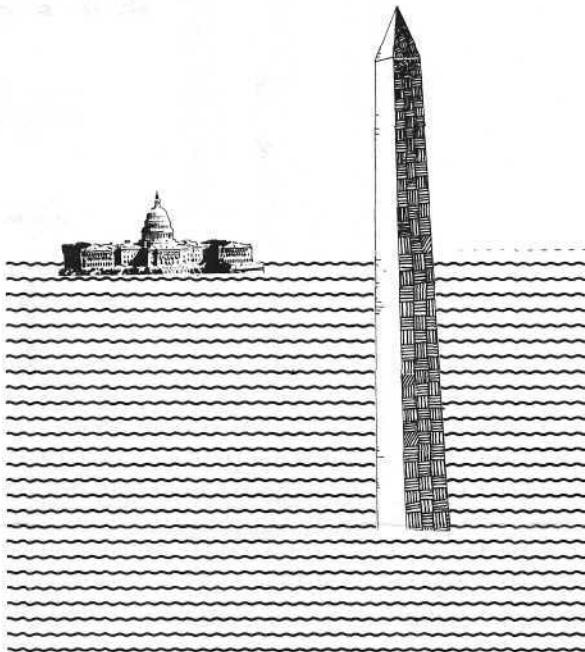
If global temperatures rise according to the greenhouse projections, the effects will be doubled or tripled in polar regions. Vast quantities of ice and snow would melt, raising the levels of the oceans.

It is difficult to predict how much polar warming will take place, even harder to estimate how much melting will occur, and thus very hard to calculate exactly how much the seas will rise.

But any significant increase may make necessary the choice between evacuating parts of such sea-level cities as London, Tokyo, and Washington or spending vast sums of money to protect them.

Some estimates predict rises of three feet in the next century -- enough to destroy our barrier islands and force the construction of huge seawalls and tidal dams.

And others have projected that, over a longer period of time, a partial loss of the ice caps of Antarctica and Greenland, equal to that experienced in the most recent interglacial period, would raise the sea level by ten to twenty-four feet.



DEALING WITH THE GREENHOUSE CRISIS

UCS believes that the worst problems of the greenhouse crisis can be avoided, but only if we begin to act now. We cannot afford to wait if we are to prevent the most catastrophic of the consequences.

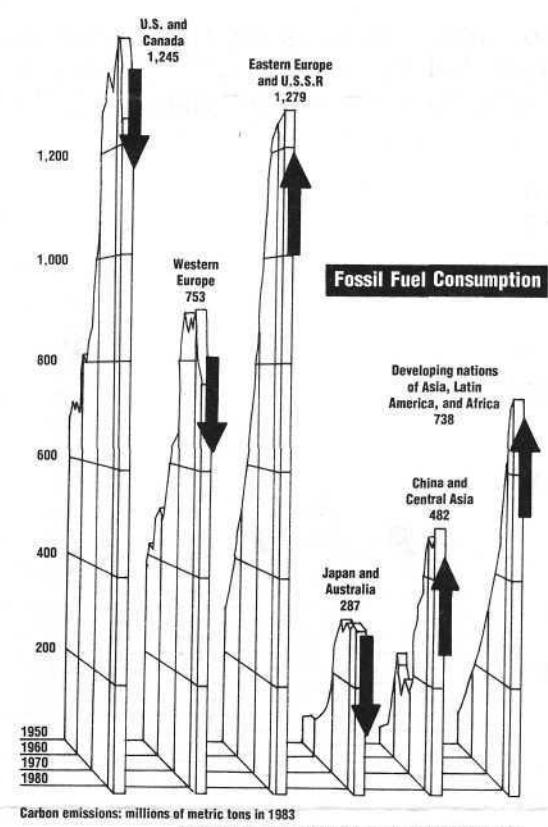
The most important cause of the greenhouse crisis is the use of fossil fuels to produce energy. That is because the consumption of coal, oil, and gas to generate electricity and for transportation is the major source of

carbon dioxide emissions.

For twenty years, UCS has been pushing for the adoption of an intelligent national energy policy -- for a switch toward renewable sources of energy, for improved efficiency of energy use, for more control of environmental and health effects, and for reducing the risks of nuclear power reactors.

Progress on these issues was being made during the energy crisis of the seventies, but the Reagan administration killed or gutted every program that had been created. And the oil glut of the eighties made it difficult to rally the forces needed to reinstate vitally needed, long-term policies.

With the mounting evidence of a greenhouse crisis and the coming of a new President, however, we are hopeful that it will soon become possible to make rapid progress on altering the way our nation produces and uses energy.



further action is shown by the fact that major industrialized countries like Japan and West Germany have achieved a high standard of living while using only half as much energy per person as we do.

ENERGY SOURCES FOR THE NEXT CENTURY

UCS believes that, over the coming decades, we can make major changes in the way in which we use and produce energy -- beneficial changes that will gradually, but steadily, reduce the emissions of carbon dioxide and other greenhouse gases.

Over the short term, we should concentrate on energy efficiency. New technologies to provide more efficient lighting, appliances, heating, cooling, and industrial motors are abundant. Automobiles that can achieve forty, fifty, or more miles per gallon are close at hand. What is needed are the financial incentives and regulatory programs that will dramatically accelerate the speed with which these technologies become more widely used.

At the international Conference on the Changing Atmosphere recently held in Toronto, policymakers and scientists met to discuss the issues of atmospheric pollution and the greenhouse crisis. They called for a cut of fifty percent or more in the global release of carbon dioxide, with an initial goal of a twenty percent cut by 2005.

UCS believes that the U.S. can -- and should -- take the lead in achieving these goals by making substantial reductions in its fossil-fuel emissions, especially since the U.S. is now responsible for much more pollution than would be expected from its share of world population.

By concentrating on energy efficiency, using technologies already available and supplementing them with new ones to be developed, we can reduce energy consumption, yet still maintain a growing and prosperous society.

Already, over the past fifteen years, we have improved energy efficiency by about forty percent. That there is much room for

On the supply side, we also must begin a shift to cleaner-burning fuels, such as natural gas, which emits less carbon dioxide than coal when burned in a power plant. Cogeneration -- producing both heat and electricity from the same source -- can help to lessen CO₂ emissions by reducing the amount of fuel that is burned overall.

Over the long term, the most important step is to make the transition to renewable energy sources. Photovoltaics, a technology that converts sunlight directly into electricity, is already economically practical for remote areas and may hold the most promise for widespread commercial viability. Other solar and wind technologies should be fully exploited as well.

And UCS believes that there may be a role for nuclear power, despite its sorry history of poor management, poor regulation, and poor design.

Today, we see promise in the research on a new generation of "inherently safe" nuclear reactors, smaller plants designed so that an accident in which all cooling and control systems are lost would still pose no danger to the public.

The nuclear industry has not embraced these new technologies because it has so much invested in larger plants and older systems. They have continued to believe their own press releases that the current generation of nuclear reactors is "safe enough." And they thought they could outlast public opposition and expert criticism. But it has now been a decade since the last order for a nuclear plant was placed, and such thinking is beginning to change.

To regain the confidence of the public, the nuclear industry will have to demonstrate that new technologies will eliminate all major risk to public safety; they will have to solve the problems of radioactive waste; and they will have to accept intelligent and comprehensive regulation. Only then can nuclear power be a part of the solution to the greenhouse crisis.

Thus, with increased efficiency and new sources of energy, we can move away from fossil fuels in a rapid, but safe and deliberate, manner. However, this movement will require a major effort, political courage, and an immediate start.

THE ROLE OF UCS

The battle against the greenhouse crisis must be fought on many fronts. UCS will concentrate our efforts on the energy part of the solution and, in particular, the role of the United States.

We will also work closely with organizations that are tackling other aspects of the problem. For instance, the solution to the deforestation problem lies in the tropical woodland conservation efforts being undertaken by a number of groups.

In addition, organizations specializing in environmental problems are working on the solutions for reducing the greenhouse gases that are derived from the production of industrial chemicals. The pattern for such control has been set by an international agreement on CFC's, finalized last fall in Montreal, although this needs to be strengthened and greatly extended.

In and of itself, the UCS portion of the task will be enormous.

We must reach the American people with basic information about the greenhouse crisis. We must undertake new studies of energy efficiency and alternatives. We must mobilize the scientific community to participate actively in educational and legislative programs. We must examine the potential for a

new generation of "inherently safe" nuclear reactors, even while working to prevent the industry from using the greenhouse issue to frighten the public and to impose unsafe forms of nuclear power.

And we must expand our efforts in Congress. While maintaining our arms control lobbying, we must redouble our activities on behalf of an intelligent national energy program. Expanded funding for research and development of alternative sources of energy and strengthened regulatory programs to scale back fossil-fuel emissions will be absolutely essential.

But, convincing policymakers of the urgency of the issue will not be easy.

Fortunately, we bring many important assets to this new battle. Our research enjoys a solid record of high credibility and objective analysis. Our legislative staff is ranked second to none in effectiveness. Our public education activities range from the creation of brief brochures and major books to videotapes and prime-time television programs.

HOW YOU CAN HELP FIGHT THE GREENHOUSE CRISIS

We have these strengths and this tremendous record of accomplishment because you have supported our work in the past. Now, with the greenhouse crisis rapidly approaching, I am asking for your help again.

First, you need to become familiar with some of the issues involved in the greenhouse crisis so that you can spread the word to your friends and neighbors, to help them understand that the strange weather we are experiencing may not just be the result of natural swings in temperature and precipitation.

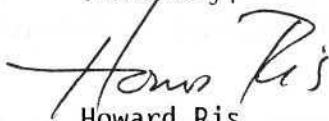
Second, you can help by letting your elected representatives know that you are concerned about the greenhouse crisis and that you want the U.S. to take the lead in cutting our emissions of carbon dioxide and the other greenhouse gases.

Finally, we need your financial support.

UCS is effective and independent because we are supported by thousands of individual donors all across the nation. Almost all of our work is paid for by contributions from people like you who believe in what we are trying to accomplish.

UCS can make a profound impact on the greenhouse crisis and create a better future for our children and grandchildren, but only if you continue your generosity by making a tax-deductible donation. Thank you.

Sincerely,



Howard Ris
Executive Director

P.S. As the Toronto conference statement said, "Humanity is conducting an uncontrolled and globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war." We must have your help today.