Why Worry About Global Warming?

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NCPA Policy Report No. 157
February 1991
ISBN #0-943802-60-1

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Executive Summary

For years, the most extreme global warming alarmists have warned that a significant increase in average temperatures would cause ecological disaster. Some have suggested that palm trees would grow in Canada, tropical rain forests would become deserts, the ice caps would melt, coastal regions would be flooded, major crop-growing regions of the world would experience recurrent droughts, and hurricanes would become more frequent and destructive. Today, many of those scientists are taking a second look:

- Whereas in 1988 global warming theorists were predicting a temperature rise (from doubled carbon dioxide in the atmosphere) of between 4.5 and 6.0 degrees Celcius, the most likely projection now is 1.5 degrees; and the respected Max Planck Institute is predicting only 0.7 degrees.

- Whereas the climate modelers in 1980 were forecasting an increase in sea levels of 30 feet, that forecast fell to three to five feet by 1988, and the current forecast is only 12 inches.

- New evidence shows that the polar ice caps are growing, not melting; and almost all the warming at the poles is occurring during the polar winters, when no melting can occur.

- New research on hurricanes shows they are not produced by global warming and, if anything, warmer temperatures make hurricanes less severe.

- Most of the warming so far has occurred at night, reducing the number of frosts and increasing the growing season for farmers — 1990, one of the warmest years in recent history, was also a record year for crops.

Moreover, scientists who take the longer view argue that the real threat we face is not warming but cooling:

- In the past two to three million years, the earth's temperature has gone through at least 17 climate cycles, with ice ages lasting about 100,000 years interrupted by warm periods lasting about 10,000 years.

- Since the current warm period is about 13,000 years old, the next ice age is long overdue.

- During the coldest period of the last ice age, about 25,000 years ago, most of the northern United States was completely covered by ice.

Similarly, scientists who take the longer view know that the amount of carbon dioxide ($C0_2$) in the atmosphere is at historic lows, and that the real threat is not too much $C0_2$ but too little:

- Although $C0_2$ levels in the atmosphere have gone through cycles over time, a long-term secular decline in $C0_2$ has been going on throughout the 4.5 billion year history of the earth. If this trend continues, eventually our planet will become as lifeless as Mars.

- When dinosaurs walked the earth (about 70 to 130 million years ago), there was from five to ten times as much $C0_2$ in the atmosphere as there is today, and the average temperature was from 5°C to 10°C warmer.

- Those conditions must have been extremely life-enhancing, since they permitted the huge creatures to find plenty of food and survive.

- The Darwinian ancestors of the earth's plants evolved at a time when there was so much abundant, plant-life-enhancing $C0_2$ that some scientists fear today's plants are literally starving from $C0_2$ deprivation.

Nature puts more than 20 times more $C0_2$ into the atmosphere than humans do. But nature's contribution has been declining. One way to view man's contribution to atmospheric $C0_2$ is to see it as a replacement for nature's stinginess, and some scientists argue that humans need to contribute more, not less.

In the scientific community, the debate over global warming is between those who argue that there will be a large and catastrophic increase in global temperatures and those who believe that any climate change will be quite small, generally beneficial and possibly indistinguishable from normal climate variability. Increasingly, scientists are moving toward the latter position.

If the desire to do something about global warming proves politically irresistible, there are things we can do that are far more sensible than imposing a $5 trillion cost on the world economy through emissions controls. A better way is to rely on nature, which consumes 20 times more carbon dioxide each year than human beings emit. For example:

- U.S. forests may already consume more carbon dioxide each year than the United States emits, and they would consume even more if logging and replanting of trees on federal lands were increased.

- The oceans have consumed 50 times the amount of all human $C0_2$ emissions since 1850, and the ability to artificially increase their consumption may soon become technologically feasible.

We could also increase our use of nuclear energy, stop subsidizing the overuse of electricity through federal programs and encourage the maintenance of rain forests by protecting property rights in land in less-developed countries.

Putting Global Warming in Perspective

Most people who worry about global warming assume that the earth's temperature right now is ecologically ideal and that any significant warming would be harmful, if not disastrous. Scientists who take the longer view know otherwise. The greatest challenge we face is not warming, but cooling[1]:

"The earth has been through 17 climate cycles, with little ice ages lasting 100,000 years interrupted by warm periods lasting 10,000 years."

- In the past two to three million years, the earth's temperature has gone through at least 17 climate cycles, with ice ages typically lasting about 100,000 years interrupted by warm periods lasting about 10,000 years.

- Since by some calculations the current warm period is about 13,000 years old, the next ice age is overdue.[2]

Most people who worry about global warming assume that human use of carbon-based fuels is leading to a harmful buildup of carbon dioxide (CO_2) in the atmosphere. Yet scientists who take the longer view know that, far from being at a historic high, the level of CO_2 in our atmosphere is still near its historic low. Over the long term, the greater danger is too little rather than too much CO_2.

"Since the current warm cycle is 13,000 years old, the next ice age is long overdue."

The Threat of Another Ice Age. For as long as the earth has had an atmosphere and an ocean, its climate has varied substantially over time. Even the normal climate is subject to rapid changes that can exceed the scary predictions causing so much concern today. Over the longer term, environmentally devastating glaciers have dominated the climate of the earth for millions of years, briefly interrupted by warm periods. These cycles are thought to be caused by the "wobbling" of the earth in its orbit, not by changes in CO_2 in the atmosphere.[3] In recent geologic time, the "normal" temperature of the earth is not warm, but very cold. The warm climate that we currently enjoy has existed for only 10 percent of the time over the last two to three million years and only 2 percent of the time for the last 10 to 15 million years.[4]

As recently as the 1970s, many scientists warned of a coming ice age, and with good reason.[5] Although there has been a slight increase in average temperatures during the twentieth century, many regions of the globe have experienced sustained cooling trends.[6]

- The citrus industry in Florida has been devastated by several major freezes in the last decade, and California growers were blasted by record cold in December 1990.

- In fact, the entire globe cooled considerably from about 1940 to 1970, and current temperatures are barely above those of the 1930s.

"About 25,000 years ago, half of North America was completely covered by ice."

All the evidence suggests that warmth is life-enhancing and life-sustaining, whereas cold is life-threatening.

- The earth experienced as much warming between the eleventh and thirteenth centuries as is now being predicted by global warming theorists — with no major ecological disturbance.[7]

- During that period, the Vikings colonized Greenland and built settlements in Canada — settlements which disappeared after the onset of a cooling period which lasted from about 1400 to 1850.

About 25,000 years ago, during the last ice age, half of North America was completely covered by ice. A significantly cooler world would be disastrous for humans as well as plants and animals. For this reason, Soviet climatologist Mikhail Budyko and others argue that we should welcome global warming and even encourage it, if possible. Enhancing the greenhouse effect may contribute to our future survival.[8]

The Long-term Decline in Carbon Dioxide (CO_2). Those who worry that too much CO_2 is being sent into the atmosphere by human use of carbon-based fuels may be surprised to learn that CO_2 levels in the atmosphere have varied radically as life on earth has evolved. Moreover, just as warmth has always been unambiguously good for life, so has CO_2:[9]

"When dinosaurs walked the earth, there was five to ten times more CO_2 and the temperature was 5 to 10 degrees warmer."

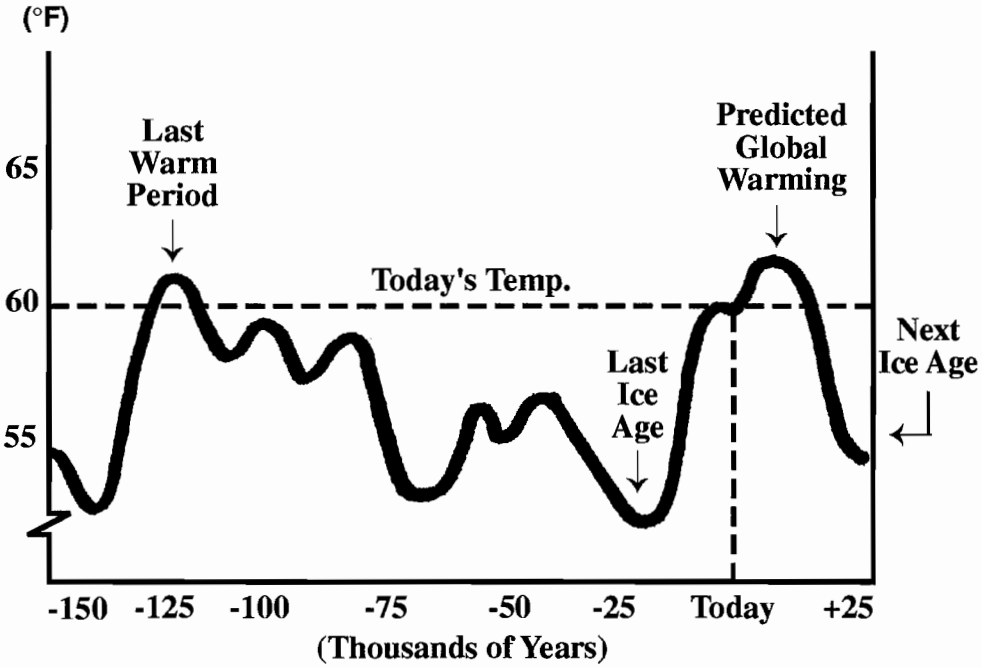
- When dinosaurs walked the earth (about 70 to 130 million years ago), there was from five to ten times as much CO_2 in the atmosphere as there is today, and the average temperature was from 5°C to 10°C warmer.

- Those conditions must have been extremely life-enhancing, since they permitted the huge creatures to find plenty of food and survive — a task that is difficult for our largest land animal, the elephant, today.

"All the evidence suggests that warmth is life-enhancing and life-sustaining, whereas cold is life-threatening."

FIGURE I

Average Global Temperature



Source: Adapted from William K. Stevens, "In the Ebb and Flow of Ancient Glaciers, Clues to a New Ice Age," *New York Times*, January 16, 1990, p. C-1.

- The Darwinian ancestors of the earth's plants evolved at a time when there was so much abundant, plant-life-enhancing CO_2 that some scientists fear today's plants are suffering from CO_2 deprivation.

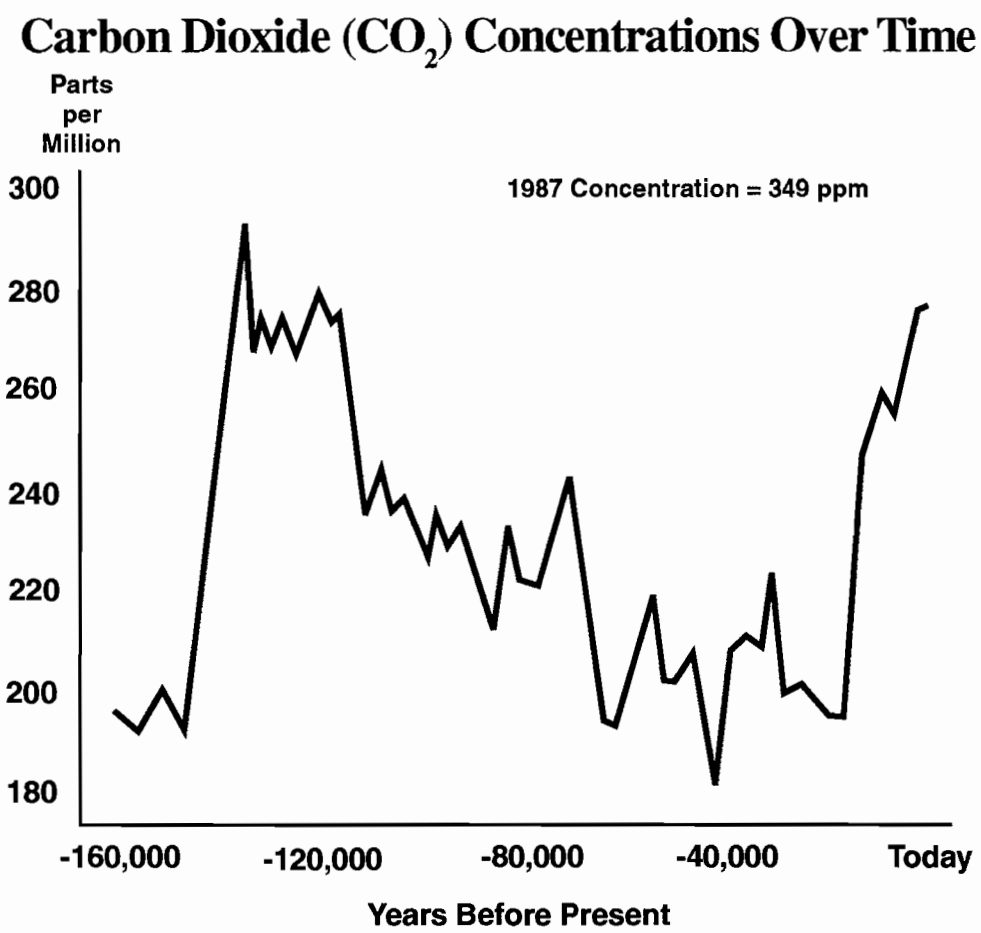
- This may explain why plants thrive when exposed to more CO_2, a phenomenon greenhouse operators have observed for years.

"If the decline in CO_2 continues, eventually earth will become a lifeless planet, like Mars."

Although CO_2 levels in the atmosphere have gone through cycles over time (see Figure II), a secular decline in CO_2 has been going on throughout the 4.5 billion year history of the earth. If this trend continues, and there is no scientific reason to think it will not, eventually our planet will become as lifeless as Mars.[10]

Nature puts about 20 times more CO_2 into the atmosphere than humans do. But nature's contribution has been declining. One way to view the human contribution to atmospheric CO_2 is to see it as a supplement to nature's declining amount, and some scientists argue that humans need to contribute more, not less.

FIGURE II



Source: J.M. Barnola, et al., "Vostok Ice Core Provides 160,000-year Record of Atmostpheric CO_2," *Nature*, Vol. 329, p. 410.

"Nature puts 20 times more CO_2 into the atmosphere than humans do."

What Difference Would Global Warming Make?

"Predictions of warming have been lowered by two-thirds to three-fourths in the last two years."

For years, the most extreme global warming alarmists have warned that a significant increase in average temperatures would cause ecological disaster. Some have suggested that palm trees would grow in Canada, tropical rain forests would become deserts, the ice caps would melt, coastal regions would be flooded, major crop-growing regions of the world would experience recurrent droughts, and hurricanes would become more frequent and destructive. U.S. Senator and presidential candidate Albert Gore, Jr. even compared global warming to the Holocaust.[11] Are these predictions justified?

How Predictions of Disaster Have Moderated. Many of the climate modelers who made dire predictions about global warming a few years ago have substantially changed their tunes:[12]

"Predictions of a rising sea level have been reduced from 30 feet to 12 inches."

- Whereas in 1988 global warming theorists were predicting a temperature rise (from doubled CO_2) of between 4.5 and 6.0 degrees C, the most common projection now is 1.5 degrees; and the respected Max Planck Institute is predicting only 0.7 degrees.

- Whereas the climate modelers in 1980 were forecasting an increase in sea levels of 30 feet, that forecast fell to three to five feet by 1988, and the current worst-case forecast is only 12 inches.

Why the Polar Ice Caps Aren't Melting. The prediction of a rising sea level was based on the assumption that global warming would cause large amounts of polar ice to melt. In fact, the evidence shows that the ice caps are apparently growing, not melting.[13] In principle, global warming can't cause the ice caps to melt unless the warming occurs during the polar summers. No melting is going to occur during a polar winter if the average temperature rises from -35° to -30°. Research by James K. Angell, climatologist at the National Oceanographic and Aeronautical Administration (NOAA), shows that in 1990 polar temperatures increased during the polar winters, not during the periods when melting could have occurred.[14]

"The ice caps are apparently growing, not melting."

Why Hurricanes Won't Get Worse. The idea that global warming could cause more hurricanes got a big boost when Dan Rather interviewed James Hansen of NASA's Goddard Institute for Space Studies on "The CBS Evening News" as Hurricane Gilbert approached Mexico in September 1988. Hansen, who had announced during that year's summer drought that "the greenhouse effect has been detected, and it is changing our climate now,"[15] predicted that larger, more destructive hurricanes would result from an enhanced greenhouse effect. In fact, Hurricane Gilbert had nothing to do with global warming. Nor do any other hurricanes.

- William Gray of the Department of Atmospheric Science, Colorado State University, has discovered a strong correlation between severe Atlantic hurricanes reaching the United States and an approximate 20-year cycle of wet and dry periods going back for hundreds of years in the western Sahel region of Africa.[16]

"In warmer temperatures, hurricanes become less severe, not more severe."

- To the degree that temperature makes any difference, the historical record indicates that a warmer climate results in weaker hurricanes while cooler temperatures produce more powerful storms.[17]

"All the warming has come at night — delaying frosts and producing record harvests."

Why We Aren't Experiencing Crop Failures. The fear of crop failure and mass starvation is similarly fading. Those predictions were based on the assumption that daytime temperatures would soar, greatly increasing water evaporation and drying out of the soil. But the climate data suggests that if average temperatures are going up, it is mostly due to an increase in nighttime low temperatures. This has the effect of lengthening the growing season by reducing the likelihood of frost and does not increase the likelihood of drought. Far from causing crop failure, as we shall see, warmer temperatures stimulate record agricultural harvests.

How the Scientific Debate Has Changed. In the scientific community, there is a debate over global warming. Media coverage tends to assume the debate is between those who say climate will change and those who say it won't. This is misleading. The actual debate is between those who argue that there will be a large and catastrophic increase in global temperatures and those who believe that any climate change will be quite small, generally beneficial and possibly indistinguishable from normal climate variability. Increasingly, scientists are moving toward the latter position, yet most media reports remain wedded to the idea of an apocalypse.

Why Global Warming May Be Good for the Planet

Not everyone thinks that global warming is bad. In fact, two of the world's leading climate scientists — Arizona State physicist Sherwood Idso and Soviet climatologist Mikhail Budyko — argue that we should welcome a CO_2 buildup with open arms.

"More CO_2 and a warmer planet could create an agricultural Garden of Eden."

CO_2 has a well-known fertilizing effect on plants, including most of the major food crops.[18] Increasing atmospheric CO_2 not only increases plant growth rates but also reduces a plant's water requirements. Coupled with the fact that a warmer atmosphere would hold more moisture (and therefore increase average precipitation), more CO_2 and a warmer planet could produce an agricultural Garden of Eden. For example:[19]

- Idso (who, in addition to his own research, has reviewed over 1,000 scientific papers on CO_2) argues that the "green revolution" that has tripled crop yields since the 1950s is partly due to the

0.4°C degree warming that has occurred since the extreme cold dip of the late 1950s and early 1960s.

- The experience of 1990 is consistent with that view. One of the warmest years in recent history was also a record year for agricultural production worldwide, with one of the longest and wettest growing seasons on record.

"1990, one of the warmest years in recent history, was a record year for crops."

A CO_2 buildup may also be necessary to avert the predicted decline into the next ice age. Budyko, who argued that global warming was underway long before U.S. scientists did, says that's the main reason we need to maintain worldwide emissions of CO_2.[20]

How Much Do We Really Know About Global Warming?

The theory of global warming is that emissions of carbon dioxide and other man-made gases accumulate in the atmosphere and produce a stronger greenhouse effect than would naturally occur, raising the average global temperature. Yet while political leaders from around the world are meeting to adopt international policies based on this theory, the scientific community is engaged in a little-publicized retreat.

"As more politicians become convinced of the need to act, more scientists are becoming skeptical."

Scientists at MIT, the University of Virginia, the University of Wisconsin, the National Climate Data Center for the National Oceanographic and Atmospheric Administration — even scientists in the Soviet Union — are calling the details of the theory into question. In 1989 the Climate Trends Panel made up of the world's 61 top climatologists issued a statement undercutting the theory widely accepted by global warming alarmists. The scientists are impressed by the following facts.

False Predictions. The predictions of global warming are based on five models of the global climate. The problem is that all five models are inconsistent with reality:[21]

- According to the climate models developed in the 1980s, the global temperature should *already* have risen by 1.7°C to 2.0°C.

- In fact, global warming over the last 100 years has been a modest 0.5°C — only one-third to one-fourth of the predicted amount.

In theory, the buildup of carbon dioxide and other gases in the atmosphere is supposed to *cause* the greenhouse effect. Thus warming should follow the CO_2 buildup, not the other way around. Yet:[22]

"The theory says the CO_2 buildup should precede warming; our experience has been the other way around."

- About two-thirds of the carbon dioxide buildup in the atmosphere in this century has occurred in the last 50 years.
- There has been no net global warming in that time, however; almost all of this century's warming took place in the 1920s, long before most of the emissions of trace gases by humans.

Beginning around 1940, there was a prolonged cooling trend which continued through the 1960s. The return to warmer decades is still within the range of natural climate fluctuations. Computer model simulations fail to follow this pattern. The greenhouse models have also proved faulty in other ways:[23]

- According to the climate models, the effects of global warming should appear *first* in the Northern Hemisphere.
- In fact, there has been no *net* change in temperature in the Northern Hemisphere over the last 55 years and most of the temperature rise in the Southern Hemisphere occurred *before* the buildup of carbon dioxide in the atmosphere.

"Almost all of this century's warming took place in the first half; the CO_2 increase was in the second half."

Climatology is still in its infancy. The relatively primitive models in use do not capture the complexity of nature. The global warming forecast models cannot even explain past temperature trends, let alone predict the future.

Other Causes. Scientists are discovering other explanations for the apparent 0.5°C increase in the temperature of the earth's surface over the last 100 years. For example, one explanation is natural temperature variability:[24]

"Natural climate variability can explain all of this century's temperature changes."

- It is possible for temperature changes to occur without any change in carbon dioxide or any other known factor affecting the climate.
- One study showed that this natural variability of the climate can account for as much as a 0.4°C change in just 25 years.

Another explanation is the behavior of the sun:[25]

- When solar activity increased from the 1880s to the 1940s, global temperatures rose, and when it declined from the 1940s to the 1960s, temperatures fell.
- In the 1970s and 1980s, when solar activity and sunspot numbers reversed and began to rise, global temperatures did the same.

"Climate changes correlate far more closely with solar activity than with global warming theory."

These correlations may explain the temperature changes that are so puzzling to scientists who are trying to explain them purely in terms of the greenhouse theory.

The Effects of Clouds. By slowing the escape of the absorbed warmth, trace gases in the earth's atmosphere raise the average surface temperature and moderate day and nighttime temperature swings. The moon, with no atmosphere, is subjected to tremendous temperature ranges between lunar night and day. The net result of this "blanket" of gases is that the earth's average surface temperature is about 59 degrees Fahrenheit (33 degrees Celsius) warmer than it otherwise would be. The earth would be as lifeless as the moon without the greenhouse effect.

"In producing warmth the most important greenhouse gas is water vapor, not carbon dioxide."

From the point of view of producing warmth, the most important greenhouse gas is not carbon dioxide. It is water vapor:[26]

- Of the 33°C of warmth created by the earth's atmosphere, water vapor is responsible for 20°C, while CO_2 is responsible for only 7°C.
- Moreover, if a doubling of CO_2 produced a temperature rise, only 30 percent of the rise would be directly due to CO_2 itself, while two-thirds would be due to water vapor.

"A small increase in cloudiness can easily offset the warming effects of the doubling of CO_2."

Most climate models used to predict global warming assume that water vapor is evenly distributed through the atmosphere.[27] Yet the behavior of water vapor in the atmosphere is dynamic and complex. Among other things, it accumulates in clouds. Recent research indicates that, on balance, an increased cloud cover has a cooling effect.[28] Clouds cast shadows and deflect incoming solar energy. Moreover, because the effect of clouds is much more powerful than the influence of CO_2, a relatively small increase in cloudiness could offset a doubling of CO_2.

"Evidence suggests that sulphur dioxides, produced by burning coal, are offsetting the warming effects of more CO_2."

Other Emissions. Man-made emissions interact in the atmosphere in complicated ways. Take, for example, sulphur dioxides — which are created primarily by burning coal to produce electricity:[29]

- There is evidence that sulphur dioxide stimulates cloud formation, and clouds can produce a pronounced cooling effect.
- In fact, excessive cloud formation can be detected downwind of the major industrial regions of the globe.
- Thus sulphur dioxide emissions may be counteracting the effect of carbon dioxide emissions.

Ironically, reducing sulphur dioxide emissions by 10 million tons a year, as the federal government is attempting to do, might actually increase global warming. On the other hand, a drastic reduction in carbon dioxide emissions with no change in atmospheric sulphur dioxide could lead to substantial cooling.

Has the Earth Been Getting Warmer?

It is generally believed that the average temperature of the earth has increased by approximately 0.5 degrees Celsius during this century. But the temperature records are inconsistent. The most accurate — and most numerous — measurements were made at land-based locations. Yet 70 percent of the earth is covered by water. In general, historical ocean temperatures must be estimated through complex adjustments to the raw data.[30]

"New satellite data have failed to detect any global warming in the past decade."

Even on land, difficulties in interpreting the data must be overcome. Many recording sites were moved or discontinued. More importantly, cities grew up around many sites, causing an artificial "urban heat island" effect that can be misinterpreted as general, atmospheric warming. Anyone who has crossed an asphalt parking lot in summer has experienced this phenomenon.

As scientists take a closer look at temperature data, the evidence of warming is becoming more elusive:

- In the U.S., which has the best climate records in the world, data adjusted for urbanization show no statistically significant temperature increase in the 48 contiguous states over the last century.[31]

(See Figure III.)

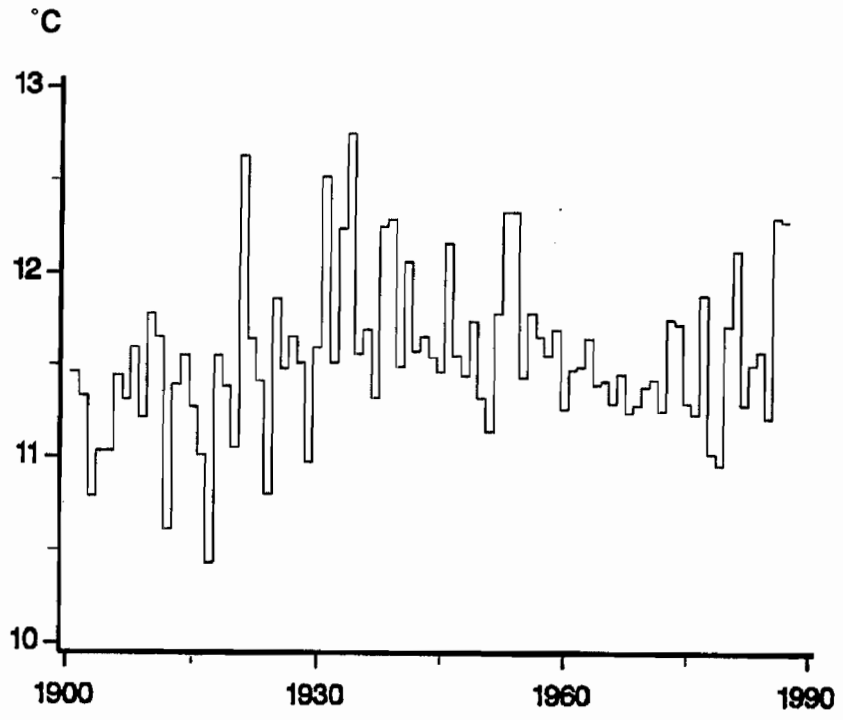
"New evidence shows no warming in Europe or in Canada."

- Similarly, new urban-adjusted temperature records in Europe and Canada show no evidence of global warming there.[32]
- A recent MIT study shows no significant warming in ocean temperatures over the past 120 years.[33]
- Satellite measurements of global temperature, which do not suffer from the defects of ship- or land-based measurements (since the readings are not distorted by their surroundings), show no warming trend over the past decade.[34] (See Figure IV.)

"Careful studies show there has been no warming over the United States in 100 years."

FIGURE III

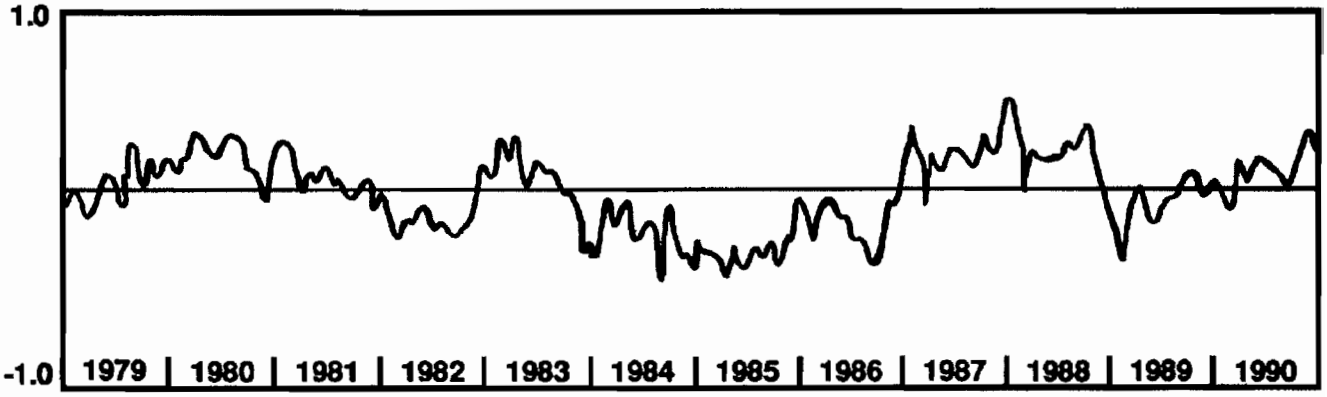
Average Annual Temperature In the United States



Source: "Trends '90: A Compendium of Data on Global Change" from the Carbon Dioxide Information Analysis Center of Oak Ridge National Laboratory, August 1990.

FIGURE IV

Satellite Measurement of Global Temperature



Source: Henry Christopher, *Washington Times*, February 5, 1991.

"TV documentaries on global warming have pandered to public fears and reflected bad science."

Television Coverage of the Global Warming Debate

Television has been particularly guilty of one-sided scare stories. Perhaps the worst offender was "After the Warming," shown on PBS. It was a fictional account of the future, presented as a retrospective from the year 2050 when a "Planetary Management Authority" is imagined to combat runaway global warming. Although purported by its makers to be based on scientific studies, it was little more than a Hollywood-style thriller. In "After the Warming," the tropical rain forests become deserts and coastal regions are inundated by rising seas and raging storms. Fortunately, science does not support these inflammatory claims.

Another series broadcast on PBS, "Race to Save the Planet," included an episode in which the viewer was encouraged to believe that computer model predictions had been accurately tested against well-known climate conditions. But the actual "test" shown was based on assumptions about the climate of northern Africa 9,000 years ago. These assumptions could not possibly be as accurate as the records from the past 30 years. The fact that current models are wildly inaccurate when predicting today's climate from information gathered in the 1950s was not mentioned. This omission represents very unbalanced reporting.

On the other hand, a science documentary called "The Greenhouse Conspiracy" was broadcast in Britain in August 1990. To date, it has not been shown in America. "The Greenhouse Conspiracy" questions the basis for public fears of global warming and raises the important issue of conflict of interest among the most vocal — and therefore most heavily funded — scientists who predict doom from climate change.

The Cost of Trying to Prevent Global Warming

The cost of reducing carbon dioxide emissions to prevent global warming would be enormous. Estimates of the worldwide costs of imposing restrictions on CO_2 emissions range into the trillions of dollars. One study calculated potential costs of restraining greenhouse gas emissions through the year 2050 at over $5 trillion.[35] Another study gives a country-by-country breakdown of these costs:[36]

"To cut carbon dioxide emissions by 20 percent would cost the U.S. as much as $3.6 trillion."

- In the U.S. alone, curbing carbon dioxide emissions by 20 percent of their current level between now and the year 2100 would have a present value loss equal to between $800 billion and $3.6 trillion — depending on what help we might get from new technology.

- In other countries the cost would be greater. If China did its share, the cost would equal a loss of 10 percent of that nation's annual income.

What the advocates of emergency international actions seem to find alarming is change itself. They assume that any change will be harmful. They prefer stasis — an unchanging world.[37] The fact that the climate has never been constant and that mankind must alter the natural world merely to survive is often forgotten or ignored.

International Paranoia

The Intergovernmental Panel on Climate Change, or IPCC, was formed in 1988. This ad hoc international organization, associated with the United Nations, has created three Working Groups to study various aspects of potential warming. Working Group I focuses on the science of climate change, Working Group II on potential impacts, and Working Group III on response strategies.[38] The IPCC is insisting on international action to reduce

"The goal of UN study groups is international control over domestic economic decisions."

emissions of greenhouse gases. Much of the justification for this is the assumption that temperatures will increase by 0.3°C per decade during the next century. The IPCC goal is to reduce this rate of warming to 0.1 degrees per decade, which it says would allow natural adjustments to occur. Presumably, pursuit of this goal would mean international controls over domestic economic decisions. The United States hosted the second IPCC working group meeting in February 1991. It was at the opening of this conference that the Bush Administration announced its support for a freeze on U.S. greenhouse gas emissions by the year 2000.

Fail-Safe Policy Proposals

A recent report from the Environmental Protection Agency indicates that U.S. greenhouse gas emissions will remain stable for decades.[39] But if further research fails to placate calls for emissions reductions, there are many sensible policies the United States could adopt. Ironically, most of these policies are vigorously opposed by many environmentalists.

"Nuclear energy is producing 20 percent of U.S. electricity."

Encouraging Nuclear Power. Nuclear generation of electricity emits no pollutants and no carbon dioxide. About 110 nuclear power plants provide about 20 percent of U.S. electricity today. Yet more than 100 additional plants have been cancelled or deferred indefinitely since the early 1970s.[40] This was the direct result of an intense antinuclear power campaign, carried out by many of the same individuals who are now demanding domestic reductions in carbon dioxide emissions.

The issues surrounding nuclear power are political, not technological. Before politicians wreck the economy with an international treaty on greenhouse gases, they should establish a rational policy on nuclear power.

Encouraging Carbon Sinks by Creating Property Rights in Land. Most of the proposals to deal with greenhouse gas emissions seek to eliminate them. Particularly with regard to CO_2 emissions, the economic costs of restrictions would be astronomical. However, CO_2 is absorbed by plants on land and in the oceans.[41] The possibility of increasing the rate of absorption offers an alternative to draconian cutbacks in energy use.

Many Third World populations, too poor to have access to fossil fuels, are forced to rely on wood. Without defensible private property rights, for-

"Rain forests are being destroyed because people do not have rights to the property they acquire."

ested regions suffer from over cutting and little replanting. For example, Brazil requires property owners to clear forests in order to secure title to the land. In contrast, U.S. forests are thriving, at least outside the federally owned areas. The United States has more trees today than at the turn of the century. Creating property rights would help restore or enlarge Third World forests.

Encouraging Carbon Sinks in U.S. Forests. A study by the Goddard Space Institute and Columbia University shows that trees consume an incredible amount of carbon dioxide. In fact, U.S. forests could be consuming as much carbon dioxide as the U.S. emits. But this is only true of growing forests. Mature forests give off as much carbon dioxide as they consume, and dead trees are net carbon emitters.[42] Ironically, environmentalists have filed no less than 3,000 lawsuits against the U.S. Forest Service to stop the logging on federal land. As a result, virtually all of the increase in growing wood volume is under private ownership.[43]

"Because of the private forest industry, U.S. forests consume as much carbon dioxide as the U.S. emits."

- In the West (where forests are mainly federally-owned), the growing stock volume of wood has decreased by 10 percent over the past 40 years, even though forest acreage has increased by 40 percent.
- By contrast, predominantly private forests have experienced an increase in wood volume of 66.4 percent in the South and 79.2 percent in the North.

Encouraging Carbon Sinks in the Ocean. Fertilizing the oceans to enhance their ability to absorb carbon dioxide may soon be technologically feasible. Man-made emissions of CO_2 are only about 5 percent of the size of natural carbon cycles, including volcanic emissions and oceanic absorption of CO_2. Thus an increase of only 2 or 3 percent in the rate of uptake of CO_2 by the oceans could be sufficient to offset man-made emissions of carbon dioxide.[44]

"The oceans consume far more CO_2 than humans emit."

- The amount of carbon dissolved in the oceans already dwarfs the amount emitted by human activities.
- In fact, all of the fossil fuel CO_2 emitted since 1850 would equal only 2 percent of the carbon dissolved in the top 1,000 meters of the world's oceans.[45]

Yet the carbon cycles of the oceans and atmosphere are not well understood. Fertilizing the oceans to stimulate the natural process (akin to fertilizing terrestrial crops) should be explored as an alternative to unworkable international controls on energy consumption.

Encouraging Biotechnology. Biotechnology opens the possibility of genetically improved plants and animals to ensure a food supply for the world's population. For example, the political opposition to bovine somatotropin[46] forces dairy farmers to have larger herds to produce the same amount of milk. This harms the consumer through higher prices and the environment through increased need for grazing land and increased methane emissions.

Ending Federal Subsidies for Energy Use. Before the federal government mandates energy efficiency standards for all Americans, it should eliminate its subsidies to energy consumers. The Power Marketing Administrations, which operate most of the huge hydroelectric systems in the western United States, continue to sell electricity at 1930s prices. This encourages overconsumption. Similarly, the Tennessee Valley Authority and the Rural Electrification Administration continue to provide politically controlled subsidies to consumers of electricity. It is irrational for government to require more efficient refrigerators while providing the electricity to operate them at one-third of its true cost.

"If we want to discourage energy use, we should quit subsidizing electricity use."

Conclusion

While the global climate changes over decades and centuries, the weather changes even more radically over periods of a few months. Consider that from January to August the average temperature in most of the world's populated areas rises by ten times as much as in the apocalyptic global warming scenarios. Temperatures that may average below freezing in winter can easily rise above 90 degrees Fahrenheit in summer. This temperature range is repeated year after year in most regions outside the tropics. It is perfectly normal and quite survivable, by both man and the environment.

For decades, Malthusian fears of imminent collapse of world food supplies have found a ready audience.[47] The new apocalyptic fear is global warming. The doomsayers have it half right. The global warming issue is of critical importance to America and the world, but not because there is a threat

of millions dying or world ecology being destroyed. The real threat is from inappropriate and counterproductive responses imposed under a political timetable devised by bureaucratic planners.

"How can a government which cannot balance a federal budget balance the world greenhouse gas budget?"

It is ludicrous to suggest that the same government which cannot balance the federal budget can somehow balance the world greenhouse gas budget. Almost every aspect of daily life would be impacted by global warming legislation. Special interests would strongly influence the resulting regulations and the bureaucratic micro-management required to enforce an international treaty would dwarf any in existence. The theory that such a system would actually benefit society is even weaker than the arguments supporting a global warming catastrophe.

There is no indication that the world is facing a climate crisis, either immediately or in the coming decades, and no reason why costly emergency responses should be adopted as international policy.

If warming does occur, it will bring many beneficial results. Most important are the longer growing seasons and increased crop yields from CO_2 fertilization. The claims of worsening storms, increasing droughts and melting ice caps are frightening but unsupported by the evidence.

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Footnotes

[1]Hugh W. Ellsaesser (Lawrence Livermore National Laboratory), "The Benefits of Increased CO_2 Have Been Ignored and the Warming Exaggerated." Paper presented to the 1989 Pacific Environment Conference, Montana State University, Bozeman, MT, October 22-25, 1989.

[2]William K. Stevens, "In the Ebb and Flow of Ancient Glaciers, Clues to a New Ice Age: Greenhouse Effect Could Delay the Onset of the Cold, Glaciologists Say," *New York Times*, January 16, 1990, p. C-1.

[3]The amount of CO_2 in the atmosphere does tend to vary with the earth's temperature, however.

[4]Ellsaesser, "The Benefits of Increased CO_2 Have Been Ignored and the Warming Exaggerated.."

[5]See, for example, Stephen H. Schneider, *The Genesis Strategy: Climate and Global Survival* (New York: Plenum Press, 1976); and Lowell Ponte, *The Cooling* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1976).

[6]See "Trends '90: A Compendium of Data on Global Change" from the Carbon Dioxide Information Analysis Center of Oak Ridge National Laboratory, August 1990.

[7]Global temperatures are estimated to have been between 0.5°C and 2.0°C warmer than now. The most common prediction for warming in the next century is 1.5°C.

[8]Ellsaesser, "The Benefits of Increased CO_2 Have Been Ignored and the Warming Exaggerated."

[9]Ibid.

[10]Ibid.

[11]Sen. Albert Gore, Jr., "An Ecological Kristallnacht. Listen," *New York Times*, March 18, 1989.

[12]Warren Brookes, "After the Warming Hype Cools," *Washington Times*, November 14, 1990.

[13]H. Jay Zwally, et al., "Growth of Greenland Ice Sheet: Measurement," *Science*, Vol. 246, December 22, 1989, pp. 1587-1591.

[14]Warren Brookes, "Warmer, Greener, Better?", *Washington Times*, January 11, 1991.

[15]Testimony before the Senate Committee on Energy and Natural Resources, June 23, 1988.

[16]William M. Gray, "Strong Association Between West African Rainfall and U.S. Landfall of Intense Hurricanes," *Science*, September 14, 1990, pp. 1251-1256. Gray suspects that a new 20-year wet cycle may have already begun at the end of the 1980s. He writes, "[w]ith such a rainfall increase, we should also expect a return of more frequent intense hurricane activity in the Caribbean Basin and along the U.S. coastline. The historical data imply that such an increase in intense hurricane activity should be viewed as a natural change and not as a result of man's influence on his climate." Ibid, p. 1255.

[17]Robert Balling, "Carbon Dioxide and Hurricanes: Implications of Northern Hemisphere Warming," *Meteorology and Atmospheric Physics*, December 1990.

[18]See Sherwood B. Idso, *Carbon Dioxide and Global Change: Earth in Transition* (Tempe, AZ: IBR Press, 1989).

[19]Brookes, "Warmer, Greener, Better?"

[20]Ellsaesser, "The Benefits of Increased CO_2 Have Been Ignored and the Warming Exaggerated."

[21]Patrick J. Michaels, "The Greenhouse Effect," *Liberty*, January 1990.

[22]Hugh Ellsaesser, "A Different View of the Climatic Effect of CO_2 - Updated," *Atmosfera*, 1990, Vol. 3, pp. 3-29.

[23]Michaels, "The Greenhouse Effect."

[24]*Scientific Perspectives on the Greenhouse Problem* (Washington, DC: George C. Marshall Institute, 1989).

[25]Ibid.

[26]Ellsaesser, "A Different View of the Climatic Effect of CO_2 - Updated."

Footnotes (continued)

[27]The assumption is made not because it is believed to be true, but because the models cannot capture the complexity of the atmosphere, although current attempts are under way to do so.

[28]V. Ramanathan, et al., "Cloud-Radiative Forcing and Climate: Results from the Earth Radiation Budget Experiment," *Science*, Vol. 243, January 6, 1989, pp. 57-63.

[29]This argument is elaborated by Dr. Patrick J. Michaels, Department of Environmental Sciences, University of Virginia, in a forthcoming publication. See also Warren T. Brookes, *Executive Alert,* Vol. 4, No. 1, January/February 1990.

[30]See, for example, Philip D. Jones and Tom M. L. Wigley, "Global Warming Trends," *Scientific American*, August 1990, pp. 84-91. Jones and Wigley conclude that, despite the complexity of the analysis, temperatures have indeed risen over the past century. However, in March 1990, the *Global Ocean Surface Temperature Atlas* (a joint project of the Meteorological Office, in Bracknell, England, and the Department of Earth, Atmospheric and Planetary Sciences at the Massachusetts Institute of Technology) found that there has been little or no warming over the past century.

[31]Thomas Karl of the National Climatic Data Center in Asheville, NC, headed a study of U.S. records. After accounting for the urban heat island effect and other spurious data, he concluded that temperatures in the United States showed no statistically significant change over the past century.

[32]Warren Brookes, "Greenhouse Hysteria," *Executive Alert*, Vol. 4, No. 1, January/February, 1990, p. 3.

[33]*Global Ocean Surface Temperature Atlas.*

[34]R. W. Spencer and J. R. Christy, *Science*, Vol. 247, March 30, 1990, p. 1558.

[35]"The Economics of Long-Term Global Climate Change: A Preliminary Assessment." Report of an Interagency Task Force, September 1990, U.S. Department of Energy, Office of Policy, Planning and Analysis, DOE/PE-0096P, p. 24.

[36]Alan Manne (Stanford) and Richard Richels (Electrical Power Research Institute), "CO_2 Emissions Limits," unpublished paper.

[37]See, for example, Virginia I. Postrel, "The Green Road to Serfdom," *Reason*, April 1990, pp. 22-28.

[38]See Fred Singer, "Global Climate Change: Facts and Fiction," *World Climate Change Report*, Vol. 2, No. 4, December 1990, The Bureau of National Affairs, Inc. Washington, DC, pp. 19-23.

[39]Reported in William K. Stevens, "Hopeful E.P.A. Report Fans a Debate as Talks on Warming Near," *New York Times*, January 13, 1991, p. 18.

[40]*Interim Report: National Energy Strategy.* A Compilation of Public Comments, U.S. Department of Energy, April 1990, DOE/S-0066P, p. 81.

[41]Natural sources of CO_2 are far greater than human sources, perhaps twenty times as large. It is often assumed that natural sources and natural "sinks" (or methods of absorption) of CO_2 are in approximate equilibrium over the short term. Paleohistory teaches us, however, that CO_2 levels can vary widely in the absence of man. Any increase — or decrease — in the rate of natural emissions or natural absorption has the potential to overwhelm human contributions.

[42]Pieter Tans, Inez Fung, Taro Takahashi, "Observational Constraints on the Global Atmospheric CO_2 Budget," 1990, NASA - Goddard Space Institute.

[43]Warren Brookes, "Man and Trees," *Executive Alert* Vol. 4, No. 4, July/August 1990, p. 7.

[44]See, for example, D. Allan Bromley, "The Making of a Greenhouse Policy," *Issues in Science and Technology*, Fall 1990, pp. 55-61. See also Sandra Blakeslee, "Ideas for Making Ocean Trap Carbon Dioxide Arouse Hope and Fear," *New York Times*, November 20, 1990, p. C-4.

[45]Pieter P. Tans, Inez Y. Fung, Taro Takahashi, "Observational Constraints on the Global Atmospheric CO_2 Budget," *Science*, Vol. 247, March 23, 1990, pp. 1431-38.

[46]A product of biotechnology which increases milk production in cows. Milk quality and safety are not changed.

[47]See John Tierney, "Betting the Planet," *New York Times Magazine*, December 2, 1990, pp. 52 ff.

About the Author

Kent Jeffreys is the Director of Environmental Studies at the Competitive Enterprise Institute, a Washington-based public interest group committed to advancing the principles of free enterprise and limited government. He formerly was the Energy and Environmental Policy Analyst for the Heritage Foundation in Washington, DC. Before joining the Heritage Foundation in 1988, he held a similar position with the Republican Study Committee of the U.S. House of Representatives. Mr. Jeffreys' recent work includes research into "clean air" proposals, global warming theories, marine resources and "sustainable development" issues. He holds a J.D. from the University of Mississippi School of Law and a B.A. from Mississippi State University.

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- Special taxes on the elderly have destroyed the value of tax-deferred savings (IRAs, employee pensions, etc.) for a large portion of young workers; and
- Man-made food additives, pesticides and airborne pollutants are much less of a health risk than carcinogens that exist naturally in our environment.