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The Questionable Science Behind the Global Warming Scare

by Joseph Bast*

Introduction

Scientists have discovered that concentrations of minor greenhouse gases¹ in the atmosphere, particularly carbon dioxide (CO₂), are rising. Theoretically, these gases could trap more heat in the atmosphere, leading to a gradual warming of the Earth's atmosphere. And, again theoretically, the consequences of rapid global warming could be harmful to the environment and to human health. Since the stakes are high, careful research and a deliberate response are called for.

In 1997, representatives of the United States and other nations met in Kyoto, Japan, to negotiate a treaty to address the possible threat of global climate change. That treaty, called the Kyoto Protocol, would require the U.S. to reduce its greenhouse gas emissions — primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (NO₂) — to 7 percent below 1990 levels by the year 2012.²

All three necessary conditions for accepting the Kyoto Protocol on global warming are either false or we currently lack sufficient knowledge to know whether they are true.

The Kyoto Protocol does not become effective unless approved by the United States Senate. However, Vice President Al Gore and other spokespersons for the Clinton Administration have said they will attempt to implement the treaty even if the Senate does not approve it.³

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The debate over global warming is important because implementation of the Kyoto Protocol would have significant negative effects on American workers and consumers. In order to reduce greenhouse gas emissions, the United States government would need to adopt policies that would raise energy costs by the equivalent of \$0.60 per gallon of gasoline or more.⁴ Higher energy costs, in turn, would result in substantially higher prices paid by consumers for electricity and home heating oil, some 2.4 million lost jobs, and lost income averaging \$2,700 per year for the typical American family.⁵

The cost of the Kyoto Protocol might be worth bearing if we knew three things for sure: (1) that man-made greenhouse gases are truly causing global warming; (2) that global warming is or will be bad for the natural environment and for human civilization; and (3) that the emission reduction schedule that is contained in the Kyoto Protocol is the best or most effective way to stop the threatened global warming from occurring. It is the contention of this author that all three necessary conditions for accepting the treaty are either false or we currently lack sufficient knowledge to know whether they are true.

Seven Things You Should Know About Global Warming

- 1. Most scientists do not believe human activities threaten to disrupt the Earth's climate.
- 2. The most reliable temperature data show no global warming trend.
- 3. General circulation models are too crude to predict future climate changes.
- 4. The IPCC did *not* prove that human activities are causing global warming.
- 5. A modest amount of global warming, should it occur, would be beneficial to the natural world and to human civilization.
- 6. Quickly reducing our greenhouse gas emissions would be costly and would not stop global warming.
- 7. The best strategy to pursue is one of "no regrets."

The discussion that follows has the goal of imparting a basic understanding of the issues related to global warming. Believe it or not, it is possible for a person who is not trained in physics or climatology to reach an informed opinion about the science behind the global warming debate. On issues where the science is too complicated or the jargon too dense, there are reliable sources to turn to for an objective and informed opinion.

The seven principal conclusions of this paper are listed in the box on this page. Together, they make a convincing case for rejection of the Kyoto Protocol and pursuit, instead, of an alternative strategy called "no regrets." This strategy involves funding research on the effects of higher CO_2 concentrations on plants and agriculture, lowering capital gains taxes to encourage the speedy replacement of old tools and equipment and with a new generation of more energy-efficient and less-polluting equipment, and carefully targeted investments where they are needed to accommodate climate change.

The final section of this study gives

readers advice on how they can participate in the national debate over global warming.

1. Most scientists do not believe human activities threaten to disrupt the Earth's climate.

Over 17,000 scientists have signed a petition saying, in part, "there is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate."⁶

The petition is being circulated by the Oregon Institute of Science and Medicine, an independent research organization that receives no funding from industry.

Among the signers of the petition are over 2,100 physicists, geophysicists, climatologists, meteorologists, and environmental scientists who are especially well-qualified to evaluate the effects of carbon dioxide on the Earth's atmosphere. Another 4,400 signers are scientists qualified to comment on carbon dioxide's effects on plant and animal life. Nearly all of the signers have some sort of advanced technical training.

The qualifications of the signers of the Oregon Institute Petition are dramatically better than the qualifications of the 2,600 "scientists" who have signed a competing petition, circulated by Ozone Action, calling

The Oregon Institute Petition

"We urge the United States government to reject the global warming agreement that was written in Kyoto, Japan in December 1997, and any other similar proposals. The proposed limits on greenhouse gases would harm the environment, hinder the advance of science and technology, and damage the health and welfare of mankind.

"There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."

- Signed by over 17,000 scientists

for immediate action to counter global warming. An investigation by Citizens for a Sound Economy found that more than 90 percent of that petition's signers lacked credentials to speak with authority on the issue.⁷ The entire list included just *one* climatologist.

Over one hundred climate scientists signed the 1996 Leipzig Declaration, which stated in part, "there does not exist today a general scientific consensus about the importance of greenhouse warming from rising levels of carbon dioxide. On the contrary, most scientists now accept the fact that actual observations from Earth satellites show no climate warming whatsoever."⁸

A survey of 36 state climatologists—scientists retained by state governments to monitor and research climate issues—conducted in September and October 1997 found that 58 percent disagreed with the statement, "global warming is for real," while only 36 percent agreed.⁹ A remarkable 89 percent agreed that "current science is unable to isolate and measure variations in global temperatures caused only by man-made factors." The same survey found that none of the climatologists strongly agreed, and only 11 percent "somewhat agreed," with the following statement: "Reducing anthropogenic or man-made carbon dioxide emissions among developed nations such as the United States to 1990 levels will prevent global temperatures from rising." Eighty-six percent disagreed with the statement.

A remarkable 89 percent of state climatologists agreed that "current science is unable to isolate and measure variations in global temperatures caused only by man-made factors." Global warming alarmists have sought to silence their critics by calling them a small group of industry-funded dissenters from the "scientific consensus."¹⁰ The Oregon Institute Petition, the Leipzig Declaration, and the survey of practicing climatologists prove these claims are false. We should keep in mind, however, that scientific truths are not found by polling scientists, but through rigorous debate recorded in peer-reviewed

journals. As the following points show, global warming skeptics can win that debate, too.

2. The most reliable temperature data show no global warming trend.

It is an article of faith among those who warn of catastrophic global warming that temperatures are already rising. They point to surface-based measurements produced by the National Oceanic and Atmospheric Administration to declare 1997 the warmest year on record.¹¹ But U.S. weather satellites and radiosonde (weather) balloons rank 1997 as the seventh *coolest* year since satellite measurements began in 1978.¹² The actual balloon and satellite record, provided by NASA, is shown on the following page. Which record is more reliable?

Modern surface-based temperature records began in 1880. Although useful for compiling regional data, such measurements are too few in number and too unevenly spaced to generate global temperature maps that are useful. Only 30 percent of the world's surface is land, so land-based temperature measurements account for less than one-third of the Earth's climate. Arctic and oceanic temperatures are under-represented. Data collected outside of the United States and Europe are poorly distributed. Urban stations, which are influenced by city heat anomalies, are over-represented; deserts, mountains, and forests are under-represented. The result is a set of measurements that understate some global trends and overstate others.

The global temperature record produced from satellite data has none of the problems faced by surface-based thermometers. Orbiting satellites cover 99 percent of the Earth's surface, not less than a third, and measure a layer of the troposphere that is unaffected by urban heat islands. Moreover, satellite data agree almost exactly with those recorded by weather balloons, even though the latter use different technology.¹³ While the satellite record extends back only to 1979, weather balloon data go back 38 years to 1960.



"A look at the trends in the satellite data—our only truly global record of lower atmosphere temperature—is remarkably revealing," said Virginia State Climatologist Dr. Patrick J. Michaels in testimony before Congress.¹⁴ "There is a statistically significant global *cooling* trend over the entire 18.8 year period." After Michaels testified, El Niño (a recurring weather phenomenon not caused by global warming) raised global temperatures in 1997 and 1998, so the 19-year record now shows neither a warming nor a cooling trend.

Dr. Roy Spencer, a meteorologist and team leader of the NASA/Marshall Space Flight Center, says "the temperatures we measure from space are actually on a very slight downward trend since 1979... the trend is about 0.05 degrees Celsius per decade cooling."¹⁵

Dr. Vincent Gray, a New Zealand scientist and member of the peer review board of the Intergovernmental Panel on Climate Change, writes: "There is no evidence of a global warming trend over the past 37 years if the radiosonde [weather balloon] measurements are considered, or over 18 years if the satellite measurements only are considered."¹⁶

Dr. Robert Balling, Director of the Office of Climatology at Arizona State University, summarizes the temperature data of the past two decades as follows: "The trend is statistically significant, and it's downward. . . . Two of the three methods we use to measure planetary temperature show cooling, and one shows nothing at all. . . . "¹⁷

It is sometimes argued that satellites measure temperatures too far above the surface to be said to contradict the record of surface-based weather stations. The Intergovernmental Panel on Climate Change strongly rejected this notion in its 1990 report: "It is not the change in thermal infrared flux at the surface that determines the strength of the greenhouse warming. The surface, planetary boundary layer and the free troposphere are tightly coupled via air motions on a wide range of scales, so that in a global-mean sense they must be considered as a single thermodynamic system. As a result, it is the change in the radiative flux at the tropopause, and not the surface, that expresses the radiative forcing of climate system." ¹⁸

3. General circulation models are too crude to predict future climate changes.

Predictions that rising concentrations of carbon dioxide in the atmosphere will cause global climate change are based on general circulation models (GCMs), complex computer

The ability to explain historical data is a critical test for any theory or model. General Circulation Models flunk that test. programs that attempt to simulate the Earth's atmosphere. GCMs were created to help scientists learn more about atmospheric physics, not to predict future climates.¹⁹ When put to such an unintended use, they are unreliable. For example:

- GCMs are unable to replicate past climate trends. While global temperatures have risen between 0.3 and 0.6 degrees Celsius over the past one hundred years, computer models predict that global temperatures should have gone up between 0.7 and 1.4 degrees by 1990. The two ranges do not even overlap.²⁰ The ability to explain historical data is a critical test for any theory or computer model. GCMs flunk that test.
- GCMs use "fudge factors" that are larger than the variables they are supposed to be measuring. In order to get their models to produce predictions that are close to their designers' expectations, modelers resort to "flux adjustments" that can be 25 times larger than the effect of doubling carbon dioxide concentrations.²¹ Dr. Richard Lindzen, a meteorologist at MIT, notes that "one cannot even calculate the temperature of the Earth without models that accurately reproduce the motions of the atmosphere," yet "present models have large errors here—on the order of 50 percent."²² Richard A. Kerr, a writer for *Science*, says "climate modelers have been 'cheating' for so long it's almost become respectable."²³
- GCMs inaccurately model the effects of clouds. Most climate models assume that clouds absorb roughly 3 percent of the sun's radiation, but more recent estimates, published in *Science* in 1995,²⁴ indicate that the absorption rate may be closer to 19 percent. This means past predictions were based on data that "were off by more than 600 percent."²⁵
- GCMs do not take into account fluctuations in solar energy. Scientists can only estimate the amount of solar energy that enters the Earth's atmosphere (an amount called the "solar constant") as well as the amount of sunlight reflected back into space by the Earth's surface and atmosphere (called the "reflectivity of the Earth"). Estimates for these values vary considerably over time, and some experts believe natural variations are closely related to changes in climate.²⁶
- GCMs are only as good as the data fed into them. The GCMs used by the Intergovernmental Panel on Climate Change were programmed to assume an increase in greenhouse gas concentrations of 1 percent per year, even though the historical data show an annual increase of only 0.3 to 0.4 percent. Population growth and coal production figures were similarly exaggerated. After correcting for these and other errors, Dr. Vincent Gray concludes "we can expect the *maximum* temperature rise between 1900 and 2100 to be

 1° C."²⁷ (Emphasis in the original.) Other scientists report similar results when the GCMs are run with accurate data.²⁸

General circulation models have become more complex over time, but this doesn't mean they are becoming more accurate. Richard Kerr quotes an anonymous senior climate modeler as saying "the more you learn, the more you understand that you don't understand very much."²⁹ Kerr reports that "most modelers now agree that the climate models will not be able to link greenhouse warming unambiguously to human actions for a decade or more."³⁰

4. The IPCC did not prove that human activities are causing global warming.

The Intergovernmental Panel on Climate Change (IPCC) was created by the United Nations to act as a source of scientific advice on global warming. Its latest assessment, *Climate Change 1995*, predicts a global temperature increase of between 0.9° C and 3.5° C by the year 2100, with a "best estimate" of 2.0° C.³¹

Climate Change 1995 is the source of perhaps the most often quoted sentence in the global warming debate: "[T]he balance of evidence suggests a discernible human influence on the global climate."³² Upon this slender reed is hung the claim of a "scientific consensus" on the need to "stop global warming." Yet, how meaningful is this sentence?

"I have never witnessed a more disturbing corruption of the peerreview process than the events that led to this IPCC report."

— Dr. Frederick Seitz

"Balance of evidence" is a phrase used by scientists when evidence of a cause-and-effect relationship is unavailable. It is an admission that genuine proof is not possible. The word "suggests" indicates that different people looking at the same data can disagree on their meaning. And "discernible" means detectible but by no means large or significant. It certainly does *not* mean "major," "troubling," or even "bad."

Climate Change 1995 is controversial for a second reason: Many revisions to the report were made *after* peer review was completed. Dr. Frederick Seitz, president emeritus of Rockefeller University and past president of the National Academy of Sciences, has publicly denounced the published document, writing "I have never witnessed a more disturbing corruption of the peer-review process than the events that led to this IPCC report."³³ Dr. Vincent Gray has written that the final version of the IPCC report he saw as a reviewer did not claim to have found "a discernible human influence on the global climate," but instead ended with the following words:

When will an anthropogenic effect on the climate be identified? The best answer is "we do not know."³⁴

There is still more evidence that the scientists who wrote the IPCC report did not believe they had proven that man-made emissions were influencing the global climate. Dr. Benjamin Santer, the lead author of the science chapter of the IPCC report, coauthored an article on the same subject for a peer-reviewed scientific journal around the same time as the IPCC report was written. In that essay, Santer et al. say it is not possible to get the general circulation models to replicate the past climate record, and until this is resolved, "it will be hard to say, with confidence, that an anthropogenic climate signal has or has not been detected."³⁵

"The climate issue is not 'settled'; it is both uncertain and incomplete."

> — Dr. Bert Bolin Chairman, IPCC

Recent comments made by spokespersons for the IPCC also suggest concern that their findings are being misrepresented. Dr. Santer has said "It's unfortunate that many people read the media hype before they read the chapter. . . . I think the caveats are there. We say quite clearly that few scientists would say the attribution issue was a done deal."³⁶ In a June 2, 1997 debate,

IPCC chairman Dr. Bert Bolin said, "the climate issue is not 'settled'; it is both uncertain and incomplete."³⁷

5. A modest amount of global warming, should it occur, would be beneficial to the natural world and to human civilization.

Because so little is known about how the atmosphere functions, it is impossible to rule out the possibility that man-made greenhouse gases might cause some amount of warming (or cooling). Would some degree of warming be bad for most societies and natural environments? Probably not.

"During the 20th century," writes Dr. Patrick Michaels, "we have already proceeded more than half way to doubling the natural carbon dioxide greenhouse effect. Here is what resulted: Life expectancy doubled in the free and developed world. The developing world is catching up as their emissions rise. Corn production per acre increased five-fold. The growing season in the coldest latitudes increased slightly, but enough to increase greenness by 10 percent."³⁸

The small amount of warming that occurred during the past century consisted primarily of increased minimum temperatures at night and during winters.³⁹ This means higher *average* temperatures, should they occur, would not result in more daytime evaporation, which some claim would lead to droughts and desertification. Warmer winters would mean longer growing seasons and less stress on most plants and wildlife, a substantial benefit for the global ecosystem. Finally, past warming has been accompanied by increased cloudiness, a phenomenon also predicted by most global climate models. This means a warmer world would probably be a wetter world, which once again is beneficial to most plant and animal life.⁴⁰

Not everyone believes a warmer world would be benign. In his 1993 book, *Earth in the Balance*, Vice President Al Gore claimed that "the climate changes that we are now bringing about by modifying the global atmosphere are likely to dwarf completely the ones that caused the great subsistence crisis of 1816-19, for example, or those that set the stage for the Black Death. . . . [H]undreds of millions of people may well become even more susceptible to the spread of diseases when populations of pests, germs, and viruses migrate with the changing climate patterns."⁴¹

Later in his book, Gore warns, "every coastal country will suffer adverse effects" from rising sea levels caused by melting polar ice.⁴² Gore and others also claim that global warming will cause more floods, more droughts, more "torrential" rainfalls, and heavier snowfall.⁴³

Gore's claims are at odds with much scientific research. The bacterium responsible for the epidemic episode called the Black Death was transmitted by rats, which flourish in cool as well as warm climates. Cholera, another disease mentioned as a potential threat, is readily brought under control by treating water supplies with chlorine. Like

The latest research suggests that sea levels would decline, not rise, if temperatures rise, due to increased evaporation from the oceans and subsequent precipitation.

most other bacteria-based diseases, the problem is not a difference in average temperatures of one or two degrees, but a lack of sanitary living conditions, food, and water.⁴⁴

The latest research suggests that sea levels would decline, not rise, if temperatures rise, due to increased evaporation from the oceans and subsequent precipitation.⁴⁵ Increasing polar temperatures by a few degrees would not cause ice or snow to melt because the original temperatures are so low the new temperatures would still be well below freezing. However, the slightly warmer air *would* be able to retain more moisture, meaning more snowfall in polar regions and *more*, not less, water locked up in snow and ice.⁴⁶

"Torrential" rainfalls turn out to be any rainfall of 2 inches or more in a 24-hour period, something every farmer knows would likely be a blessing rather than a curse.⁴⁷ The number and intensity of hurricanes occurring in the Atlantic (the ocean basin with the highest quality data) has steadily fallen since aircraft reconnaissance began in 1944.⁴⁸ The IPCC itself found "no evidence that extreme weather events, or climate variability, has increased, in a global sense, through the 20th century," noting that some regions exhibit greater variability and others less.⁴⁹

In short, a slightly warmer world would probably be greener and a little cloudier than our world today, but otherwise not much different. As Dr. Patrick Michaels asked members of Congress during his 1997 testimony, "How much of the money of the citizens of this nation are you willing to spend to stop this? How much to stop a slight amelioration of the coldest temperatures, in the air-masses most inhospitable to unprotected life? How much to stop making the Earth greener, more productive, and human life increasingly long over the mass of the planet that still finds us the envy of history?"⁵⁰

6. Quickly reducing our greenhouse gas emissions would be costly and would not stop global warming.

Attempting to reduce emissions quickly requires retiring existing capital stock (tools, equipment, machinery) before the end of its useful life.⁵¹ Forcing more rapid technological change is possible, but it is costly. The cost to only one country-the United States-of reducing and stabilizing only one greenhouse gas—CO₂ —to 93 percent of 1990 levels ranges from 2.4 million to 3.1 million jobs lost and an annual reduction in gross domestic product of between \$177 billion and \$318 billion.⁵² Alone, this would be a staggering cost. But it is only a fraction of the amount the entire world would have to spend each year to implement the Kyoto Protocol.

"[I]n order to approach those targets, emissions from the industrial countries have to go below zero. We have to more than disappear from the map to achieve any of them."

- Eugene Trisko

Another cost of the Kyoto Protocol is more difficult to quantify but no less real. Virtually all economic activities, and many purely recreational or consumptive activities, involve the use of energy and consequently the release of greenhouse gases. A treaty that proposes to limit greenhouse gases therefore is a license for governments to monitor, tax, regulate, or ban virtually any activity. That

this is an international treaty giving vague enforcement powers to a new United Nations bureaucracy is especially disturbing. "It would be the first time in history," said Sen. Larry Craig (R-Idaho), "that an American President has allowed foreign interests to control and limit the growth of the U.S. economy."53

For all this pain, there would be little gain. "Actions by the industrial countries alone," says Eugene Trisko, a spokesperson for the United Mine Workers of America, "cannot achieve any of the target [greenhouse gas] concentrations that are now frequently discussed within the scientific community... [I]n order to approach those targets, emissions from the industrial countries have to go below zero. We have to more than disappear from the map to achieve any of them."54

Tom Wigley, a climate researcher at the National Center for Atmospheric Research (NCAR), says "a short-term target and timetable, like that adopted at Kyoto, avoids the issue of stabilizing concentrations entirely."55 Similarly, Jerry Mahlman, director of the Geophysical Fluid Dynamics Laboratory at Princeton University, believes "it might take another thirty Kyotos over the next century" to slow down or stop global warming.⁵⁶

Bert Bolin, Chairman of the IPCC, admitted in 1994 that the Kyoto Protocol would not stop global warming. In an address to the Conference of Parties in Geneva, he said: "Preliminary estimates using the central IPCC 92 scenario suggest that stabilization of greenhouse gas emissions at 1990 levels through 2100 by all Annex I [i.e., developed] countries would reduce annual emissions in 2100 by less than 15 percent and cumulative emissions by less than 10 percent."57

Dr. Michaels recently computed the "temperature saving" if the *entire world* reduced greenhouse emissions to 1990 levels by 2010. (So long as developing countries refuse to limit their emissions, there is simply no way this could happen.) Using the NCAR model and the latest IPCC estimates of CO_2 increase rates, he finds the global temperature increase would be just 0.18° C less than baseline in 2040, a mere 7 percent of the IPCC's "best estimate" temperature increase.⁵⁸

7. The best strategy to pursue is one of "no regrets."

Some environmentalists call for a "save-the-day" strategy to "stop global warming," saying it is better to be safe than sorry. Such a position seems logical until we stop to think: Immediate action wouldn't make us any safer, but it would surely make us poorer. And being poorer would make us *less* safe.

Researchers have found a close relationship between a nation's standard of living (its wealth) and many measures of public health and safety.⁵⁹ Wealthier societies are able to invest more in things that ensure safety, such as guardrails on highways, vaccines against diseases, and safe drinking water. Simply put, wealthier is healthier.

The "save-the-day" strategy will definitely make us poorer, to the tune of hundreds of billions of dollars each year. If that money is no longer available to purchase safety-enhancing devices, plainly we will be less safe as a result of our efforts to "stop global warming." We would, moreover, be depriving



our children and grandchildren of the capital and new technologies that would enable them to live better lives than we did.

 CO_2 stays in the atmosphere for decades, meaning each year's emissions are only a small percentage of the total amount of CO_2 in the atmosphere. Consequently, immediate large reductions in emissions have relatively small effects on concentrations of greenhouse gases.

Whether emission reductions occur now or thirty years from now, they will have the same overall impact. If it proves necessary to make reductions, the *cost* of making reductions later, after new technologies now under development become available commercially and after current capital stock has come up for replacement, is likely to be much less than the cost of making reductions today.

The best strategy is to invest in atmospheric research to determine whether a genuine threat exists, and to invest in reducing emissions only when such investments make economic sense in their own right. Reduced emissions, then, are an added benefit.

This strategy is called "no regrets." It positions us to respond quickly to bad news while avoiding the mistake of spending too much, too soon, preparing for a threat that never materializes. Some of the activities that would form part of a no-regrets strategy include:

- Fund research on the effects of higher CO₂ concentrations on plants and agriculture.
- Break the federal monopoly over global warming research, which currently has the effect of funding only those researchers who support the catastrophist view of global warming.
- Lower capital gains taxes and make other changes to tax policies and regulations to encourage new investments in capital and technology, thereby speeding up the process of phasing out inefficient machinery.
- Repeal regulations that stand in the way of energy efficiency, such as restrictions on operating small businesses at home, and zoning ordinances that lead to urban sprawl.⁶⁰

The "no regrets" strategy is a comprehensive alternative that promises much superior results *without* enormous social costs or losses of liberty.

Carefully target investments where they are needed to accommodate climate change. For example, higher sea levels, should they occur, could be addressed by modest improvements to dikes and seawalls in some areas, and by relocating homes and businesses in other areas. This cost—spread out over the course of a century—would surely be less than the

cost of attempting to prevent climate change through energy taxes or emission caps.⁶¹

Replace "command and control" regulations, which tell businesses what they must do to reduce emissions, with flexible and incentive-based rules that allow the use of lowest-cost options. This would end the pure waste of billions of dollars a year, allowing some part of that savings to be invested in research or ways to accommodate climate change.

The alternative to the Kyoto Protocol is not to do nothing. The "no regrets" strategy is a comprehensive alternative that promises much superior results *without* the enormous social costs and losses of liberty that would accompany implementation of the Kyoto Protocol. The contrasting means and results of the two approaches is illustrated on the following page.



What you can do

Call or write your elected representatives in Washington and your state capitol. Tell them you oppose a climate treaty based on "junk science" that would cost tens of thousands of family farms each year, and cause millions of jobs to disappear.

Write to the editor of your local newspaper. Challenge reporters to discuss the enormous costs to real people of the proposals being put forward to "stop global warming." Point out the shortcomings of the science of global climate change. Demand to know why your point of view is not being given equal coverage in the debate.

Talk with your friends, coworkers, and family members about the shaky science and huge costs of the global climate treaty. Urge them to join you in contacting elected officials and journalists, and help them spread the word to *their* friends, coworkers and families.

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Endnotes

- 1. Carbon dioxide, methane, and the other gases that would be regulated under the Kyoto Protocol are called "minor" greenhouse gases because together they make up only 1 percent of the atmosphere and account for less than 5 percent of the natural greenhouse effect. Thomas Gale Moore, *Climate of Fear: Why We Shouldn't Worry about Global Warming* (Washington, DC: Cato Institute, 1998), pages 10-11.
- 2. The full text of the Kyoto Protocol is available in Adobe Acrabat's portable document format (PDF) on the Internet at www.unfcc.de.
- 3. "Administration Tries 'End-Run' on Kyoto," *Environment News*, April 1998, page 9.
- 4. WEFA, *Global Warming: The High Cost of the Kyoto Protocol. National and State Impacts.* Eddystone, PA: 1998).
- 5. Ibid. See also CONSAD Research Corporation, *The Kyoto Protocol: A Flawed Treaty Impacts America. Sectoral and Regional Economic Impact Analysis.* May 1998.
- 6. The names of persons who have signed the petition can be viewed at http: //www.oism.org/pproject. See also "15,000 Scientists Urge Congress to Reject Kyoto Global Warming Treaty," *Environment News*, Vol. 1, No. 9, May 1998, pages 1, 5.
- 7. Citizens for a Sound Economy, "Analyses Finds Only 10% of Ozone Action 2600 are 'Experts' on Global Warming," news release, October 29, 1997.
- 8. Dr. S. Fred Singer, *Hot Talk, Cold Science: Global Warming's Unfinished Debate* (Oakland, CA: The Independent Institute, 1997), pages 40-43.
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- 12. Ibid. See also Dr. Roy Spencer, "Truth and Consequences: In Defense of the Satellite Data," in Dr. Patrick J. Michaels, ed., *State of the Climate Report 1998*, New Hope Environmental Services, Inc.
- 13. Dr. Patrick Michaels, "New Independent Measure Verifies Satellite Accuracy," *World Climate Report*, July 13, 1998, pages 1-2.
- Dr. Patrick Michaels, "The Effects of Proposals for Greenhouse Gas Emission Reduction." Testimony before the Subcommittee on Energy and Environment of the Committee on Science, U.S. House of Representatives. November 6, 1997.
- 15. NASA/Marshall Space Flight Center Web site, February 6, 1997.
- 16. Dr. Vincent Gray, "Climate Change 95: An Appraisal." *Heartland Policy Study* (Chicago, IL: The Heartland Institute, September 10, 1997).
- 17. Dr. Robert Balling Jr., Briefing on Global Warming. Sponsored by the Competitive Enterprise Institute and the National Center for Policy Analysis, June 13, 1997.

- IPCC, Climate Change: The IPCC Scientific Assessment, 1990 (1993), page 49. See also page 251.The IPCC's Climate Change 1995 report was published in three volumes, each representing the report of a different Working Group: Working Group 1, The Science of Climate Change; Working Group 2, Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses; and Working Group 3, Economic and Social Dimensions of Climate Change. The report was published by Cambridge University Press, Port Chester, New York, in 1996. For ordering information, call 1-800-872-7423.
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