

The Kyoto Protocol on Climate Change

BACKGROUND, UNRESOLVED ISSUES
AND NEXT STEPS

J.W. Anderson



RESOURCES
FOR THE FUTURE

January 1998

J.W. Anderson is RFF's journalist-in-residence. He is a former member of the Washington Post's editorial page staff.

This paper is a revised and expanded version of *Climate Change, Clinton and Kyoto: The Negotiations Over Global Warming*, issued November 1997.

Resources for the Future (RFF) is an independent, nonprofit research organization that aims to help people make better decisions about the conservation and use of their natural resources and the environment. For the past 45 years, researchers at RFF have conducted environmental economics research and policy analysis involving such issues as forests, water, energy, minerals, transportation, sustainable development, and air pollution. They also have examined, from a variety of perspectives, such topics as government regulation, risk, ecosystems and biodiversity, climate, hazardous waste management, technology, and outer space.

While many RFF staff members are economists by training, other researchers hold advanced degrees in ecology, city and regional planning, engineering, American government, and public policy and management. RFF neither lobbies nor takes positions on specific legislative or regulatory proposals. Its operating budget is derived in approximately equal amounts from three sources: investment income from a reserve fund; government grants; and contributions from corporations, foundations, and individuals (corporate support cannot be earmarked for specific research projects). Some 45 percent of RFF's total funding is unrestricted.

The latest RFF news and information is available on the internet at -- <http://www.rff.org>.

© 1997 Resources for the Future. All rights reserved. Reproduction of this paper is permitted with attribution and copyright citation.

RESOURCES FOR THE FUTURE
1616 P Street NW
Washington, DC 20036

phone (202) 328-5019
fax (202) 939-3460
internet <http://www.rff.org>

WHEN THEY MET in Rio de Janeiro in 1992, the world's governments agreed to try to stabilize emissions of the gases that can change the climate. But it was an agreement only to make a voluntary effort, with no binding commitments and no penalties for countries that failed to meet their goals.

When the same governments met again in Kyoto last December, they were attempting a much more difficult feat. They undertook to negotiate a binding agreement to firm and specific limits on greenhouse emissions in at least the world's major economies.

As the Kyoto Protocol to the Rio Treaty emerged on Dec. 11, it was a success in the sense that it represented a solid consensus of the 159 governments represented at the conference. But it was only a partial success, for it achieved that consensus by avoiding, or deferring to future conferences, a number of issues that would be crucial to its operation generally, and to its ratification by the country producing the greatest emissions, the United States. (For analysis of the Kyoto Protocol, see pages 14 to 18 of this paper.)

The Rio treaty had set the aim of lowering emissions to the 1990 level by the year 2000. By the Kyoto meeting, five and a half years later, it was clear that only a few countries would achieve that reduction. In the meantime, accumulating scientific evidence tended to support the proposition that gases resulting from human activity were already changing the global climate. This evidence is not conclusive and much controversy continues among researchers, but it is fair to say that by 1997 most scientists considered it at least probable that rising concentrations of these gases in the atmosphere were having an impact on temperatures and weather patterns.

Since greenhouse gases are generated mostly by burning fossil fuel, as in power plants, factories and automobiles, it is not easy to reduce emissions in growing economies. With the Kyoto conference, the concept of limiting emissions has become a political issue in many of the industrial countries. Here in the United States, ratification of the Protocol will require a two-thirds vote in the Senate. On one side are fears that emissions limits will interfere with economic growth and the rise in standards of living. On the other are fears, expressed by President Clinton and Vice President Gore among others, that global warming will mean bizarre weather with disastrous flooding, droughts and epidemics.

Climate change is an unusually difficult issue for the people who make the decisions in democratic governments. First of all, the science is uncertain while governments have to make firm policy decisions — if only the decision to do nothing — long before these uncertainties can be resolved. Political leaders are already beginning to overstate the clarity of the science, in order to attract public support. A lot of money is now going into climate research, and new findings with varying political implications will continue to appear.

Any serious attempt to cut emissions will have clear and immediate costs, but the benefits may not appear for a long time. To the extent that the benefits may be disasters that didn't happen, they may never be obvious. But the costs will be. As the debate develops, much of it is being cast in terms of the restraint that the present generation owes to future generations.

The Negotiating Record Up to 1996

Climate change is a newcomer to the international political agenda, having emerged as a major policy issue only in the late 1980s. But scientists have been working on the subject for decades.

They have known since the 19th century that carbon dioxide (CO₂) in the atmosphere retains heat from the sun, and that temperatures on the Earth's surface are affected by it. CO₂ is generated by burning any fuel containing carbon, from coal and oil to wood and cow dung. With the industrial revolution, the world's consumption of these fuels has increased hugely.

For many years scientists ignored it because, they assumed, the increases in CO₂ were being absorbed by the oceans. But in the International Geophysical Year 1957-58, they decided to test that assumption with a series of measurements from the top of Mauna Loa, the Hawaiian volcano, chosen as a site far removed from the influence of any local smokestacks. The Mauna Loa readings quickly demonstrated that concentrations of CO₂ in the atmosphere were rising steadily.¹

That finding led to a series of scientific meetings, most of them organized by various United Nations agencies. Concern about the climate was reinforced by a number of events, particularly the devastating drought along the southern rim of the Sahara Desert. As these meetings continued, scientists began to realize that in addition to CO₂, other common gases could also affect climate. Methane was one example, nitrous oxide another.

Until the mid-1980s, in most countries, environmental policy had been focused on domestic action. The most obvious threats were at home and, in any case, in the context of the Cold War any serious international cooperation to curtail greenhouse gas emissions seemed unlikely. But attitudes began to change around 1985, as scientists warned their governments about the ozone layer. Ozone in the stratosphere, they said, formed a screen that blocked ultraviolet radiation that can cause skin cancers in humans. Chlorofluorocarbons, a class of manufactured gases widely used in refrigeration and air conditioning, were escaping into the upper atmosphere where they were eating holes in the ozone layer. In response, the governments of most of the industrial countries negotiated the Montreal Protocol of 1987 to restrict, and ultimately to ban altogether, the production of these gases. The success of international cooperation at Montreal greatly encouraged the prospect for similar cooperation on other environmental policies. The end of the Cold War then removed another longstanding impediment.

The year 1988 is the point at which climate change and global warming emerged as a major political issue throughout the industrial countries. In the United States, Sen. Timothy Wirth (D-Colo- rado) had been deeply exasperated by his inability to draw public attention to the subject. When summer arrived he waited for a day forecast to be spectacularly hot, and called a hearing at which several experts testified. With the temperature at 98 degrees and anxiety rising about the drought gripping the Midwest and South, one of the experts, James E. Hansen, told the senators that the world was warmer than at any time in this century. It was 99 per cent certain, he continued, that the cause was man-made gases and not natural variation. “It is time to stop waffling so much and say the evidence is pretty strong that the greenhouse effect is here,” he told a reporter for the New York Times, which put the story at the top of page one.

Hansen’s testimony had unusual force because he was director of the National Aeronautics and Space Administration’s Institute for Space Studies, and the first scientist of that stature to declare flatly that the rising temperatures were related to burning fuel.

Four days later a conference opened in Toronto, attended by several hundred scientists, politi- cians and officials from 48 countries and the UN. It started the push for action by calling for a 20 per cent reduction in CO₂ emissions by the year 2005. Political leaders in several countries picked up the issue. One of them was Margaret Thatcher, the prime minister of Great Britain, who had been trained in chemistry as an undergraduate. In December the UN’s General Assembly approved the establishment of an Intergovernmental Panel on Climate Change (IPCC) to review the science.

The following year at their annual summit meeting, the heads of the seven big industrial democ- racies’ governments called for a treaty —a framework convention, as it became known — to limit the world’s production of CO₂. Negotiations shortly got under way.

But strains between the United States and most of the western European countries soon became visible. The Bush administration was uneasy about the scientific base for policy, and wanted more time for research. It was also hearing from industries threatened by the prospect of limitations on fuel con- sumption. The Europeans wanted to begin to move immediately. In early 1990 Bush held a White House conference attended by most of the industrial countries, where this dispute was ventilated but not re- solved.

Later in 1990 the first IPCC reports appeared, demonstrating a broad consensus among scientists in the field that the possibility of global warming at least had to be taken seriously. If warming had not yet started, the IPCC said, continuing increases in concentrations of greenhouse gases would certainly lead to it sooner or later. The Europeans cited the warnings in the report, while the Bush administration pointed to the uncertainties.

Throughout a long series of negotiating sessions, the United States flatly opposed any firm targets for CO₂ reduction in the emerging Framework Convention on Climate Change. The Europeans pushed and pulled vigorously, but got nowhere. In its final form the text gave them half a loaf, by acknowledging the desirability of reductions and setting the voluntary goal of cutting CO₂ emissions back to the 1990 level by the year 2000. Although that goal was merely an aspiration with no firm commitment or means of enforcement, it represented substantial movement from the United States’s original inclination to do no more than study the situation. The text of the Framework Convention was completed in time to be signed with great ceremony by nearly every country on Earth at the UN’s huge and colorful Conference on Environment and Development in Rio de Janiero in June 1992.

The 1992 elections brought to Washington an administration more sympathetic to action on environmental issues than its predecessor. It immediately signaled its intention of moving away from the Bush administration's position, and in February 1993 President Clinton proposed a broad tax on all energy consumption. It became known as the BTU tax, since it was to be based on each fuel's energy content measured in British Thermal Units. In April, to celebrate Earth Day, Clinton announced that he would reverse the government's previous position and adopt a program to stabilize greenhouse gas emissions at the 1990 level by 2000, as the Framework Convention urged. But that was the high point of environmental concern in the first Clinton administration. The president was soon distracted by the great struggle over his budget. Congress, hostile to the idea of an energy tax from the beginning, whittled the original BTU proposal down to an increase of 4.3 cents a gallon in the gasoline tax — too little to have any significant impact on consumption. When the specific details of the president's Climate Change Action Plan appeared later in the year, they turned out to be entirely voluntary. They included the promotion of products and technologies that use energy efficiently, encouragement of industry to commercialize efficient technologies to bring down their prices through mass production, and review of regulatory rules affecting energy production and use. Many environmental advocacy organizations denounced the Action Plan as inadequate.

They turned out to be right. By 1996 greenhouse emissions in the United States were 8.3 per cent above 1990 and continuing to rise steadily.² But the Bush administration also turned out to have been right about the Europeans when it accused them of making promises that they could not keep. By 1996 it was clear that, of the world's major industrial powers, only three would have their emissions under the 1990 level in the year 2000 — and none of them for reasons arising from environmental policy. Russia would make it because of the tremendous drop in industrial production there since the collapse of the Soviet Union. Germany would succeed because it had been closing down the grossly inefficient plants, mostly fueled by brown coal, that it had inherited from the defunct Communist regime in the former East Germany. Britain would also succeed, because the government was cutting off its subsidies to the obsolescent coal industry. But nowhere, in any of the large economies, was there any sign of a serious and purposeful effort to reduce CO₂ emissions for environmental reasons.

As 1996 began, the British Meteorological Office and the University of East Anglia, which is a central collector of global weather data, announced that the year 1995 had been the warmest in a record of temperatures going back to 1866.

The Science of Global Warming

At that point the ICPP published its second survey of the subject, three fat volumes of which the first was a review of the science markedly more decisive in its tone than its predecessor five years earlier.³ The statistical evidence, it concluded in a widely quoted line, “now points towards a discernible human influence on global climate.” But it followed that sentence with a warning about the limitations on present knowledge: “Our ability to quantify the magnitude of this effect is currently limited by uncertainties in key factors, including the magnitude and patterns of longer-term natural variability and the time-evolving patterns of forcing by (and response to) greenhouse gases and aerosols.”⁴

This report is, in effect, a textbook representing mainstream opinion among the specialists in climate change and the many sciences that it touches. It does not represent unanimous opinion. Some researchers believe that the case for human influence on the climate is still unproved. But the ICPP report is now at the center of the debate over the science of global warming, which at least in Washington goes forward largely in terms of what the report said, or did not say, or should have said. This report

is not as sharply conclusive as many politicians would have liked. It strongly emphasizes the many questions not yet answered, and the uncertainties that make judgment difficult. But the appearance of this report marked the point at which it became clear that most of the scientists involved had concluded that, to one degree or another, human activity appears to be playing a part in global warming.

The concentration of CO₂ in the Earth's atmosphere, the report said, was about 280 parts per million (ppm) in 1750, before the Industrial Revolution began. By 1994 it was 358 ppm and rising about 1.5 ppm per year. If emissions continue at the 1994 rate, the concentration will be around 500 ppm, nearly double the pre-industrial level, by the end of the 21st century.

Other greenhouse gases like methane and nitrous oxide have also been rising. The effect is that the atmosphere retains more of the sun's heat, warming the Earth's surface. Not all man-made additions to the atmosphere increase warming. Aerosols, tiny particles of solid or liquid suspended in the air, tend to reflect heat and diminish warming. But aerosols are mostly short-lived while the CO₂ thrown into the atmosphere will stay there for decades.

While the pattern of future warming is very much open to debate, it is indisputable that the surface of the Earth has warmed, on average, 0.3 to 0.6 degrees Celsius since the late 19th century when reliable temperature measurements began. Recent decades appear to be the warmest since at least 1400, according to the fragmentary evidence available. (Too little is known about the world's climate before 1400 to allow generalizations.)

A month after the Kyoto conference, American scientists at the National Climatic Data Center reported that the worldwide average surface temperature in 1997 was the highest ever recorded, and the 1990s the warmest decade, since reliable readings began in the 19th century. The continuing trend, they said, tended to strengthen the evidence that greenhouse gases are a cause.

The warming has not been uniform across the Earth's surface. It has been greatest in the mid-latitudes in winter and spring. Night temperatures have increased more than daytime highs. Patterns of precipitation have also changed, with greater rain and snow fall in the high latitudes of the Northern Hemisphere, and less in the subtropics from Africa to Indonesia. Global sea level has risen 10 to 25 centimeters over the past century.

The IPCC panel estimates that, on a worldwide average, temperatures will rise by 1 to 3.5 degrees Celsius by the year 2100, and sea level will rise another 15 to 95 centimeters.

Warmer temperatures could mean more droughts and floods. But the IPCC report states that present data are inadequate to judge whether climate is becoming more unstable, or that storms are becoming bigger and more destructive.⁵

To try to identify the human contribution to warming, scientists construct mathematical models of global climate. The IPCC report's conclusion is based on a finding that those models that take account of human activities run closer to the observed data than models based solely on natural factors. The early models predicted warming rates that were clearly too high, but in the 1990s the model-makers began to include the aerosols and their cooling effects, bringing their results into closer conformity with actuality. The fit is still far from perfect, and large uncertainties remain.

As the scientists put it, their models seek to identify the "signal" of human causation from the background noise of purely natural fluctuation in a climate that, over geological time, has changed continually and drastically. The test is statistical. Proof is never certain. Attribution can only be stated to

a given confidence level. Different scientists have different views about the confidence level necessary to support conclusions about greenhouse warming — whether it should be 95 per cent, or 99 per cent, or 99.5 per cent. Here one’s judgment is necessarily subjective. The IPCC report itself takes up the question as to when science will identify a positive anthropogenic effect (that is, an effect caused by human activity) on climate. It gives this answer: “Detection of a human-induced change in the Earth’s climate will be an evolutionary and not a revolutionary process. It is the gradual accumulation of evidence that will implicate anthropogenic emissions as the cause of some part of observed climate change, not the results from a single study.”⁶ A few paragraphs later, the report comes to its conclusion that the “body of statistical evidence” points toward human influence. As many people have pointed out, the IPCC report neither claims absolute proof, nor does it deny that other, purely natural, forces may also be at work in the warming trend.

Within the span of recorded history, the report observes, there is no time when the climate has been changing as rapidly as it now appears to be doing. That means that historical experience is not a reliable guide. That’s why it’s necessary to rely on the models, although they still show systemic errors.⁷ There are also uncertainties about natural variation, since accurate records go back less than 150 years.

The IPCC report clearly warns that the current models are unlikely to include all of the feedback mechanisms in the planet’s highly complex climate system. This point is highly important, and cuts both ways in the political debate. It means that there may be triggers hidden in the system, visible only in retrospect, that could change the warming trend line suddenly and sharply. To people who want quick and vigorous action to limit greenhouse emissions, it seems intolerably dangerous to run the risk of a feedback that might start the warming process compounding itself rapidly. But the possibility of feedbacks working in the other direction, to stabilize the climate, are the basis for the most substantial criticism of the IPCC panel’s work. Some highly qualified scientists point out that the most important of all the greenhouse gases is water vapor, and the physics of clouds is currently not sufficiently well understood to permit precise descriptions of the circulation of greenhouse gases or the way any feedbacks might operate.⁸

An issue of a different kind has arisen over the data from satellites measuring the temperatures of the atmosphere at various altitudes. These readings have been taken by some commentators to indicate that, contrary to the surface-level readings, the atmosphere has actually been cooling in recent years. But the scientists carrying out this work have argued that, when the satellite readings are corrected for the cooling effects of volcanic eruptions and for shifts in tropical ocean currents, they show a warming trend.⁹

In its general outline and tone, the IPCC report gives great prominence to the uncertainties and gaps in the present scientific understanding of the climate. As it notes, politicians will have to make decisions on climate policy without waiting for conclusive scientific evidence on the key questions.

If the physical science of this subject is uncertain, the economics is even more so. The third volume of the IPCC’s report is devoted to the economic and social consequences of warming. The right approach to policy, the report proposed, is to ask what actions to take over the next decade or two to position the world to act on new findings as they appear. “Climate change demands a decision process that is sequential and can incorporate new information.”¹⁰

If the uncertainties are prominent in the physical science, they are even greater in the economic analysis of global warming. The purpose of analysis is, or ought to be, to weigh the costs of mitigating the warming process against the costs of doing nothing.

In the present state of knowledge it is impossible to quantify the costs of doing nothing. A large factor is the risk, which is unknown, of catastrophic consequences of warming. Another factor, which usually goes unmentioned in the current debates, is the possibility of off-setting benefits of warming. One example is the prospect of longer growing seasons in northern countries like Canada and Russia.

A good deal of work has been done on the costs of mitigation, but it has resulted in a range of estimates too wide to be of much use in making policy. Many models have been constructed, but their results reflect the assumptions on which they rest.¹¹ The models generally fall into two categories. Some are built, in effect, from the bottom up, based on the prospect of new technologies and the benefits in conservation and emissions that they could theoretically bring. Others are built from the top down, using conventional macroeconomic experience to estimate the costs of writing off and replacing a generation of producers' equipment. It is not astonishing to learn that the first method generally produces low — often implausibly low — estimates of the costs of mitigation, while the second produces high — often implausibly high — estimates.

One of the strongest reasons for getting started on at least a small scale with some mandatory mitigation programs is to begin to accumulate reliable data based on actual experience.

Recent Negotiations

In early 1995, the UN had held in Berlin a conference of the parties to the Rio de Janeiro meeting — in the jargon of the negotiators, COP-I. The idea was to assess progress on the grand promises made there. The 120 governments represented at COP-I agreed to a plan, known as the Berlin Mandate, to pursue over the next two years an attempt to set specific and binding targets and timetables to reduce greenhouse gas emissions. These targets and timetables were to apply to the industrial countries, but not the developing countries. Although that provision seemed innocuous at the time, it became increasingly controversial as time passed.

The negotiators met again for COP-II in Geneva in the summer of 1996. At that session Wirth, the former senator, now under secretary of state for global affairs and the chief American spokesman in this process, announced that the United States would support legally binding limits on emissions if other countries also did so. That was a clear and important reversal of longstanding American policy.

But there was still friction between the Americans and the Europeans. In December 1996, at an interim meeting, Wirth emphasized that the United States favored great flexibility in setting targets. Here he was following the advice of economists, who argue that flexibility means greater efficiency and lower costs in reaching targets. But in the international talks as in American domestic environmental politics, there is sharp debate between economists seeking efficiency and regulators who suspect that flexibility is merely a synonym for loopholes.

While the international talks trundled along through many meetings, there was little sign that the subject of climate change was getting much attention at the White House. The President gave it part of one sentence in his 1997 State of the Union Message: “We must also protect our global environment, working to ban the worst toxic chemicals and to reduce green house gases that challenge our health even as they change our climate.” That constituted a tip of the hat, but nothing substantial.

The Europeans meanwhile were trying to turn up the pressure for action. On March 3, 1997, the 15-nation European Union called for a reduction of emissions by all industrial countries of 15 per cent below the 1990 level by the year 2010. In Britain, where an election campaign was under way, the

Labour Party pledged in its manifesto to put Britain at the front of the world environmental movement by supporting a 20 per cent reduction in CO₂ by 2010. Labour's huge win in May gave further momentum to its demand.

While the United States was committed in principle to binding limits, the Clinton administration was having trouble deciding exactly how much to reduce and over what period of time. Those questions were being hotly debated in endless meetings in Washington. The debate was being forced not only by criticism from abroad but by a deadline. A third meeting of the conference of parties, COP-III, was scheduled to be held in Kyoto in December 1997 and the negotiators hoped to write a treaty there that would set the promised legal limits.

In June, at the annual meeting of the world's leading industrial powers, the Europeans began to press Clinton personally and publicly. Clinton agreed that global warming is a serious issue, but avoided specific numbers for the emissions ceilings. The president of France, Jacques Chirac, chided the Americans as "great polluters" and said that they generate three times as much CO₂ per capita as the French do.

Immediately after the Denver meeting the UN's General Assembly convened a special session in New York to assess the progress on the Rio pledges. The progress, it found, was minimal. The Europeans continued to assail the United States for failing to join them in supporting a sharp rollback in emissions. Britain's new prime minister, Tony Blair, offered the comment that "the biggest responsibility falls on those countries with the biggest emissions." The United States's emissions are the largest of any country, by a wide margin.

The reasons for the tension between the Americans and the Europeans are rooted in deep differences between the economies and politics of the two continents. Only a few of the European countries have substantial energy industries under private ownership. Both the United States and Canada have hugely important energy industries with great political influence, not only through corporations but through the labor unions. By 1997 a number of American unions, led by the United Mine Workers, were fiercely hostile to any treaty on global warming. Europeans have a stronger conservation tradition, and already have energy prices much higher than those in the United States. Some of them would also point out that they live much closer to the horrific pollution that the former Communist governments of Eastern Europe created in their desperate efforts to wring faster growth out of their badly run industries. In some European countries there are vigorous Green parties nipping at the heels of their governments.

In addition to the disputes between Americans and Europeans, the UN session also displayed a broader range of differences between North and South — the rich countries and the poor. At Rio the rich had promised new aid, amounting to about \$6 billion, to the poor to help them toward more efficient use of energy. Very little of that money had actually been forthcoming. Some of the oil-exporting countries were trying to claim compensation for any world-wide attempt to drive down energy consumption, and with it their incomes. A group of small countries inhabiting low-lying islands plaintively observed that continued rises in sea level threatened to sweep them and their people off the map altogether. More important, many people in the big countries well embarked on industrialization, especially China and India, suspected that the whole idea of global warming was a device invented by the rich countries to hold down growth among their newest competitors. In general the Third World regarded the threat of global warming, if it actually existed, to be a creation of the rich countries and felt that it was up to the rich countries to deal with it.

In this atmosphere President Clinton went to New York in June to address the UN's special session. "The science is clear and compelling," he said. "We humans are changing the global climate." He spoke of new technologies and economic strategies like emissions trading that would, he argued, allow reductions in greenhouse gases without damaging economic growth.

For the first time the president personally declared himself in favor of limits: "We will work with our people, and we will bring to the Kyoto conference a strong American commitment to realistic and binding limits that will significantly reduce our emissions of greenhouse gases." But, as all his critics immediately observed, he again declined to say where the United States wanted to put those limits. The American position remained undefined.

Clinton clearly felt that, before he proceeded to any serious action, he would have to get more Americans focused on the subject. On July 24 he held a White House conference in which he and Vice President Gore, the administration's ranking environmentalist, opened a campaign for greater public awareness. "We see the train coming," the president said, "but most Americans in their daily lives can't hear the whistle blowing."

On the following day, as though in response, the Senate passed, 95 to 0, a resolution telling the president not to sign at Kyoto any treaty putting limits on the developed countries' emissions unless it also committed the rest of the world to take action. While lobbyists for some of the energy companies had been pushing this idea, it spoke to much wider concerns in Congress. Specifically, the Senate feared that the treaty might hamper American industrial expansion to the benefit of China, with which this country is already running a very large trade deficit, and other newly industrializing economies.

Pursuing his effort at public education, the President held another White House conference on Oct. 6. Vice President Gore was again there, along with much of the Cabinet. Clinton set out four principles to guide policy. Three repeated past statements. "First, I'm convinced the science is real." Second, the United States must be prepared to commit itself to "realistic and binding" goals. Third, those goals must permit the economy to keep expanding.

And fourth, he continued, all the world's nations must participate. At Kyoto, the president said, the United States wanted "meaningful, but equitable" contributions from all countries. That was new, and meant that he had decided against fighting with the Senate over China's role. But it raised severe difficulties for the negotiators working toward a treaty text for Kyoto. Most of the developing countries were adamantly against any restrictions on their emissions until they had seen a serious and substantial effort by the rich economies. In addition, the Europeans complained that Clinton was changing the terms that had been agreed in the Berlin Mandate two years earlier. This new requirement was introduced by the United States in the final weeks of a cumbersome negotiating process, involving more than 140 governments, that had been going on for two and a half years.

Japan's government, as host of the Kyoto conference, was deeply anxious that it not become a fiasco. On the same day as Clinton's White House conference, the Japanese brought out their own proposal for emissions goals: reduction to 5 per cent below 1990 levels by 2012. The proposal, intended as a compromise, also included complex formulas for differentiation — that is, for varying the goal in response to each country's particular circumstances.

The lower Japanese targets drew jeers from some environmentalists and reproaches from the Europeans. But then some Americans began pointing out that the European Union's plan, when read closely, was revealed to provide wide differentiation among the EU's member countries while firmly opposing any differentiation at all outside the EU. Critics also observed that the Europeans had had very

little to say about the policies by which they might actually achieve the targets that they were proposing. By this time even those politicians around the world who hadn't been following global climate policy very carefully were becoming aware of the political and economic implications of a possible Kyoto treaty.

But up to this point the debate had a loose and slightly unrealistic quality, because the country with the greatest influence had not yet disclosed its position. That changed on Oct. 22, when the president went to the National Geographic Society in Washington, the proper setting, he thought, for an address on global climate change.

President Clinton's Oct. 22 Program

In the key lines of his speech, the president said that the United States would commit itself at Kyoto to "the binding and realistic target of returning to emissions of 1990 levels between 2008 and 2012. And we should not stop there. We should commit to reduce emissions below 1990 levels in the five-year period thereafter, and we must work toward further reductions in the years ahead." That schedule was slower than the one proposed by the EU although, the administration argued, stronger than the Japanese position because it included a longer list of greenhouse gases.

Clinton repeated his position on the developing countries, to leave no doubt regarding the American position at Kyoto: "...both industrialized and developing countries must participate in meeting the challenge of climate change. The industrialized countries must lead, but developing countries also must be engaged. The United States will not assume binding obligations unless key developing nations meaningfully participate in this effort."

The American proposal was drafted to address the long term. As the administration conceived it, this program was to fall into four five-year phases. In the first, from now until 2002, the inducements would be all carrots and no sticks. The federal government would provide \$5 billion in incentives, including tax preferences, to encourage the development and installation of new technologies to produce and use energy more efficiently. To industrial plants that reduce their greenhouse gases now, the government would offer special credits to be cashed in when the mandatory restraints on emissions took hold later. As Gene Sperling, the president's assistant for economic policy, put it in a press briefing, this first phase will be devoted to "the things America can do without waiting, without, we think, conflict." The concept was to exploit first the technologies that already exist.

The second phase would be devoted to evaluation what has been accomplished and taking account of new developments in science. Nothing envisioned in these first two stages, other than minor tax cuts and other incentives, was to require congressional action. The method would be, again, carrots alone.

The binding and mandatory limits were to be applied in the third phase, from 2008 through 2012, with the intention of getting the country's greenhouse gas emissions back down to the volumes of 1990. As noted earlier American emissions in 1996 were already 8.3 per cent above 1990. By the administration's calculation, by 2010 they would be 34 per cent above 1990 if they continued on the present track.¹² As the president described it, voluntary reductions might well bring emissions close to the necessary 1990 target even before the mandatory limits go into effect. The enforcement system, he suggested, might follow the model of the present market for sulfur dioxide rights to control acid rain. That mechanism applies only to large industrial power plants, most of them run by electric utilities.

The suggestion here was that the future emissions reduction regime would operate mainly, if not exclusively, through the large industrial sources. Through two decades of experience, environmental policy makers have discovered that the American public has a fairly high tolerance for costs of protection as long as they are filtered gradually through utility bills. But it has very little tolerance for directly imposed costs, as in higher costs for gasoline. There was nothing in the president's program that remotely hinted at restraints on individual citizens' activities, such as driving.

Nor was there any reference to nuclear power or hydropower, at present the only technologies that generate electricity on a large scale without producing carbon dioxide. Any indication of an expansion of either would incense much of the environmental movement, illustrating one of the many hazards in climate politics.

In the fourth phase of this program, the years after 2012, president said, the country would push its emissions down below the 1990 level to a target not yet specified.

Another notable omission in the president's plan was any discussion of preparations for life in a somewhat warmer world. If the president is correct in believing that CO₂ emissions are raising temperatures, some measure of warming is going to be inevitable in the 21st century. No one in political office, in this country or any other, is talking about the kind of draconian reductions in current emissions that would be required to hold the concentrations of CO₂ in the atmosphere at their current levels. The question is not whether the world will get warmer, but only how fast it will happen. Adaptation to a changing climate will be unavoidable. But it is a subject that carries a heavy ideological freight, for many people in the environmental movement suspect that any discussion of adaptation can only distract attention from the efforts to cut emissions.

The president's purpose in his Oct. 22 address was less to lay out a detailed program than to get Americans thinking about climate change and to take the prospect seriously. Before anything else could be done, he had evidently concluded, he needed to build a political base for action. Throughout his address the president sought to elevate the issue of global warming without getting entangled in the difficult and controversial choices that a serious policy would, sooner or later, require. The time for vigorous administrative and regulatory blueprints would come only when, to use his metaphor, Americans began to hear the train's whistle. In his October program, he chiefly wanted to get Americans into the habit of making a connection between changes in the weather and their own use and misuse of fossil fuel. Beyond that, he wanted the engineers and boards of directors running utilities to begin routinely taking into account the idea that at some point the equipment they install today may have to meet new and much tighter emissions standards.

But there is another side to this subject. However persuasive the administration's political calculations were, certain economic realities also applied. In particular, the administration was caught in two dilemmas.

The first involved prices. Far from talking about increased energy prices, the administration was saying that under its plans they would stay low or perhaps even fall. Lower prices generally mean higher consumption and higher CO₂ emissions. The administration did not deal with this contradiction but merely deferred it, with much else, to the future. That led to the second dilemma.

The president's program depended heavily on the credibility of its promise that, a decade from now, mandatory reduction in emissions will be enforced by federal law. If people do not believe that — especially the people making decisions on the design of long-lived industrial equipment and consumer goods — they are unlikely to begin making the substantial investments that a low-emissions regime

requires. The administration's offer of \$5 billion in subsidies and tax breaks does not begin to cover the enormous costs of shifting to that regime. To have any significant effect without greater outlays of federal money, it would be necessary that both industry and, ultimately, consumers consider it highly probable that a time will come when cooperation is no longer voluntary. The sketchiness of the Clinton program, its evasiveness on pricing and its very long timetable all militated against its credibility.

The Kyoto Conference

Less than six weeks after President Clinton had announced his program, the international conference to draft a treaty opened at Kyoto, Japan. It was a huge affair, with some 10,000 officials from nearly every national government on Earth plus a large following of lobbyists and observers from a great variety of non-governmental organizations representing environmental interests and industries. Originally scheduled to run from Dec. 1 to 10, it got off to a slow start and, like many hard-fought negotiations, picked up speed only in the final hours when the meetings had run into overtime.

On Dec. 8 Vice President Al Gore flew in from Washington for a one-day stop, pushing the process forward with the message that the United States was willing to compromise by agreeing to a deeper emissions cut than the President had specified in October. Even then the talks bogged down again over the vehement resistance of some developing countries to the concept of emissions trading. The chair of the conference's committee of the whole, Raul Estrada Oyuela of Argentina, warned that the whole proceeding would collapse in the absence of more flexibility. Eventually, in an all-night session, he managed to broker a deal notable for the key issues left to the future. The committee of the whole completed the text of the Kyoto Protocol at 10.15 am on Dec. 11, and the plenary session convened that afternoon to adopt it.¹³

The proposed Protocol settles a number of difficult issues. The most visible, the targets and timetable for emissions reduction, split the difference between the United States and the European Union. Where the U.S. had wanted a target of returning to 1990 emissions levels and the EU had wanted one 15 per cent below it, they agreed on a target for the U.S. 7 per cent below the 1990 level and, for the EU, 8 per cent below it. But within the EU the text allows wide country-by-country variations. Japan will cut emissions to 6 per cent below 1990. Several smaller economies will be allowed to increase emissions: Iceland 10 per cent above 1990, Australia 8 per cent above and Norway 1 per cent above. Several will be required only to return to 1990 levels: Russia, Ukraine, New Zealand. The others will reduce emissions by varying amounts in the range from 95 to 92 per cent below 1990. These limits have been accepted by 38 countries — those conventionally called developed, including Eastern Europe and some of the former Soviet Union. In the language of the Protocol, these are the Annex I countries. These cuts are calculated to amount to a reduction in worldwide emissions of 5.2 per cent below 1990.

The conference accepted the American idea of a five-year target period, 2008 through 2012, rather than a single date.

It also accepted the American proposal to include all six of the major greenhouse gases. There had been some sentiment in favor of covering, at this stage, only the three most important: CO₂, methane and nitrous oxide. But, as completed, the text also covers hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. Emissions are to be measured and counted by methodologies established by the IPCC in its role as scientific advisor to the process.

On a less conspicuous but equally important point, the governments were finally able to agree to count net, not gross, emissions. A forest is a sink for CO₂; that is, it absorbs the gas out of the atmosphere. Most of the developed countries strongly favored allowing for sinks, on grounds that it would encourage planting trees and discourage burning them. Some developing countries, notably Brazil, were uneasy about this language, apparently fearing that it would turn into a condemnation of their land-clearing practices. They asked whether it would create a license for rising emissions in the developed countries. But the developed countries won that one, and the final text (Article 3, paragraph 3) permits them to count net changes in sinks “resulting from direct human-induced land use change and forestry activities” since 1990.

The protocol is to be open for signature from March 16, 1998, to March 15, 1999. It is to come into effect 90 days after the fifty-fifth government ratifies it, assuming that those 55 countries account for at least 55 per cent of the CO₂ emissions of the developed countries in 1990. That percentage was chosen to ensure that most of the developed countries’ emissions would be covered, but not so high a proportion that any one country — meaning the United States — could veto the protocol by refusing to approve it. This provision is not, of course, likely to have much practical effect since few of the major economies are likely to ratify this agreement unless the United States does.

Before the United States can ratify the protocol, it must go to the Senate. That leads to another large subject.

The Issues Left Unresolved at Kyoto

The Kyoto conference was a success, in the sense that it came to agreement on a document that covers an extremely difficult subject touching many interests. It represents substantial progress toward a worldwide agreement on greenhouse gases and, by implication, the production and use of energy. But the negotiators arrived at that achievement only by explicitly postponing to later meetings some questions that the United States considers crucial. They also used notably vague language to patch over several troublesome disputes. There are five major points on which the administration is going to need further progress or clarification before it can safely send the Kyoto protocol to the Senate.¹⁴

First and most obvious, the United States got nowhere at Kyoto with its demand that the largest of the developing countries commit themselves to some kind of limitation on emissions. In Congress there is a broad consensus, including both parties, against any agreement that does not somehow include China, Mexico, and South Korea. There is a widespread concern that emissions restrictions in this country will simply provide an economic incentive to companies to shift industrial production, and the jobs it represents, to sites abroad where no such expensive rules apply. Vice President Gore, speaking for the administration, has said flatly that the treaty will not be submitted to the Senate until the leading developing countries are included. Since the next negotiating session has been scheduled for November 1998, the treaty is unlikely to move toward ratification until 1999 at best.

Second, the United States has insisted on international trading in emissions rights and on joint implementation. Trading means that a country that is under its limit can sell emissions rights to a country, or to a corporation in a country, that is over its limit. Joint implementation means that a company in, say, the United States, wishing to expand and increase its emissions, can earn the right to do it by making investments that reduce emissions elsewhere in the world. But, to make these markets work, the countries on both sides of the deal have to be under emissions limitations. Otherwise there is no baseline against which to score the increases and decreases. The greatest opportunities to reduce emissions

cheaply are in the Third World. That adds to the American interest in bringing developing countries into the system.

In demanding a mechanism to trade emission rights, the United States cites its own experience as proof that trading will maximize the efficiency of emissions reduction. The American legislation to curb acid rain established a market in SO₂ emissions rights, and the result has been to bring down those emissions at a cost far below the electric utilities' expectations. Applying this lesson to global warming gases is good economics.

But it has run into substantial political opposition. Some Third World governments fear that the developed countries will use their great financial power to buy their way out of emissions restrictions and transfer those limits to poorer countries, where they will interfere with industrial development. Some Third World officials have spoken of joint implementation as environmental colonialism. At Kyoto India, with the support of China and Indonesia, declared its opposition to the concept of trading on grounds that it is irrelevant to the Berlin Mandate — which in those countries' view leaves them out of the system at this stage — and that it would not lead to reductions. When developing countries' opposition to trading threatened to stalemate the whole Kyoto conference in its last hours, the British came up with a compromise paragraph (Article 16 bis) that accepts the concept of trading in principle, but leaves the design of the market and its rules entirely to a future conference.¹⁵ Again, the Clinton administration is not likely to send the protocol to the Senate for ratification until a matter of such central importance to the United States has been more clearly resolved.

Until now, these negotiations have moved forward by consensus. But the Kyoto Protocol foresees the possibility that it may not be possible to resolve some disputes by consensus and it sets a rule of one vote for each country, as in the UN's General Assembly. Since the developed countries are outnumbered three to one by the undeveloped, the administration cannot be confident that it will prevail in these future conferences.

It is quite possible that trading and joint implementation will also be attacked in the U.S. Congress, although for reasons very different from India's. It has not escaped congressional notice that these arrangements would result in a substantial flow of investment capital from the United States to other countries. Rep. Bill Archer (R-Texas), the chairman of the House Ways and Means Committee, recently said, "It's another form of foreign aid."¹⁶

Third, the Protocol also provides for explicit financial aid, in the form of funds given by rich countries to poor ones to help them set up emissions accounting procedures and to promote the transfer of technology. But it is very vague about the amounts, speaking only of "new and additional financial resources" (Article 11, section 2 (a)).

There's a long and contentious history to this phrase. It's drawn directly from the Framework Convention on Climate Change, the treaty signed in 1992 at Rio, which declared that the money would be handled by a new agency run by the Conference of Parties to the treaty — that is, all the governments that had joined it. As an interim measure, only until the new agency could be organized, it would be run by the Global Environmental Facility that had been created by the World Bank. But, five years later, as the governments met again at Kyoto, the new agency had not yet appeared and the Global Environmental Facility was still in charge. Many developing countries considered that a betrayal. One political issue here concerns control and voting procedures. The Third World countries have a majority in the Conference of Parties, but the GEF is run under complex voting rules that, as in the World Bank itself, gives reliable control to the donor countries. Another source of resentment among the developing countries is the amount of money provided, which has turned out to be much less than many of them expected.

The Kyoto Protocol would establish a Clean Development Mechanism to regulate joint implementation (Article 12). It would operate under the Conference of Parties and would assess a share of the proceeds from joint implementation projects to help developing countries “that are particularly vulnerable to the adverse effects of climate change.” That would be, in effect, a transaction tax on these projects with the tax rate to be set by the Conference of Parties.

These financial issues have received a great deal of attention among Third World governments. Their disappointment with the rich countries’ performance under the Rio Treaty, and the promises it made, has contributed heavily to the suspicion and resentment with which many of these governments reacted to the American proposals at Kyoto. While the financial aid provisions have hardly been mentioned so far in the United States, many developing countries consider them crucial to any further cooperation on their part.

Fourth, the whole question of sanctions and what to do about countries that fail to meet their commitments was deferred to a future meeting of the Conference of Parties (Article 17). The question was, in effect, too hard to resolve at Kyoto. But it is difficult to believe that many of the developed countries will be willing to ratify the Protocol without some assurance of significant penalties against those that violate it.

There was some discussion of sanctions during the negotiations, but they came to no resolution. None of the current proposals is very attractive. One possibility might be monetary fines, but that would be received with suspicion by Third World officials who fear that some rich countries might simply choose to pay and pollute. Another idea is a rule that a country exceeding its limit in one period would be required to make up that excess in the next period. But that would not bring any additional pressure to bear on a country that simply continued to disregard its commitments. A third proposal is to enforce the limits with trade sanctions. The trouble with trade sanctions is that they are dangerously powerful. They threaten economic growth, not only in the country being sanctioned, and they generated political tensions that can quickly turn ugly.

Diplomats point out that the history of international agreements shows that most countries make a good-faith effort to live up to them most of the time. But that assurance is probably not going to be accepted by the opponents of the Kyoto Protocol, who observe that in this case violators would gain a substantial commercial advantage over their competitors.

Fifth, no government has yet offered any clear outline of the actual policies and methods by which it would meet its commitments under this Protocol. In this respect, the Clinton administration is typical. The President’s last word on the subject was his Oct. 22 program calling for little more than voluntary efforts until 2008. But the country is now committed to an emissions reduction of 30 per cent from the level that, by the administration’s calculations, it would reach by 2010 under present policy. In a period of only 12 years, a 30 per cent reduction is a massive change with deep implications for industrial practices and consumers’ habits alike. If the administration has no intention of using taxes and higher energy prices to push that change, it is difficult to see how it can begin to meet this very ambitious target.

In the United States and every other democracy, emissions reductions on this scale will require public debate, and public engagement with the issues of energy use, of an intensity not yet visible. Some governments have begun to talk about action to meet the Kyoto requirements. Britain, on beginning its six-month term as president of the European Union in January, said that one of its priorities would be to get moving on a climate change policy. But the governments at Kyoto set their goals with no clear strategy for getting there, or clear estimates of the costs of doing it.

In Article 2, the Protocol says that the developed countries shall undertake various policies and methods “such as” improving energy efficiency, promotion of sustainable agriculture, research and development addressed to new and renewable energy sources, ending energy subsidies and so forth. This phrasing was a compromise between countries that wanted the Protocol to specify mandatory measures and those that did not.¹⁷ The elasticity of the language leaves it up to governments to interpret the article as they choose.

A Final Comment

The Kyoto conference was the beginning, not the culmination, of the first serious international attempt to address greenhouse emissions and the prospect of climate change. Kyoto was not the last word but rather only a stage in working toward genuinely binding international agreements. That has disappointed those people who had hoped for dramatic action. But it was consistent with the advice that scientists are still far from a reliable grasp of the planet’s climatology, just as its diplomats and politicians are far from a consensus on dealing with it.

The climate is not the only factor that will affect the quality of life on this Earth in the 21st century. The population of the world is also rising rapidly. While its rate of growth has slowed over the last several decades, it is still rising several times as fast as the CO₂ concentrations in the atmosphere. The world’s economic output in recent years has been rising half again as fast as its population and there are few people — certainly not President Clinton — who are prepared to slow down productivity in order to protect the climate. Global warming, population increase and economic expansion are all related to each other.

“It is our solemn obligation to move forward with courage and foresight to pass our home on to our children and future generations.” Clinton said at the National Geographic Society in October. But because of all that a restless and creative humanity does from day to day, our children and future generations are going to live in a world very different from the present one. A changing climate will be only one of those differences.

###

Endnotes

- ¹ A useful summary of this history is provided by Matthew Paterson, *Global Warming and Global Politics*, London and New York, 1996. See Chapters 2 and 3.
- ² U.S. Department of Energy, *Emissions of Greenhouse Gases in the United States 1996*, Washington, DC, Oct. 22, 1997.
- ³ While the reports were actually published in book form in 1996, their conclusions had become widely known in late 1995 as various meetings approved the texts. The section on science became public Nov. 30, 1995, at a meeting in Madrid.
- ⁴ Houghton, J. T., and others, eds., *Climate Change 1995: the Science of Climate Change*, Cambridge, 1996, p. 439.
- ⁵ This summary of the report's summary comes from op. cit., pp. 1-7, 28.
- ⁶ Op. cit., p. 438.
- ⁷ Op. cit., p. 413, 416.
- ⁸ See, for example, the testimony of Ronald G. Prinn, director of the MIT Center for Global Change Science, before the subcommittee on energy and environment of the Committee on Science, U.S. House of Representatives, Oct. 7, 1997. Prinn told the committee that forecasts of slow or rapid growth are equally defensible, in the present state of knowledge, and in his view it would be as irresponsible to overreact as to do nothing.
- ⁹ See, for example, the testimony of John R. Christy, University of Alabama, Huntsville, before the Committee on Environment and Public Works, U. S. Senate, July 10, 1997.
- ¹⁰ Bruce, James P., and others, eds., *Climate Change 1995: Economic and Social Dimensions of Climate Change*, Cambridge, 1996, p. 26.
- ¹¹ Repetto, Robert, and Duncan Austin, *The Costs of Climate Protection: a Guide for the Perplexed*, World Resources Institute, Washington, 1997.
- ¹² U.S. Department of Energy, Energy Information Administration, press release, Nov. 12, 1997.
- ¹³ Warrick, Joby, *The Washington Post*, p. A-1, Dec. 13, 1997. See also the detailed and very useful account of the proceedings published by the semi-official *Earth Negotiations Bulletin*, Vol. 12, No. 76, available on the Internet at www.iisd.ca/linkages/vol12/enbl276e.html#1.
- ¹⁴ On this subject I am indebted to two articles in *Weathervane* by Raymond J. Kopp, Richard D. Morgenstern and Michael A. Toman, "The Kyoto Protocol: Unresolved Issues," at <http://www.weathervane.rff.org/features/feature026.html>, and "The Realities of Implementation," <http://www.weathervane.rff.org/features/feature027.html>.
- ¹⁵ See the Earth Negotiations Bulletin summary cited above.
- ¹⁶ *Congressional Quarterly*, Nov. 29, 1997, p. 2953.
- ¹⁷ *Earth Negotiating Bulletin*, cited above.



As policymakers prepare for the upcoming meeting of the Conference of the Parties, Resources for the Future (RFF) recently launched *WeatherVane*, an internet forum dedicated to climate change policy. Published at <http://www.weathervane.rff.org>, *WeatherVane* is designed to provide the news media, legislators, opinion leaders, and the interested public with analysis and commentary on U.S. and international policy initiatives designed to reduce emissions of greenhouse gases.

Just as a traditional weathervane tracks the direction of the wind, *WeatherVane* tracks the developments in climate change policy, both internationally and within the United States. And, just as one of the basic rules for designing a weather vane is that there must be equal mass on either side of its center, its editorial aim is to present balanced and objective information, with no one perspective or viewpoint dominating our analysis and reporting. With the stakes potentially enormous on all sides of this complicated issue, *WeatherVane* strives to provide a neutral forum for careful analysis to complement the political calculations that so often drive decisions.

WeatherVane includes feature articles and news commentary written by the online publication's staff, RFF researchers, and invited policymakers and opinion leaders. The site also contains a number of departments. These include:

P O I N T ▶
◀ **C O U N T E R P O I N T**

An opinion forum for invited players in the climate policy debate. It gives experts from every corner — business, government, environmental groups, and academia — an opportunity to weigh in with their opinions on a selected topic. The essays solicited are “quotable,” on-the-record statements by the people most intimately involved in climate change policy.

W W W . W E A T H E R V A N E . R F F . O R G

A regular column by RFF's Ray Kopp to help decode and demystify energy and environmental data and create a better understanding of the link between economic data and policy formulation.



AT THE NEGOTIATING TABLE

At the Negotiating Table, a running column devoted to tracking developments in international policy, the key players in the debate, key reports issued by various government and intergovernmental groups, and international meetings.

Other features include: **Research Spotlight**, which sheds light on new climate findings and projects; **Sounding Off**, an open forum for site visitors to voice their opinions on a variety of topics related to climate change; and, an expanding glossary of economic, environmental and ecological terms often used in climate change negotiations.

Since its launch in mid-July, *Weathervane* has, as of November 1, hosted more than 12,250 site visitors who have logged nearly 212,000 hits to individual pages. In addition to the U.S., site visitors have logged in from Canada, Australia and New Zealand, Japan, France, Denmark, Norway, the Netherlands, the UK, Austria, South Korea, Taiwan, Italy, Malaysia, and Brazil, among other countries.

Join the climate change debate today at www.weathervane.rff.org!

To receive free e-mail updates about new features and articles at Weathervane, send the e-mail message "subscribe" to Weathervane-Request@rff.org.