

FL58
CO5
I865
no.89-5

Documents Department
Oklahoma State University Library

Order Code IB89005

CRS Issue Brief

Global Climate Change

Updated May 10, 1993

by
John R. Justus and Wayne A. Morrissey
Science Policy Research Division



Congressional Research Service • The Library of Congress



CONTENTS

SUMMARY

MOST RECENT DEVELOPMENTS

BACKGROUND AND ANALYSIS

Greenhouse Effect and Global Warming

Greenhouse Gases: Sources and Trends

The Policy Context

International Action

Framework Convention on Climate Change

Congressional Interest and Activities

100th Congress

101st Congress

102nd Congress

103rd Congress

LEGISLATION

CONGRESSIONAL HEARINGS, REPORTS, AND DOCUMENTS

CHRONOLOGY

FOR ADDITIONAL READING

Global Climate Change

SUMMARY

There is growing concern that human activities could be affecting the energy-exchange balance between the Earth, the atmosphere, and space, inducing global climate changes. These changes may have far-reaching effects, with results that could be seen as both positive and negative. Human activities, particularly the burning of fossil fuels, have increased atmospheric carbon dioxide (CO₂) and other trace gases, including chlorofluorocarbons (CFCs), methane, and nitrous oxide. If these gases continue to accumulate in the atmosphere at current rates, global warming could occur through intensification of the "greenhouse effect," a process that moderates the Earth's climate, making it habitable and supportive of life. Such warming could affect agriculture, forestry, and water resources, and, under certain scenarios, could lead to either rising or falling sea levels depending upon climate system responses. Although causal relationships between these projected long-range trends, the record-setting warmth of the 1980s, or a singular event such as the severe U.S. drought of summer 1988 have not been firmly established, such conditions have focused public attention on potential climate change and on the need for better understanding of global and regional climate and improved climate prediction models. The basic question is: Given the scientific uncertainties regarding the magnitude, timing, rate, and regional consequences of the potential climatic change, what are the appropriate policy responses, both at the national level and international levels?

Fossil-fuel combustion is the primary source of CO₂ emissions, and it also emits other "greenhouse" gases. Removing these gases after combustion imposes severe technical difficulties and economic penalties. Policy options to curb emissions stress energy efficiency and conservation, market-oriented strategies such as carbon taxes, and the substitution of nuclear energy, renewable energy, and less CO₂-intensive fossil fuels, like natural gas, for coal and oil.

Global warming would probably have significant effects on agriculture and forestry. Regional agricultural practices could change, yield stabilities might decrease in some regions, and survival over winter of some insect pests might increase. Forest productivity might decline in some regions; and changes in climate, when added to other stresses which forests are undergoing, could produce major regional disturbances. Some changes -- for example, in northernmost growing regions -- might be beneficial, however.

Congress has sought to acquire information about possible climate change, to evaluate potential economic and strategic impacts of a warmer climate, and to formulate appropriate policy responses. Because of the global implications of this problem, some Members and committees of Congress have also attempted to elevate concern internationally through direct communication with world leaders, participation in international conferences, passage of congressional resolutions and appropriate legislation, and exchange of views and information with international organizations within and outside the United Nations system. It is in this milieu that scientists, diplomats, and policymakers completed negotiations, under United Nations General Assembly auspices, achieving consensus on a binding, yet voluntary agreement to stabilize atmospheric greenhouse gas concentrations, in hopes of moderating potential global warming.

MOST RECENT DEVELOPMENTS

President Clinton announced on Apr. 21, 1993, that he would reverse official U.S. policy and reduce emissions of greenhouse gases to 1990 levels by the year 2000. This counters the previous Administration's policy of not committing to specific targets and timetables for greenhouse gas reduction. This proposal is more in line with the sentiment of a majority of parties to the U.N. Framework Convention of Climate Change who were aiming for specific targets and timetables for emissions reductions.

Many environmental groups praised the President's action, but with reservations that no specific commitments were made to sustain lower emissions beyond the turn of the century. A Clinton Administration spokesperson stated, however, that such a long-term commitment is implied through the planned actions that would be undertaken to realize the President's goals.

The Washington, DC-based Global Climate Coalition, a group of America's largest industries using coal and oil, believe they would bear the greatest economic burden of meeting the President's fossil fuel emissions reduction goals. Consequently, they have expressed that they will strongly oppose any effort by the President to include targets and timetables for greenhouse gas reductions, which the coalition believes are arbitrary, in domestic legislation or in negotiations of any future regulatory agreements, such as protocols, to which the United States would be a party.

BACKGROUND AND ANALYSIS

Greenhouse Effect and Global Warming

Concern is growing that human activities, such as the burning of fossil fuels, deforestation, and certain land-use practices, are increasing atmospheric concentrations of carbon dioxide (CO₂) that, along with increasing concentrations of other trace gases (chlorofluorocarbons-CFCs, methane, nitrous oxide), could affect global climate. According to some projections based on computer models of the atmosphere, if these gases continue to accumulate, a globally averaged warming of 3 to 8 degrees F. could occur over the next 100 years through enhancement of Earth's naturally occurring "greenhouse effect" -- the process by which the atmosphere traps infrared radiation emitted by the Earth, thus warming the Earth's surface. Such a warming could shift temperature zones, rainfall patterns, and agricultural belts and, under certain scenarios, cause sea level to either rise and inundate low-lying coastal areas or, in the event polar ice sheets grow, to fall and expose more land area near the coasts. Global warming could have far-reaching effects -- some positive, some negative -- on natural resources; biodiversity; food and fiber production; energy supply, use, and distribution; transportation; land use; water supply and control; and human health and welfare.

There have been some controversial claims that a CO₂-induced global warming signal has been detected. Indeed, globally averaged air temperatures have warmed by about 0.9 degrees F over the last 100 years. Natural variability of climate is large enough, however, that even the record-setting warmth of the 1980s or a singular event such as the severe U.S. drought of summer 1988 does not allow the vast majority of

knowledgeable scientists to state beyond a reasonable doubt that a global warming signal *attributable to human pollution* has been identified, at least at the present time. Although causal relationships between long-range global trends and present-day severe weather events have not been firmly established, such events do focus attention on possible climate change and the need for better understanding of global and regional climate and improved climate prediction models.

In this regard, most scientists concur that dedicated, long-term research is required to reduce current uncertainties relating to the complexities of Earth's climate system. Specifically, they assert that although partially understood, scientific knowledge about sources and sinks of greenhouse gases, clouds, the world's ocean, and polar ice sheets needs to be enhanced. Such an endeavor might be facilitated through empirical measurements and observations of those phenomena in question, applying an emerging generation of advanced scientific instrumentation and remote-sensing technologies.

Greenhouse Gases: Sources and Trends

The four most important variable greenhouse gases, whose atmospheric concentrations can be influenced by human activities, are CO₂, methane, nitrous oxide, and chlorofluorocarbons. Historically, CO₂ has been the most important, but over the past several decades other gases have assumed increasing significance. Collectively, they are projected to contribute, directly, about as much to potential global warming over the next 60 years as CO₂.

The amount of carbon cycling from naturally occurring processes each year through the biosphere as CO₂ is enormous -- some 700 billion tons. As evidenced by the general long-term stability of the global climate, the amounts generated by natural processes have been about equal to the amounts absorbed by natural processes. Human activity, mostly in the form of burning fossil fuels, is now generating some 24 billion tons of CO₂ per year; incomplete evidence available shows that only about half this amount is being absorbed by natural processes. Thus, atmospheric CO₂ concentrations are increasing steadily and are now about 26% higher than they were 100 years ago.

Human activities are believed to be responsible for half or more of the total annual generation of methane and nitrous oxide. There has been much less study of sources and sinks (both natural and human-related) of these gases, so great uncertainties remain. Nonetheless, available data show that the atmospheric concentrations of methane and nitrous oxide are also growing steadily, but the rate of growth of methane may be decreasing. Methane that results from human activities comes from cattle-raising, rice paddies, and trash dumps, and from losses to the atmosphere of natural gas during its production, transportation, and use. Natural sources include ruminant (grazing) animals, wetlands, and, to a lesser extent, termites. Most people-related nitrous oxide results from combustion, while most naturally occurring nitrous oxide emissions are from biological processes in soil.

There are no naturally occurring chlorofluorocarbons (CFCs). These gases, which last in the atmosphere for a century or more, all result from human activity. Ironically, CFCs have become so ubiquitous because they are nontoxic, nonflammable, and very stable compounds. Their effects on the atmosphere, such as their capacity for depleting stratospheric ozone, were totally unforeseen when they entered commerce. Although

annual world production of these gases has increased over the past several years on the order of 5% per year, U.S. production of CFCs has dropped over 40% since 1989. This is well in advance of provisions of the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, amended June 1990, and has been achieved by subsequent voluntary actions taken by the signatory parties.

CFCs are very potent greenhouse gases in their own right. Previously, it had been estimated that the contribution of CFCs to Earth's total radiative "greenhouse" forcing amounted to about 25%. But, according to findings originally released in an October 1991 United Nations Environment Program (UNEP) report on the state of the ozone layer, the contribution to global warming attributable to CFCs may be much less than scientists had thought. CFCs can have both a direct warming effect and an indirect cooling effect, the latter occurring because CFC-induced depletion of ozone -- itself a greenhouse gas -- exerts a climate-cooling effect. UNEP found that more ozone depletion is occurring in the lower stratosphere than had previously been estimated; consequently, the thinning of ozone (a greenhouse gas) there reduces the amount of heat radiated down into the troposphere. Taken together, the radiative forcing (global warming potential) of the CFC molecules and the climate-cooling effect of ozone depletion were estimated by scientists to be similar in magnitude, opposite in sign, and, indeed, might even be offsetting.

It is important to note, however, that the indirect cooling effects of the CFCs would not be distributed uniformly over the globe. Maximum offsets of global warming by CFCs are expected to occur in higher latitudes of the northern hemisphere, and only at certain times of the year. Moreover, decreasing stratospheric ozone over those latitudes might result in larger amounts of high-energy, shortwave ultraviolet radiation (UV-B) at the Earth's surface that could have health consequences for living organisms. If the finding is confirmed, that CFCs cause less warming than was thought, then it could invalidate key arguments in future negotiations to control greenhouse gas emissions, should they transpire, that actions to reduce emissions of CFCs will offset the warming caused by increased emissions of CO₂ (see **International Action**).

Scientists are also assessing the potential for indirect cooling effects that might be attributed to ozone depletion that occurs through chemical interactions of reactive chlorine compounds upon nitrogen and sulfur-bearing ice particles within polar stratospheric clouds (PSCs) and upon sulfate aerosols in the stratosphere. Such reactions had not been accounted for previously in computer models that simulate stratospheric ozone chemistry. Sulfate aerosol particles are found in the atmosphere in relatively stable background concentrations and are byproducts of fossil fuel combustion and such natural processes as volcanic eruptions. Although the potential for some augmented, albeit transient, ozone depletion would be anticipated in the weeks and months following a major volcanic eruption, scientists have pointed out that the real implications for climatic impacts are associated, to a greater degree, with longer-term ozone depletion that appears to be occurring through the interaction of normal, but growing, background concentrations of sulfate particles with long-lived, man-made ozone-depleting substances.

An added dimension to this issue is that sulfate particles themselves can have a direct cooling effect on climate. For example, NASA scientists reported findings that combined direct and indirect cooling effects of the 1991 Mount Pinatubo eruption may result in a globally averaged cooling of about 1°F over the next couple of years. The

so-called "parasol effect", which is most pronounced in the northern hemisphere, owing to industrialization and resultant air pollution, is attributed to the reflection of incoming solar radiation (sunlight) by sulfate veils in the upper atmosphere as well as to reflection of sunlight by clouds, the formation of which is influenced by the capacity of sulfate particles to act as cloud condensation nuclei.

Several atmospheric scientists have suggested that offsetting effects, such as those discussed above, could explain, in part, why observed temperatures have so far lagged behind theoretical climate model projections of greenhouse-gas-induced temperature increases, at least as far as daytime maximum temperatures are concerned. However, scientists have also discovered that the particle size and mass distribution of sulfate aerosols are important in a number of climatic effects. For example, large aerosol droplets also trap longwave radiation and, like a greenhouse gas, reradiate heat which warms the troposphere. Therefore, although the parasol effect (cooling) of sulfate aerosols would prevail during daylight hours, scientists believe the greenhouse effect (warming) would probably prevail at night, when heat is released from the Earth's surface. This effect, some scientists claim, can already be observed as an average increase of 0.3° C (0.5° F) of daily minimum (nighttime) temperatures over northern hemisphere mid-latitudes. If all these interactions among pollutants and the atmosphere sound complicated, that's because they are. Atmospheric pollution might be causing global warming, but atmospheric pollution might be holding it in check, too, at least in the northern hemisphere!

The Policy Context

The prospect of global warming from an increase in greenhouse gases became a major science policy issue during the past decade. Seeking answers to a number of questions -- How much warming?...How soon?...Should we worry? -- a growing number of policymakers at the national and international levels are debating the advantages and disadvantages of an active governmental role in forging policies to deal with prospective climate change.

How real is the human-induced global warming threat? Another 10-15 years of continued warming would add certainty to the scientific projections, but waiting for this added assurance might put society at risk for a larger dose of climate change than if actions to curb or slow the buildup of greenhouse gases were implemented now. But actions on what scale? Moreover, in times of fiscal restraint and deficit reduction, many policymakers, here and abroad, are counseling caution, lest their actions commit their government and private sectors to the expenditure of major resources in support of remedial, perhaps expedient, courses of action to avoid consequences we cannot foresee with confidence.

Given uncertainties about the timing, pace, and magnitude of global warming projections and the imprecise nature of the regional distribution of possible climate changes, and recognizing the complex feedback mechanisms within the climate system that could mask, mimic, moderate, amplify, or even reverse a greenhouse-gas-induced warming, the question is posed: What policy responses, if any, are appropriate, now, or in the future? Some have suggested that collectively, a number of anticipatory, yet flexible policy responses might be likened to the purchase of an "insurance policy" to hedge against the risks of potential climate change in the future. For example, the

Netherlands, and some U.S. cities, such as Charleston, SC, have already pursued policies and actions to protect themselves against potential future sea level rise.

Broader national responses could range from engineering countermeasures, to passive adaptation, to prevention and an international law of the atmosphere. One approach that has been widely discussed, the so-called "no regrets" approach, is to implement those policies now that would not only reduce emissions of greenhouse gases but would have additional benefits to society as well. Policy options that stress energy efficiency and conservation, renewable energy, and fuel substitution are important examples. Many scientists also stress that such actions might buy time to gain a better understanding of global climate change, by forestalling the onset of potential global warming or, at least, slowing the rate of climate change.

The Bush Administration adhered to this "no regrets" policy, without actually committing to CO₂ targets and timetables, in an attempt to come into alignment, in principle, with a majority of industrialized nations whose governments have pledged to stabilize their respective emissions of CO₂ by the year 2000. Furthermore, this was a basic tenet of the U.S. position in international negotiations toward attaining a U.N. Framework Convention on Climate Change under United Nations auspices.

International Action

Worldwide efforts to deal with global climate change have proliferated. National governments, on their own initiative or through such intergovernmental organizations as the European Community, the United Nations and its affiliated agencies, and even the Economic Summit, are working together to promote increased scientific endeavor toward understanding global climate change, and are devising ways to respond to global climate change from a concerted international policy perspective.

Some nations have already committed, unilaterally, to actions aimed at stabilizing their emissions of CO₂ by the year 2000. A few of those, however, have since had to reevaluate the feasibility of achieving such goals. The United States and a number of developing countries consistently opposed specific targets and timetables for stabilization and reduction of carbon dioxide emissions, arguing that the information available to make sound policy decisions is inadequate because of: (a) remaining scientific uncertainties regarding the magnitude, timing, rate, and regional consequences of potential climate change; (b) uncertainty with respect to how effective specific response options or groups of options would be in actually averting potential climate change; and (c) uncertainty with respect to the costs, effects on economic growth, and other economic and social implications of specific response options or groups of options. The United States was also concerned about the ability or will of nations to adhere to such commitments in the long term, especially when faced with competing or conflicting economic priorities.

Over the last several years, spokesmen for the U.S. Government and U.S. industry have argued that it is important when negotiating future climate change agreements to consider the total and cumulative effect of all the greenhouse gases -- all sources and all sinks -- rather than a narrower, more immediate focus on just CO₂. Canada, Norway, and Finland, for example, have also endorsed such a "Comprehensive Approach." However, the U.N.-Intergovernmental Panel on Climate Change (IPCC) -

Science Working Group, in its February 1992 Supplement, reported that the relative global warming potentials of greenhouse gases other than CO₂ need to be recalculated because some of the indirect radiative forcing effects from atmospheric interactions of those gases are not well understood. Such uncertainties could undercut negotiating positions at future U.N. climate negotiations, to the extent that they transpire, that any controls on greenhouse gas emissions should consider all greenhouse gases, rather than focusing more narrowly on CO₂ emissions in the near term.

Moreover, if the October 1991 preliminary UNEP finding is confirmed that the contribution of CFCs to the total net radiative forcing in projections of global warming might now be balanced by offsetting effects (see **Greenhouse Gases: Sources and Trends**, above), then it could be argued that CO₂, and actions to reduce CO₂ emissions, therefore, should received priority attention, relative to the remaining greenhouse gases, in formulating mitigation and response strategies for global warming.

Bush Administration actions were governed by the "no-regrets" path of policy response as delineated in a brochure released Feb. 4, 1991, by the White House, entitled, *America's Climate Change Strategy: An Action Agenda*, supplemented Feb. 27, 1992, with additional details of plans for further measures to be taken to mitigate climate change, and complemented in June 1992 with publication of *U.S. Actions for a Better Environment: A Sustained Commitment*. The Clinton Administration, however, might be expected to propose more stringent and prescriptive measures at the U.S. national level, and at the international level, in pursuit of regulatory protocols advocating reductions in emissions of greenhouse gases (see **Framework Convention on Climate Change**).

Framework Convention on Climate Change

Laying the foundation for future United Nations negotiations on a climate change convention/treaty, the Intergovernmental Panel on Climate Change (IPCC) was organized in November 1988 under the auspices of the U.N. World Meteorological Organization (WMO) and the U.N. Environment Program (UNEP) to assess the "scientific information... related to the various components of the climate change issue" and formulate "response strategies for the management of the climate change issue." The Panel created three working groups: Working Group 1, chaired by the United Kingdom, to assess scientific evidence for any global warming trend and determine its possible causes; Working Group 2, chaired by the Soviet Union, to analyze the environmental, economic, and social impacts of climate change; and Working Group 3, chaired by the United States, to identify and evaluate legal, technical, financial, economic, and educational measures to implement response strategies, including elements of a possible future framework convention on climate change.

The IPCC Working Groups submitted their findings to the full IPCC in June 1990, and, following a plenary session in August 1990, the IPCC presented its *First Assessment Report* to the 45th session of the U.N. General Assembly and to the Second United Nations World Climate Conference. That conference convened in Geneva Oct. 29-Nov. 7, 1990, under the auspices of WMO, UNEP, and the International Council of Scientific Unions. The IPCC report, adopted by the General Assembly, would form the basis for future international negotiations on a framework convention on climate change. Toward that end, the U.N. General Assembly on Dec. 21, 1990, recalling its resolutions 43/53 of 6 December 1988 and 44/207 of 22 December 1989 in which it

recognized that climate change is a common concern of mankind and established an Intergovernmental Negotiating Committee (INC). INC is supported by WMO and UNEP and is charged with preparing an effective framework convention on climate change, containing appropriate commitments and any related legal instruments as might be agreed upon. This resolution, A/RES/45/212, called for the framework convention negotiations to be completed prior to the June 1992 U.N. Conference on Environment and Development (UNCED) and opened for signature during that conference.

Amid concerns voiced by some observers that involving the General Assembly could bog down the negotiating process or broaden the discussion of climate problems into a debate over economic development issues, the INC commenced negotiations Feb. 4-14, 1991, at a session hosted by the United States in Chantilly, VA, near Washington, DC. By the close of deliberations, the INC established Working Group I-Commitments and Working Group II-Mechanisms.

The second session of the INC met in Geneva, June 19-29, 1991, the third session convened in Nairobi, Sept. 9-20, and the fourth session convened in Geneva, Dec. 9-20, 1991. The fifth INC session took place in New York, Feb. 18-28, 1992. A continuation of the fifth session took place in New York between Apr. 29 and May 8, 1992. This session was the last remaining opportunity for the parties to meet as a whole to finalize the so-called framework convention for the purposes of enabling it to be opened for signing at the UNCED conference in Rio de Janeiro ("the Earth Summit").

At the fourth INC session in Geneva, in December 1991, the United States announced that it would put forward a draft national climate action plan for public consideration within one year of signing a convention. The United States throughout INC negotiations had maintained the position of supporting a so-called "pledge and review" process, by which each country participating in the INC negotiating process, and as a potential signatory of a framework climate convention on global climate change, would present their own national plan to address global climate change. Primarily, this would entail each nation assessing its own contributions to the suite of greenhouse gases, taking into account both sources and sinks, and developing a plan of action toward long-term commitment to control those emissions by the best methods available to them, and within their economic ability. Accordingly, this draft plan was intended to supplement the no-regrets actions to limit net greenhouse gas emissions and support adaptation that were outlined in the February 1991 *Action Agenda*. The draft plan would include further actions such as: additional Federal Government measures, both legislative and administrative; actions taken by State governments; private sector measures; and measures undertaken in cooperation with other countries.

Later, in its "Statement on Commitments", submitted on Feb. 27, 1992, at the fifth INC session in New York, the United States did outline some new measures that it would take to mitigate climate change. The U.S. position paper emphasized that these actions would begin immediately, would be taken unilaterally, and would not be contingent on its final acceptance of any legally binding timetables or provisions as might be set forth in the text of an international climate change agreement. These actions would be pursued in several areas including: (1) improved energy efficiency; (2) transportation sector improvements; (3) supply-side changes to lower-emission technologies; (4) agriculture and natural resources--methane capture and tree planting; R&D measures--technological and scientific; (6) joint Government-industry programs to reduce emissions; and (7) State and local government actions. Some analysts

estimated that such actions taken by the United States could enable it to realize a reduction in CO₂ of about 14% below 1990 levels by the year 2000. Others criticized these "new" measures as simply a delineation of what the United States was prepared to do all along and, in some cases, what was currently required under existing law.

Some Bush Administration spokesmen who had attempted to quantify the impacts of such measures pointed out that to achieve such reductions, the United States might have to lower its expectation for economic growth over the next decade. A study by the Administration released in April 1992, called *U.S. Views on Climate Change*, suggested, however, that the United States might not be far from the goal of reducing its emissions of CO₂ to 1990 levels by 2000, a goal called for by many INC parties, simply by undertaking energy efficiency and savings programs, and other mitigation and adaptation strategies for climate change that are already underway in existing Federal and State programs. Other studies undertaken independently by the National Academy of Sciences, the U.S. Office of Technology Assessment, and other non-governmental institutions have shown that certain savings to the economy might be achieved by embarking upon a variety of recommended global change mitigation or adaptation strategies, such as developing environmentally-beneficial technologies.

The reconvened fifth INC session, which began in New York City on April 28, concluded on May 8, with a flexible, voluntary response to stabilizing atmospheric greenhouse gas concentrations as the backbone of the climate convention that would be presented for signature by world leaders at UNCED. The final text of the Convention, approved in New York City, contained general language encouraging nations to restrain their emissions of "greenhouse" gases at "previous year" levels, alluding to 1990 as a possible baseline. It did not imply, however, that any such commitment would necessarily extend beyond the turn of the century. Many economists, U.S. and otherwise, consistently criticized emission caps throughout INC negotiations. They claimed that targets and timetables that might be included in any possible international regulatory agreements would be too inflexible to adapt to evolving scientific knowledge about climate change, especially about the sources and sinks of greenhouse gases for which many uncertainties remain. The Bush Administration staunchly adhered to the findings of those economists and industry spokesmen who had reached the above conclusions; indeed, right up to the conclusion of INC negotiations in May.

During UNCED ("the Earth Summit"), which took place the first two weeks of June 1992 in Rio de Janeiro, a number of parties voiced differences over the issues of financial assistance and technology transfer to developing countries as well as over the composition and authority of the international mechanism to manage such aid. The industrialized countries agreed, in principle, that aid and technology transfer was a necessary and desirable goal. Many donor nations believed that compensation should only be given to those nations that made certain concessions, such as limiting their use of coal and oil -- two major CO₂-emitting fossil fuels. Some parties were clearly concerned, however, that any such future negotiations as might be necessary to implement the Framework Convention could become deadlocked in a "north-south," "have-have not," "new international economic order" debate over transfers of wealth that has been carried on in international forums for the past 20 years. Many developing countries are adamant about their expectations for the industrialized nations to fund any such technological measures that might be required of them to ensure their adherence to strategies for development that are least detrimental to the environment.

For its part, the United States pledged a \$50 million contribution toward a technology cooperation initiative for whatever international mechanism the INC establishes or designates to manage financial aid. At this point it has been decided that mechanism will be the World Bank's Global Environmental Facility (GEF). The United States has also made available \$25 million in direct grants to developing countries in order to facilitate their implementing obligations under the framework convention on climate change, including the inventory of greenhouse gas emissions, and to help them prepare national strategies to address climate change. These U.S.-funded "country studies" would identify ways to adapt to or mitigate global climate change through individual efforts and bilateral cooperative technology initiatives with the United States and other nations. This mechanism is also consistent with "a pledge and review" process, a position that the United States and other nations such as Japan, who proposed that process, had adhered to throughout INC negotiations. A Global Climate Response Fund was established in the recently enacted National Energy Policy Act of 1992 (P.L. 102-486) to manage funds appropriated for U.S. financial obligations under the U.N. Framework Convention on Climate Change.

On June 12 at the Earth Summit, the United States, along with 153 other nations, signed the U.N.-Framework Convention on Climate Change. The Convention contains a legal framework that would commit the world's governments to voluntary reduction of greenhouse gases, or other actions such as enhancing greenhouse gas sinks, aimed at stabilizing atmospheric concentrations of greenhouse gases at 1990 levels. The Convention also contains other binding agreements related to its establishment, support, and administration. Furthermore, the Convention suggests the possibility of continuing negotiations, subject to a judgement of the ratifying parties after its entry into force, to pursue subsequent actions to counter global warming -- rather like the 1985 Vienna Convention, which preceded the Montreal Protocol on Protection of the Ozone Layer. The majority view among INC representatives appears to be that the convention opened for signature at UNCED represents a scientifically sound first step toward a proactive stabilization of atmospheric greenhouse gas concentrations. There is less agreement, however, on how far that convention should have gone toward setting emission reduction targets and timetables. It remains to be seen whether a flexible and general framework convention or a specific, prescriptive, and quantitative convention would have been the best venue to approach the potential climate change problem.

On Sept. 8, 1992, the Convention was transmitted to the U.S. Senate by the President for the advice and consent of the Senate to U.S. ratification. That Committee endorsed the treaty and reported it (Senate Exec. Rept. 102-55) on Oct. 1, 1992. The Senate consented to ratification of the U.N. Framework Convention on Climate Change on Oct. 7, 1992, with a two-thirds majority division vote. President Bush signed the instrument of ratification on Oct. 13, 1992, and that instrument of ratification was deposited on Oct. 15, 1992, with the U.N. Secretary General.

The earliest the first meeting of the Parties to the Convention could occur would be after the Convention enters into force, which is defined as 90 days after 50 parties have deposited their respective instruments of ratification with the Secretary General; however, the parties would then have up to one year before they would be required to convene and up to 6 months before countries would be required to submit their national action plans. It is the sense of some officials at the Department of State that, based on the rate of ratifications so far, the Convention's legal entry into force will probably not take place until early 1994; therefore, the first meeting of the Parties to

the Convention could occur either in 1994 or 1995. Upon the occasion of that first meeting, the Convention provides for the establishment of a Secretariat, a subsidiary science and technology advisory body acting as liaison between the IPCC and the Convention, and a subsidiary implementing body. In the interim, it is anticipated that many nations will have completed their national inventory of greenhouse gases and will have submitted preliminary national plans to control their respective emissions of such gases. The United States, in fact, released a draft *National Action Plan for Global Climate Change* (and opened a 90-day public comment period) at the sixth session of the INC, which met Dec. 7-10, 1992, in Geneva.

At this sixth session, INC representatives addressed the future of the INC, including its organizational structure (e.g., working groups), and reevaluated the urgency (timetable of meetings) of moving forward on measures to address potential global climate change. The INC will act as the interim coordinating body on business matters relating to global climate change for the U.N. Secretary General, until the Conference of the Parties to the Convention meet for the first time. Meeting dates in 1993 are scheduled for March 15-19 in New York City and August 16-27 in Geneva. Also, it was recommended to the U.N. Secretary-General that the IPCC continue as the official scientific and technical body in support of the INC and any such future negotiations as might be undertaken.

Congressional Interest and Activities

100th Congress

The 100th Congress enacted the Global Climate Protection Act as Title XI of H.R. 1777 of P.L. 100-204, assigning Department of State and the Environmental Protection Agency the responsibility to develop a coordinated national policy on global climate protection and containing other measures for coordination, research, and international cooperation.

101st Congress

In the 101st Congress, interest widened among Members and committees of relevant jurisdiction that sought to acquire information from all sides of the scientific debate over possible global climate warming, to evaluate the potential economic and strategic impacts on the United States of a warmer climate, and to assess the adequacy of the Federal organizational base for conducting scientific research and policy studies.

Seventy-three bills, resolutions, concurrent resolutions, and amendments dealing with global climate and atmospheric change were introduced in the 101st Congress. There were major enactments that dealt with global warming issues in legislation on: foreign aid decisions and U.S. foreign lending policies (P.L. 101-167, P.L. 101-240, P.L. 101-513); clean air (P.L. 101-549); Department of Defense environmental research and activities (P.L. 101-189, P.L. 101-510); water resources (P.L. 101-397); taxation (P.L. 101-239, P.L. 101-508); agriculture and forestry (P.L. 101-624); and Federal organization (P.L. 101-606). For further information, see CRS Report 91-359 SPR, *Global Climate Change and the 101st Congress: A Review of Legislation*.

102nd Congress

Congressional interest and concern about climate and global change continued during 102nd Congress. There was interest among the relevant congressional committees in overseeing congressionally mandated efforts to improve coordination among Federal agencies conducting scientific research in atmospheric change and policy research in impacts assessment and response strategies. Congress also closely followed the progress of U.N. negotiations for achieving a framework convention on global climate and sent a parliamentary delegation to the Earth Summit held in Rio de Janeiro, in June. The Senate consented to ratification of the Convention [Treaty Doc. 102-38]; the instrument of ratification was signed by the President on Oct. 13, 1992.

On the legislative agenda, there was a noticeable shift toward formulating response strategies. A number of bills were considered with provisions that indirectly affect the emissions of carbon dioxide and other greenhouse gases or that deal directly in a variety of approaches to reduce the rate of generation of greenhouse gases. Other legislation focused on developing accommodation and mitigation measures for climate change, to the extent that global warming occurs. Seventy-one measures relating to global climate change were introduced during the 102nd Congress. Some legislation introduced in the first session was revisited in the second with further hearings, mark-up sessions, or reintroduced as original bills or substituting amendments.

Eight major bills relating to global climate change were enacted in the 102nd Congress. In the first session, these include the Foreign Relations Authorization Act for FY1992-1993 (P.L. 102-138), which expressed the sense of the Congress regarding negotiations of the U.N. International Negotiating Committee and a framework convention on climate change; Departments of Veterans Affairs and Housing and Urban Development and Other Sundry Agencies Appropriations Act for FY1992 (P.L. 102-139), which included funding for EPA and NASA for greenhouse gas, global warming, and stratospheric ozone depletion research and NASA funding for the Consortium for International Earth Science Information Network (CIESIN) to assess policy options to address global climate change; Foreign Operations, Export Financing and Related Programs Appropriations Act for FY1992 (P.L. 102-163), which set forth restrictions on U.S. foreign aid through a Global Warming Initiative; and the National Aeronautic and Space Administration Authorization Act for FY1992 (P.L. 102-195), which enhanced global change research activities within NASA and improved data collection, archival, and dissemination of remotely sensed land data.

In the second session, the Department of Veterans Affairs and Housing and Urban Development... Appropriations Act for FY1993 (P.L. 102-389) continued funding of research on global warming and stratospheric ozone depletion for EPA and NASA and funded CIESIN through NASA and the White Office of Science and Technology Policy (OSTP); Foreign Operations, Export Financing and Related Programs Appropriations Act for FY1993 (P.L. 102-391) appropriated funds through AID to developing countries for reducing greenhouse gas emissions through a Global Warming Initiative, and through the World Bank's Global Environmental Facility for other U.S. obligations under environmental agreements; National Defense Authorization Act for FY1993 (P.L. 102-484) called for an evaluation of DOD use of Class I and II ozone-depleting substances, which include CFCs and Halons, and a subsequent report to Congress; National Energy Policy Act of 1992 (P.L. 102-486), Title XVI -- Global Climate Change, called for the appointment of a Director of Climate Protection within DOE, several

reports and analyses of greenhouse gas emissions including a national inventory, and voluntary reporting of greenhouse gas reductions. The title further established a Global Climate Change Response Fund as depository for U.S. contributions to a financial mechanism pursuant to the U.N. Framework Convention on Climate Change. This Act also increased baseline taxes on certain uses of ozone-depleting substances. For further information, see CRS Report 93-445 SPR, *Global Climate Change Legislation: A Review of the 102nd Congress*.

103rd Congress

The Clinton-Gore Administration has taken a more active stance on the need for action to support the U.N. Framework Convention on Climate Change, and is on record as calling for prompt implementation of the Convention, here and abroad. This is reflected in President Clinton's speech of Apr. 21, 1993, commemorating Earth Day 1993, in which he stated that the United States would reverse the previous Administration's policy of reluctance to committing to specific targets and timetables for greenhouse gas reductions and would pursue the goal of reducing emissions of greenhouse gases to 1990 levels by the year 2000. Domestic implementation, in some cases, may require legislative initiatives, and legislation introduced in the 102nd Congress to foster active implementation will likely be re-introduced. There have been calls, here and abroad, for the preparation of draft regulatory protocols addressing mitigation of potential global climate change to be ready for the first meeting of the Parties to the Convention. Consequently, it will be the responsibility of the Clinton Administration to review the comments received during the 90-day public comment period on the draft *National Action Plan for Global Climate Change* (presented at Geneva last December) with an eye toward either writing an entirely new action plan or recommending such revisions as might be necessary to comport with the policy of the new Administration. This is also a potential issue for congressional oversight among committees of relevant jurisdiction. In developing this national strategy for climate change, the new Administration supports an open process that solicits active participation by the public, making available for review among interested parties all appropriate comments and background documents.

LEGISLATION

H.R. 109 (Boehlert)/S. 171 (Glenn)

Department of the Environment Act of 1993. Title III: Establishment of the Commission on Improving Environmental Protection. Requires the President to encourage the establishment of an international office to monitor annual generation of carbon dioxide and trace gases on a country-by-country basis. Introduced Jan. 5, 1993; referred to more than one committee. S. 171, similar bill, introduced Jan. 21, 1993. Reported to Senate by Committees on Governmental Affairs (S.Rept. 103-38) and on Environment and Public Works (S.Rept. 103-39) Apr. 15, 1993. Passed Senate, amended, May 4, 1993.

H.R. 299 (Porter)

Establishes the Commission on Environment and Development to monitor the actions of the signatories to documents of the United Nations Conference on Environment and Development (UNCED) that reflect compliance with or violations of the goals of the Articles of Agenda 21 of UNCED, the Statement of Principles on the

Maintenance, Conservation, and Development of All Forests, the United Nations Framework Convention on Climate Change, and the Convention on Biological Diversity. Introduced Jan. 5, 1993; referred to Committee on Foreign Affairs.

H.R. 804 (Stark)

Amends the Internal Revenue Code to impose a tax on the sale or importation of the following fuels based on their carbon content: coal, petroleum, and natural gas. Provides an inflation adjustment for such tax rates after calendar year 1994. Introduced Feb. 3, 1993; referred to Committee on Ways and Means.

H.R. 970 (Dellums)

Emergency Climate Stabilization and Earth Regeneration Act of 1992. Declares that the purpose of this Act is to establish a process through which the Congress and the President shall cooperate in a national and international program to: (1) reduce heat, drought, famine, tornadoes, and forest fires and to decrease the freezing extremes, snow buildup, flooding, cloud cover, and storms in the winter; (2) regenerate the earth through reforestation, soil and ocean remineralization, conservation, and alternative energy technology development; (3) maximize food and agricultural security; and (4) create a secure, environmentally sustainable way of life consistent with long-term climate stabilization. Sets forth specific ways to achieve reduction of carbon dioxide. Introduced Feb. 18, 1993; referred to more than one committee.

CONGRESSIONAL HEARINGS, REPORTS, AND DOCUMENTS

NOTE: For listings prior to the 102nd Congress, see part 5, "Congressional Publications," in CRS Report 91-359 SPR; see also CRS Report 91-549 L. For the 102nd Congress see CRS Reports 92-393 SPR and 93-445 SPR. Current listings are maintained by the Science Policy Research Division.

CHRONOLOGY

- 04/21/93** --- President Clinton, the day before Earth Day 1993, announced that the United States would commit to reducing its emissions of greenhouse gas emissions to 1990 levels by the year 2000.
- 12/07-12/11/92** --- The INC met in Geneva, Switzerland, for a sixth session to discuss its future and to prepare for the first meeting of the parties to the Convention.
- 10/07/92** --- U.S. Senate consented to ratification of the U.N. Framework Convention on Climate Change [Treaty Doc. 102-38] with a two-thirds majority division vote. The Convention's instrument of ratification was signed by the President on Oct. 13, 1992.
- 06/03-06/12/92** --- Earth Summit convened in Rio. Framework Convention on Climate Change opened for signature by world leaders at UNCED. President Bush signed Convention on behalf of the United States June 12, 1992.

- 04/29-05/08/92** --- Continuation of fifth session of the UN-INC convened in New York City. INC parties agreed to adopt text of framework convention on climate change.
- 04/10/91** --- The Committee on Science, Engineering, and Public Policy of the National Academy of Sciences released its report, *Policy Implications of Greenhouse Warming*. The report was requested by Congress in P.L. 100-404.
- 02/04-02/14/91** --- The INC of the U.N. General Assembly commenced negotiations to prepare a framework convention on climate change. The first session was hosted by the United States in Chantilly, VA, near Washington, DC.
- 10/29-11/07/90** --- Second World Climate Conference convened in Geneva. First IPCC Assessment on Global Climate Change adopted by U.N. General Assembly.

FOR ADDITIONAL READING

- National Academy of Sciences, National Academy of Engineering, Institute of Medicine. Committee on Science, Engineering, and Public Policy. Panel on Policy Implications of Greenhouse Warming. Policy implications of greenhouse warming: mitigation, adaptation, and the science base. Washington, National Academy Press, 1992. 918 p.
- U.S. Congress. Office of Technology Assessment. Changing by degrees: Steps to reduce greenhouse gases. Washington, U.S. Govt. Print. Off., 1991. 357 p. OTA-O-482, February 1991
- U.S. Congress. Senate. Committee on Foreign Relations. United Nations Framework Convention on Climate Change, Report [To accompany Treaty Doc. 102-38]. Exec. Rept. 102-55. 102nd Cong., 2d sess. [Washington, Oct. 1, 1992] 16 p.
- U.S. Library of Congress. Congressional Research Service. Global climate change: Legislative actions in the 102nd Congress, first session, by Wayne A. Morrissey. Mar. 31, 1992. [Washington] 1992. 28 p. CRS Report 92-393 SPR
- U.N. World Meteorological Organization. United Nations Environment Programme. Intergovernmental Panel on Climate Change: 1992 IPCC Supplement, February 1992. 71 p.
- U.S. Department of State. Bureau of Oceans and International Environmental and Scientific Affairs. Office of Global Change. National action plan for global climate change. Washington, U.S. Govt. Print. Off., 1992. 129 p. (State Department publication no. 10026)
- U.S. Office of Science and Technology Policy. Committee on the Earth and Environmental Sciences. Our changing planet: the FY1993 U.S. Global Change Research Program; a supplement to the U.S. President's fiscal year 1993 budget. [Washington, January 1992] 79 p.