

GAO

Report to the Chairman, Subcommittee  
on Oversight and Investigations,  
Committee on Energy and Commerce,  
House of Representatives

January 1990

# GLOBAL WARMING

## Administration Approach Cautious Pending Validation of Threat



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United States  
General Accounting Office  
Washington, D.C. 20548

**National Security and  
International Affairs Division**

B-236128

January 8, 1990

The Honorable John D. Dingell  
Chairman, Subcommittee on Oversight  
and Investigations  
Committee on Energy and Commerce  
House of Representatives

Dear Mr. Chairman:

This report discusses federal government leadership, coordination, and international cooperation in developing a national policy on and strategy for obtaining a unified international response to the perceived problem of global climate change. As you requested, we examined the extent and adequacy of federal agency coordination, effectiveness of U.S. participation in international activities, and the status of federal agency actions required to address congressional concerns.

As arranged with your Office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to interested parties and make copies available to others upon request.

This report was prepared under the general direction of Nancy R. Kingsbury, Director, Foreign Economic Assistance Issues. Other major contributors are listed in appendix III.

Sincerely yours,

Frank C. Conahan  
Assistant Comptroller General

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# Executive Summary

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## Purpose

The earth appears to be getting warmer, but scientists are uncertain about the rate and extent of the warming. They believe that global warming is primarily attributable to increased “greenhouse” gas concentrations in the atmosphere. Although scientists do not know what the global and regional effects will be if this theory is correct, they anticipate that climate change will present unprecedented economic and political challenges.

In response to a request by the Chairman of the Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, GAO examined the government’s activities related to development of a coordinated national policy, determination of agency responsibilities, and participation in research and planning aimed at improving the understanding of and encouraging an international response to actual and potential global climate change.

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## Background

Mounting scientific evidence indicates that man-made pollution resulting from release of carbon dioxide and other industrial gases into the atmosphere may be producing a long-term and substantial increase in the earth’s surface temperature. The surface is warmed because gases released into the atmosphere are transparent to incoming solar rays, but trap outgoing thermal radiation through a process known as the “greenhouse effect.” Scientists attribute an observed global temperature increase of 1 degree Fahrenheit in the past century to an increase of “greenhouse” gas concentrations in the atmosphere. They predict that, if continued, the earth’s surface will probably be warmed by another 3 to 8 degrees Fahrenheit by the middle of the next century. Further, they warn that such a magnitude of global warming would have serious environmental and economic consequences.

The build-up of “greenhouse” gas emissions in the atmosphere is primarily a global energy issue. Carbon dioxide, mainly generated by consumption of energy derived from fossil fuels, is responsible for an estimated one-half of current emissions. World energy use, led by the United States, is expected to double the atmospheric concentration of carbon dioxide and other “greenhouse” gases within the next half-century. There is general consensus that ways must be found to balance the economic and industrial growth of countries in various stages of development with improving and protecting the environment.

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Recognizing the importance of U.S. leadership in achieving a viable global climate change policy, the Congress enacted the 1987 Global Climate Protection Act (P.L. 100-204), which sets goals and agency responsibilities for developing a national policy and encouraging international cooperation.

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## Results in Brief

The administration has not as yet established national policy, defined federal agency roles and interagency relationships, or provided adequate guidance to agencies to effectively address the global warming issue. In light of considerable uncertainty that exists concerning the reality and timing of the threat posed by global warming, administration policy thus far has focused on conducting scientific research needed to reduce this uncertainty and assuming a leading international role in formulating policy responses aimed at limiting or adapting to global climate change. Although the United States has placed itself in strong position to assert international leadership and to foster cooperation on this issue, its early approach has been to proceed cautiously and defer specific new commitments until more is known about the validity and consequences of global warming.

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## GAO's Analysis

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### National Policy Not Established

The administration has not established a coordinated national policy to guide federal agency efforts related to global climate change. The Congress directed the Environmental Protection Agency to develop and propose such a policy, but the Agency's efforts were delayed pending further discussions and clarification of agency roles and responsibilities. The administration has further taken the position that action on the global warming threat should not wait until the scientific uncertainties have been resolved; rather, its strategy has focused on steps that may alleviate the threat and are justified on other considerations—such as reducing emissions and increasing energy efficiency and reforestation.

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### Agency Responsibilities Not Defined

The administration has not tasked any agency with providing overall policy direction or leadership, nor has any agency acted as the administration's voice on global climate change. Lacking executive guidance and because of limited focus and oversight by the Office of Management and Budget on this issue until recently, agencies have determined their own

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policies and research priorities. The Congress created institutional structures such as the Office of Science and Technology Policy and the Council on Environmental Quality to advise and assist in formulating national environmental policy and the National Climate Program Office to manage climate activities. However, it appears that low funding, inadequate staff, and unclear relationships with other agencies have reduced their effectiveness.

Interagency coordination of climate change activity occurred through mechanisms that were established to address the national climate program, U.S. global change research, and U.S. participation in the Intergovernmental Panel on Climate Change, the principal international forum addressing global warming. Their objectives differ but some overlap occurs because of commonality in their functional responsibility and constituency.

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### Strong International Role Partly Realized

The United States assumed a key leadership role in the international arena through chairmanship of the U.N.'s Intergovernmental Panel on Climate Change response strategies working group and by providing meaningful resources for research and cooperation. However, despite giving rise to expectations among other nations that it was giving high priority and was ready to act on the global warming issue, the United States so far has emphasized the need for continued further study rather than commit too early to specific targets or timetables that could result in unwarranted actions to protect the environment.

International environmental officials that we contacted were generally pleased with the initial indications of U.S. support. However, they were uncertain about the authority of spokespersons and consistency of U.S. positions at international meetings, the identification of proper focal points for information and funding, and the adequacy of coordination mechanisms.

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### Recommendations

This report provides information on the development of a coordinated national strategy and international cooperation for addressing global climate change. GAO makes no recommendations.

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### Agency Comments

As requested, GAO did not seek formal comments on its report, but did discuss the results of its findings with responsible agency officials in

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**Executive Summary**

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Washington, Geneva, and Nairobi to verify the accuracy of the data contained in the report.

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**Abbreviations**

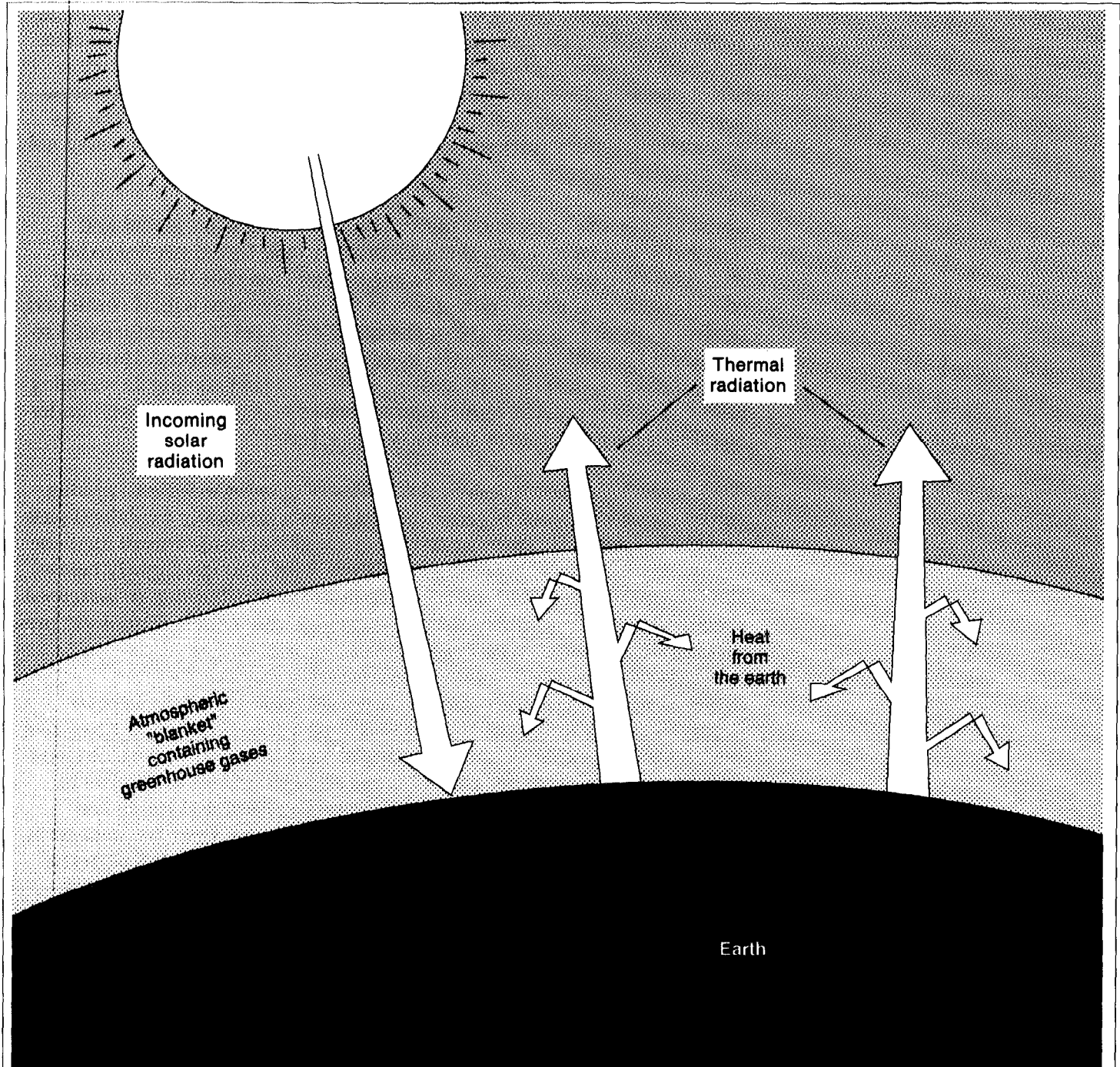
AID	Agency for International Development
CEQ	Council on Environmental Quality
CES	Committee on Earth Sciences
CFC	Chlorofluorocarbon
DOE	Department of Energy
EPA	Environmental Protection Agency
FCCSET	Federal Coordinating Council for Science, Engineering, and Technology
GAO	General Accounting Office
ICSU	International Council of Scientific Unions
IPCC	Intergovernmental Panel on Climate Change
NASA	National Aeronautics and Space Administration
NCPO	National Climate Program Office
NCPPB	National Climate Program Policy Board
NGO	Nongovernment Organization
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
OES	Bureau of Oceans and International Environmental and Scientific Affairs
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
UNEP	United Nations Environment Program
WMO	World Meteorological Organization



# Introduction

The phenomenon known as global warming by the “greenhouse effect” received substantial attention during the last year. Recent atmospheric events, such as the discovery of ozone “holes” over the polar caps, record hot weather in the 1980s, and extreme heat waves, floods, and droughts occurring in 1988, focused increased public attention on the impact that human activity and natural events may have on the earth’s climate. This impact, or global climate change, refers to the process through which complex natural and human-induced chemicals affect the earth’s surface temperature and precipitation patterns. Mounting evidence indicates that human-induced pollution resulting from the release of carbon dioxide and other gases, including chlorofluorocarbons (CFCs), methane, nitrous oxides, and other pollutants into the atmosphere may be producing a long-term and substantial increase in the earth’s average temperature. Simply stated, gases released into the atmosphere are transparent to incoming solar rays but they partially block or absorb heat radiating from the earth, and redirect the heat back to the earth, thus warming its surface. (See fig. 1.1.)

Figure 1.1: The Greenhouse Effect



Source: Oceanus Magazine, published by Woods Hole Oceanographic Institution.

## Background

The general scientific consensus is that atmospheric greenhouse gas concentrations are increasing and that the result will be a change in climate. This consensus is partly supported by an observed average global temperature increase of about 1 degree Fahrenheit in the past century. Scientists consider such temperature change to be a substantial alteration. Further, because a significant time lag can exist between the gas emissions and their consequences, the effects of past emissions may not yet be fully realized.

Considerable scientific uncertainty remains about what global and regional effects may occur if the global warming threat proves to be real. The National Academy of Sciences predicted that the increasing concentrations of greenhouse gases in the atmosphere will, if continued, probably result in a warming of the earth's surface temperature of 3 to 8 degrees Fahrenheit before the middle of the next century. However, other major earth system processes, such as the net cooling or warming effect of clouds and the absorption ability of oceans, are not well understood and may mitigate or intensify this effect.

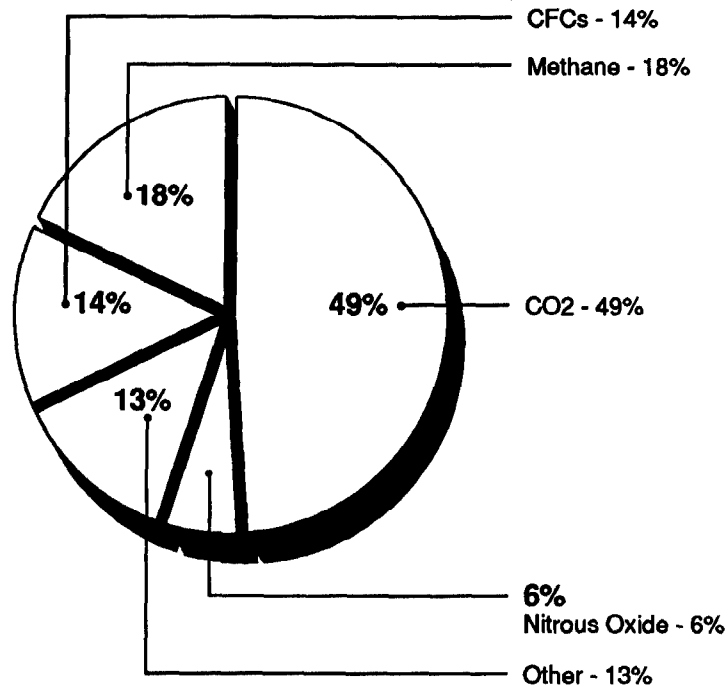
Also, many scientists question the ability of current models to predict future climatic effects, because models have not reliably explained past global observations. The observed average global temperature increase in the past century is generally consistent with (though slightly below) the theoretical predicted temperature increase attributable to increased greenhouse gas concentrations. Furthermore, the models cannot yet predict regional changes with confidence.

If global warming on the scale predicted by some scientists were to occur, the likely long-term effects would be a sea-level rise of 1 to 5 feet due to thermal expansion and melting of land-based ice—with obvious adverse consequences for coastal areas and estuaries—and shifts in rainfall patterns, making huge areas infertile or uninhabitable and touching off unprecedented population movements. Over the near term, climatologists believe that extreme temperature and rainfall patterns will become more frequent and perhaps more intense as greenhouse gases accumulate.

Global warming is mainly a global energy policy issue. World energy production and use is the largest source of greenhouse gases. Atmospheric concentration of greenhouse gases is also significantly affected by CFCs, industrial processes, agricultural practices, and land use modification. Scientists estimate that, at current levels of energy consumption,

increased atmospheric concentration of carbon dioxide, resulting primarily from fossil fuel use and contributing approximately one-half of current emissions (see fig. 1.2), and its equivalent of other greenhouse gases may double within the next half-century.

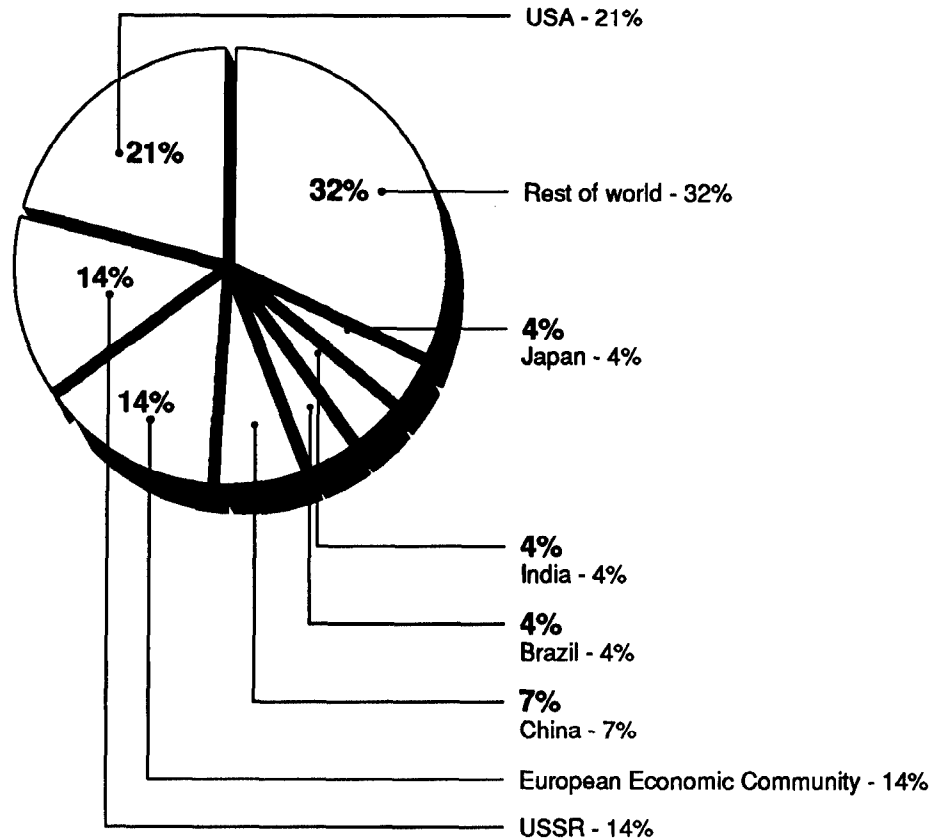
Figure 1.2: Contribution of Greenhouse Gases



Source: Environmental Protection Agency

As the world's largest energy consumer, the United States is responsible for an estimated one-fifth of greenhouse gas emissions (see fig. 1.3). Although substantial gains were made in U.S. energy efficiency since the early 1970s and the fraction of global contribution of U.S. fossil fuel emissions has declined, the United States is still a major contributor to greenhouse gases. While the United States accounts for about one-fourth of the world's energy use, it produces only about half the gross national product per unit of energy input achieved by countries such as Brazil, France, Japan, Sweden, and West Germany. The United States also produces about one-third the world total of CFCs, the fastest growing and one of the more enduring greenhouse gases having greater heat-trapping capability than other gases.

Figure 1.3: Contributors to Greenhouse Gases



Source: Environmental Protection Agency

Climate change is clearly an international issue that will require global political solutions to balance the demands to improve and protect the environment with economic and industrial growth of countries in various stages of development. Because the United States is a major contributor of greenhouse gases, U.S. social, economic, and political interests will be profoundly influenced by any set of internationally adopted measures. Accordingly, the Congress and the administration have expressed the need for U.S. leadership for the rest of the world.

Recognizing the importance of U.S. leadership in international cooperation, the Congress enacted the Global Climate Protection Act of 1987 (P.L. 100-204) in December 1987. The act states that vigorous efforts are necessary to achieve international cooperation and that U.S. leadership will greatly enhance such cooperation. It also states that effective

leadership in the international arena depends on a coordinated national policy and addresses the need for coordinating mechanisms to achieve international cooperation to confront the global warming threat.

Because of uncertainties about the reality and timing of the threat posed by global warming, many national and international research efforts are underway to study the scope of the problem and its possible effects in order to formulate appropriate policy responses. This report discusses policy and coordination mechanisms and how they are working. A brief chronology of key events affecting global climate change is provided in appendix I.

## Current Administration Approach

The administration has pledged support for actions that address the global climate change issue. The President stated in February 1989 that international cooperation and global action were essential, and added that U.S. leadership was needed to focus attention on this issue by the highest levels of government worldwide. The President further outlined policies that his administration would pursue, including sponsoring an international conference on the environment, providing for increased research to address the scientific uncertainties regarding global change,<sup>1</sup> and defining the responsibilities and establishing effective coordination mechanisms for the federal agencies and departments involved with this issue. In March 1989, the President announced that the United States was joining with other industrialized countries to amend the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer to expedite phasing out, before the year 2000, the production and consumption of CFC's. While the President has made no similar commitment to control carbon dioxide emissions, he directed the Secretary of Energy in July 1989 to develop a national energy strategy which will consider possible actions to reduce greenhouse gas emissions resulting from energy sources.

The United States is also attempting to develop a realistic and effective, internationally accepted global climate change strategy through a U.N.-sponsored Intergovernmental Panel on Climate Change (IPCC), which has become the principal international forum for addressing this topic. The United States will host the next IPCC meeting in Washington, D.C. in February 1990.

<sup>1</sup>Global change research constitutes a broad study of the full range of interrelated natural and human-induced earth system processes, including climatic, volcanic, seismic, ecological, and biological changes, of which global warming is an important element.

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## Congressional Concern

The 101st Congress has introduced various legislative proposals related to global climate change. The proposals seek various approaches to (1) improve the understanding of the causes and effects resulting from human activity, (2) improve coordination of national scientific research efforts, (3) reduce the generation of greenhouse gases, (4) foster international cooperation, and (5) determine appropriate policy responses. Ongoing debate and public interest indicates that global climate change will continue to receive high priority in the current Congress.

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## Participation by Nongovernmental Organizations

Developing viable global climate change policies will depend not only on the ability of governments to develop a common understanding and consensus among the domestic and international communities, but will require the cooperation of nongovernment sectors as well. Nongovernmental organizations (NGO) represent many viewpoints, including the perspectives of environmental/conservation organizations, scientific institutes, universities, and the business community. Efforts have been made to integrate this wide spectrum of NGO participation into the public policy process.

The Congress, federal agencies, and international organizations have sought out the views of the nongovernment sector. During the current Congress, many congressional committees received testimony on the global greenhouse effect from speakers representing various U.S. policy analyses and advisory NGOs. Administration officials have also encouraged NGO involvement in the policy-making process, stressing the important role that NGOs can play in developing climate change response strategies and promoting their involvement in domestic and international meetings, and in technical studies. The views of some of these organizations are summarized in appendix II.

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## Objectives, Scope, and Methodology

The Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, asked us to examine the adequacy of coordination and extent of participation of federal agencies in encouraging an international response to actual and potential global climate change. In addition, we were asked to solicit views on the administration's approach from various interest groups, such as industry associations and environmentalists. Our objectives were to determine

- who is responsible for providing overall policy direction and leadership;
- whether appropriate roles for federal agencies have been determined;
- how agency efforts are being coordinated;

- the status of efforts to implement the Global Climate Protection Act of 1987; and
- what U.S. actions have been taken to increase international understanding, participation, and responsiveness.

To determine the federal government's strategy and effectiveness in responding to the perceived threat of global climate change, we reviewed agency position papers and reports, studied enacted and pending legislation, examined testimony and policy statements of nongovernmental organizations (see app. II). We also interviewed officials at the following locations:

- the Washington, D.C., headquarters of the Departments of Commerce, Energy (DOE), Interior, and State; Environmental Protection Agency (EPA), National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), Agency for International Development (AID), Office of Management and Budget (OMB), Office of Science and Technology (OSTP), National Science Foundation (NSF), and Council on Environmental Quality (CEQ);
- U.S. overseas missions and offices of the World Meteorological Organization (WMO), located in Geneva, Switzerland; the United Nations Environment Program (UNEP), located in Nairobi, Kenya; the International Council of Scientific Unions (ICSU), the Organization for Economic Cooperation and Development, and the United Nations Educational, Scientific, and Cultural Organization, all located in Paris, France;
- the first meeting of the IPCC (held in Geneva, Switzerland) and the planning session of the panel's response strategies working group (Washington, D.C.); and
- the offices of various independent policy analysis and advisory organizations, science academies, and professional/technical groups.

We conducted our review between October 1988 and July 1989 and performed the overseas fieldwork between November 1988 and January 1989. Our work was conducted in accordance with generally accepted government auditing standards. We discussed the matters contained in the report with agency officials responsible for climate change activities, and their comments have been incorporated where appropriate. As requested by the Chairman, we did not obtain official agency comments.



# Development of U.S. Policy on Global Climate Change

Global climate change has a potential impact on social, economic, and political issues at all levels—local, state, national, and international. Because the nation's industry, agriculture, commerce, transportation, natural resources, health, and security will be affected by climate change and programs addressing this issue, federal agencies are conducting expanded research into the causes and effects of global warming. This research will help in studying the scope and timing of the global warming threat in order that appropriate policy and strategy responses may be developed to mitigate or adapt to its effect. However, the administration has not established a clear national policy, defined federal agency roles and relationships, or provided agencies with adequate guidance to effectively address the global warming issue.

## National Policy and Strategy Not Yet Established

The Congress has enacted legislation which addresses various broad national environmental and scientific policy concerns, including climate processes. However, it was not until passage of the Global Climate Protection Act of 1987, contained in the Foreign Relations Authorization Act, Fiscal Years 1988 and 1989 (P.L. 100-204), that Congress specifically addressed the issue of global warming. Among its provisions, the act requires the President, through EPA, to develop and propose a coordinated national policy to facilitate an effective response to the threat posed by global climate change.

We found that the administration has not yet established such a national policy or communicated a clear statement of national goals or set of objectives governing global climate change. In addition, the administration has not developed an overall strategy that provides direction for federal agencies' global climate change activities.

## EPA Efforts to Develop National Policy Delayed

EPA has traditionally examined the effects of pollution on human health and the environment, and options, including technology, for reducing pollutants. Further, EPA officials told us that the agency's experience in dealing with global environmental issues justifies its tasking to develop a coordinated national policy for global climate change. However, they said that the agency's efforts to develop such a national policy have been delayed pending designation of federal agency roles and responsibilities, improved understanding of the science of global warming, and identification of possible response strategies through international discussions.

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## Agency Roles Not Designated

The President has not designated any individual or agency to assume overall leadership or management responsibility for global climate change. Without such a designated leadership position or focal point, no identifiable hierarchical structure for policy and decision-making on global climate change issues has emerged.

A 1979 presidential executive order (E.O. 12114) on environmental effects of major federal actions abroad states that a lead agency shall be determined by the participants whenever an environmental action or program involves more than one federal agency. During current efforts, a lead agency was not designated. Federal departments and agencies developed their activities without a specific overall multiagency global climate change program.

Until an explicit national policy and program for global climate change is developed, some agency officials see a dilemma in making research relevant for policymakers without also having them improperly direct or influence the course and results of the research. The officials said that responsibilities between scientific agencies and policymakers, and between scientific assessment and policy assessment functions, should be clearly separated. They believe that such separations are needed because policy-directed programs generally focus on immediate and visible concerns rather than on long-term and less certain impacts.

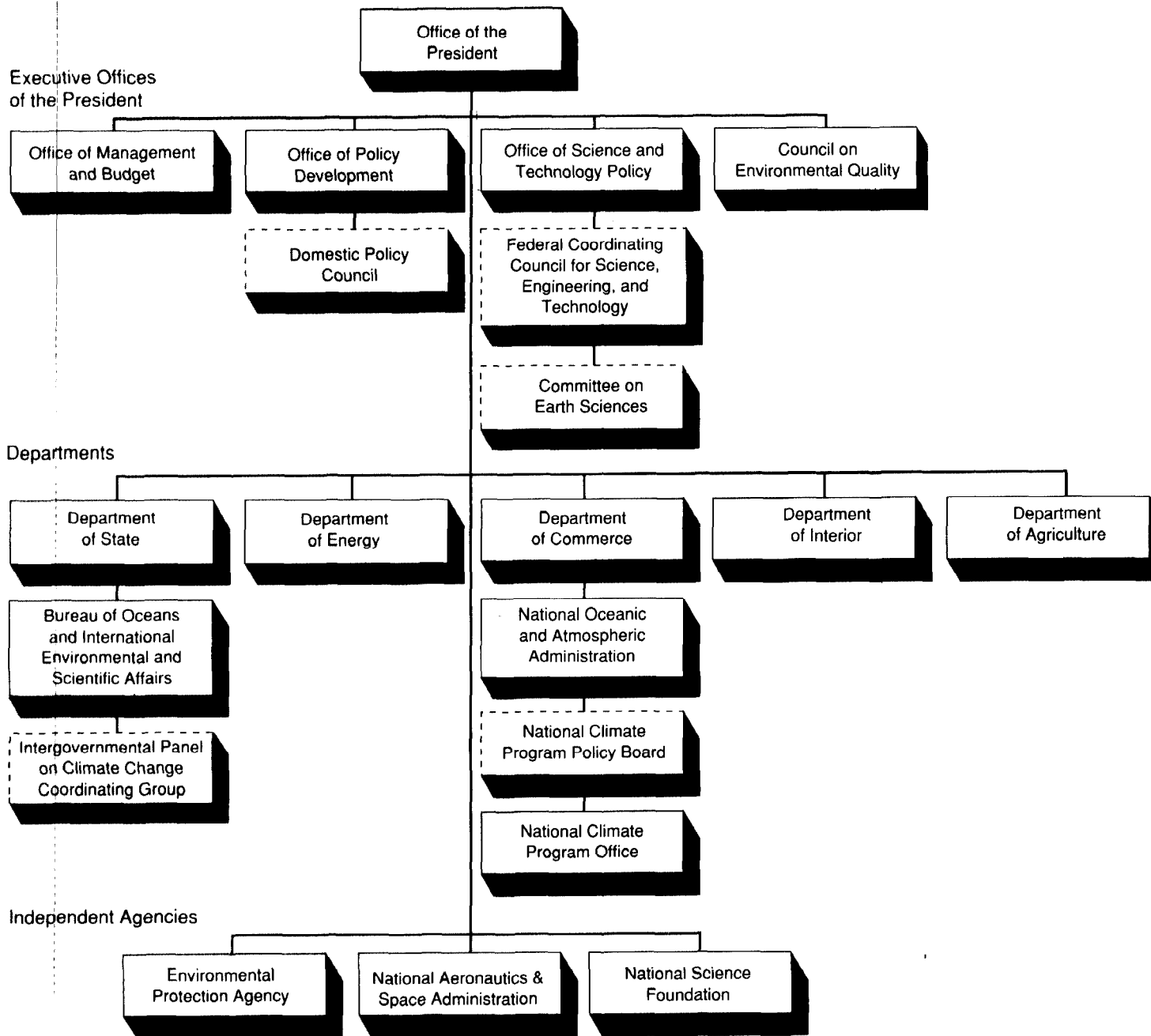
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## Executive Guidance to Agencies Inadequate

The President announced in February 1989 that he would issue an executive order on global climate change that would clearly define responsibilities of federal departments and agencies, as well as establishing effective coordination mechanisms. However, as of November 1989, the order had not been issued and its status was uncertain. Agency officials told us that they had not received clear guidance to direct the course of climate change activity. Those involved in such research activity have been guided by general principles set forth by the administration; by policies articulated in national environmental, science and technology, and climate program legislation; and by their organizational mission. Figure 2.1 shows the principal executive branch offices, departments, and agencies involved in global climate change.

Chapter 2  
Development of U.S. Policy on Global Climate Change

Figure 2.1: Executive Branch Organizations Principally Involved in Global Climate Change



- - - Denotes advisory boards

## Administration Focus on Research Pending Validation of Threat

The previous administration opposed the Global Climate Protection Act of 1987 and further global climate change legislation on the grounds that it would conflict with existing legislation and would seriously disrupt the organized effort underway. It held that OSTP was legislatively given responsibility to coordinate science activities affecting more than one agency, and that it was inappropriate to name a single lead agency. The administration noted that appropriate roles for federal agencies were being determined.

Subsequently, the current administration signaled its intention to give high priority to the global warming issue. In his February 1989 budget message to the Congress, the President pledged support for international cooperation and called for increased research to reduce the scientific uncertainties. Pending further research on the scientific causes of global warming and economic consequences of reducing it, the United States would focus on short-term actions that may affect climate change and can be justified for other reasons, such as to (1) increase energy efficiency, (2) promote renewable energy sources and technologies, (3) reduce harmful gas emissions (including phasing out CFC's), and (4) reduce deforestation and support tree planting.

In his budget message, the President stated that

- U.S. leadership was essential for international cooperation and global action;
- outlays for federal global change (encompassing climate change) research efforts would be increased in fiscal year 1990 (by 43 percent over 1989 to \$191 million) to reduce scientific uncertainties surrounding future predictions of potential greenhouse effects; and
- he would issue an executive order on global climate change to clearly define the responsibilities of federal departments and agencies, as well as establish effective coordination mechanisms.

## National Policy Advisory and Climate Program Functions Not Fully Discharged

Pending establishment of a national policy and issuance of specific guidance regarding federal agency roles and responsibilities for global climate change, certain executive branch policy advisory and program management functions established by law already exist. Through prior legislation, the Congress provided the Office of Science and Technology Policy (OSTP) and Council on Environmental Quality (CEQ) with broad authority to advise the President on national environmental and scientific policy, and it established a National Climate Program Office (NCPO)

within the Department of Commerce to manage the federal national climate program.

We found indications that these offices had not fully discharged their broad statutory advisory functions, owing in part to a lack of funding and staff resources. As a result, federal agencies have not been able to look to them for effective guidance on how their programs or other activities may contribute to, and could be affected by, global climatic change.

## OSTP

The National Science and Technology Policy, Organization, and Priorities Act of 1976 (P.L. 94-282) established a national science and technology policy, providing for an advisory mechanism (OSTP) within the Executive Office of the President to advise on aspects of issues of national concern (including the environment) that require attention at the highest levels of government. The director of OSTP serves as the President's science adviser and, as executive branch central policy planner, OSTP assists federal agencies in identifying public problems and objectives, mobilizing scientific and technological resources, and reviewing federal science policy and programs. Agencies look to OSTP for national guidance, but it appears that OSTP has not been provided with the necessary staff and funds to effectively carry out its policy, coordination, and other functions.

Adequate staff and funding to perform the OSTP functions have been concerns of its officials. OSTP staffing levels have declined over the last 6 years and key positions were not filled. Officials said that, on the average, OSTP staff left after about 2 years in their positions. They said some OSTP staffing needs are filled through staff loaned from other departments and agencies, and some key positions remain vacant. OSTP's fiscal year 1989 appropriation of \$1.6 million was at its lowest point in 10 years—at 35 percent of the amount appropriated in 1978—and further spending limitations have been imposed. (As discussed further in app. II, a recent report on Science & Technology and the President, by the Carnegie Commission on Science, Technology, and Government observed that, even after 12 years, OSTP was a long way from fulfilling its mandate to help define and implement national science and technology policy.)

OSTP appears to be taking on a more influential national policy role under the Bush administration. The President has recently elevated the status of its directorship, naming the science adviser to chair a Domestic

Policy Council working group on global change. In addition, several key staff positions formerly left vacant under the Reagan administration have been filled.

NCPO

The National Climate Program Act of 1978 (P.L. 95-367) gave NCPO broad authority to establish and coordinate a national climate program, including planning, research, data collection and assessment, global forecasting, international cooperation, and reporting. In establishing NCPO as lead entity for this program within the Commerce Department, authors of the legislation stated that the Congress meant to create a prototype research organization that would coordinate climate research across agency and disciplinary boundaries and respond to natural and human-induced climate change rather than passively adapt to it. However, agency officials told us that NCPO's low placement in the department's executive echelon and a comparatively modest budget have hindered its effectiveness.

NCPO was administratively placed under the Chief Scientist in NOAA, a Commerce Department agency which is the lead agency for climate monitoring and prediction. From there, NCPO oversees and provides guidance for a multiagency national climate program plan, and analyzes for OMB a budget of about \$200 million, with a staff of 12. Agency officials commented that NCPO's placement within NOAA made it difficult for the office to adequately administer the interagency climate program. Despite the office's perceived lack of support and visibility, cognizant agency officials said that they believe NCPO is the proper activity to provide an informed long-range climate change and forecasting capability.

CEQ

The National Environmental Policy Act of 1969 (P.L. 91-190) established a national policy for the environment (encompassing climate change) and a three-member Council on Environmental Quality in the Executive Office of the President to, among other things, develop and recommend to the President national policies to foster and promote improvement of environmental quality to meet social, economic, health, and other national goals. CEQ's chairman told us that the agency's funding and personnel resources were insufficient to carry out its tasks.

For example, CEQ regulations require that federal agencies' environmental assessments and statements address reasonably foreseeable impacts of proposed programs, projects, and regulations, as well as the impact that environmental change would have on programs or projects. CEQ has

determined that whereas global warming resulting from greenhouse gas emissions is "reasonably foreseeable," no more than six assessments prepared by federal agencies since 1982 included global climate change factors.

Further, we were told that CEQ had drafted but not yet issued additional guidance to federal agencies on this subject. In calling attention to climate change in environmental impact statements, CEQ proposed issuing policy guidance requiring that statements include specific assessments of global climate change impacts. However, the chairman said that the administration delayed issuing the initially proposed guidance because it left open the issue of whether both completed programs and those approved for completion required an assessment.

## Interagency Coordination for Climate Change Activity

Three interagency mechanisms are used to coordinate the federal government's climate change activities. A 1986 amendment to the National Climate Program Act of 1978 established the National Climate Program Policy Board (NCPBB) to coordinate NCPO activities in the Department of Commerce. An administrative order created a Committee on Earth Sciences (CES) under OSTP and the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) to coordinate federal global change research activities. In addition, a State Department group coordinates U.S. participation in the IPCC. EPA also initially established an interagency committee to ensure full coordination of scientific information and development of national policy options for global climate change, but has since discontinued it and agreed to carry out its task through existing interagency coordination mechanisms.

The administration did not designate any of these mechanisms to lead interagency coordination activity for global climate change. Their objectives differ in some respects and they have some overlapping responsibility and constituency. Agency officials have considered merging or restructuring NCPBB and CES activities to streamline operations, but said that their efforts to effect such change were hampered by legal and policy management considerations.

Although global climate change is not specifically addressed in federal research program plans, a research agenda for such activities is referred to and incorporated into the National Climate Program (administered by NCPO) and in the initial U.S. Global Change Research Program (coordinated by CES).

## FCCSET/CES Responsible for Global Change Research

FCCSET was established concurrent with OSTP by the National Science and Technology Policy, Organization, and Priorities Act of 1976, and was given the responsibility to consider problems and developments affecting more than one federal agency, and to recommend national and science technology policy. FCCSET's designated chairman is the director of OSTP, and its membership includes a representative from most departments and major scientific agencies.

The FCCSET chairman established CES in 1987 to increase overall effectiveness and productivity of federal global change research and development efforts, and to address significant national policy matters that cut across agency boundaries. CES seeks to establish the scientific basis (but not the authority or responsibility) for policy-making relative to natural and human-induced changes in the global earth system. Unless its charter is renewed, CES will terminate by December 31, 1990. Its functions are to (1) review national and international programs, (2) improve planning, coordination, and communication, (3) identify and define research needs, (4) develop and update long-range plans, and (5) assist the FCCSET chairperson and the administration. CES also evaluates how well current research activities address key scientific questions and program goals, and identifies gaps in knowledge and priorities among research needs.

CES is made up of senior-level agency representatives who review federal research programs in earth science, with global climate change as a major component. CES has representation from each of the following agencies: the Departments of Agriculture, Commerce, Defense, Energy, Interior, State, Transportation; EPA; NASA; NSF; OSTP; OMB; and CEQ. The chairman may request other federal agency representatives to participate in CES programs and activities. Staff work is conducted by the member agencies.

Administration officials view CES as the principal forum for setting the broad U.S. priorities in the earth sciences, and for integrating and coordinating U.S. research programs. Accordingly, CES prepared the special research strategy report entitled Our Changing Planet: A U.S. Strategy for Global Change Research, and submitted it to the Congress as a part of the President's fiscal year 1990 budget. The document, prepared in collaboration with the National Academy of Sciences, outlines the goals, implementation strategy, and research budget of the U.S. Global Change Research Program. The report shows fiscal years 1989 and 1990 budget levels among major science elements and funding by participating agency for each element. CES officials proposed to expand the strategy report into a detailed, comprehensive research plan during 1989.



The CES "cross-cut" global change budget marked the first time that OMB and affected federal agencies had met to develop a framework of research that provided for standardized program reporting and identification of program priorities, potential areas of overlap, and program gaps in need of attention. Decisions were reached through agency-OMB consensus, and the resulting budget represents a mixture of what the participants perceived was the appropriate investment in global change research, with climate change being a major component.

**NCPPB Coordinates  
National Climate Program**

Overall coordination of NCPO activities was legislated under a 1986 amendment to the National Climate Program Act of 1978 which created the NCPPB. The board's responsibilities include coordinating plans and reviewing progress on the National Climate Program plan, reviewing agency and department climate-related budget requests, and establishing and maintaining interagency groups necessary to carry out NCPPB activities. The board serves as a forum for interagency staff coordination on climate change research programs.

NCPPB is headed by the NCPO director and NCPO serves as its staff. Its participating agencies and activities include climate activities of the Departments of Agriculture, Commerce, Defense, Interior, State, and Transportation; EPA; NASA; CEQ; NSF; OSTP; and others as determined by the Secretary of Commerce.

NCPPB officials envisioned that the board's membership would consist of senior-level representatives from the agencies and activities participating in the program. However, they told us that it evolved into a staff-level group of researchers and policy analysts. In part, it appears to have been NCPO's inability to effectively address global change, a more recent and broader concept than climate change, that led to the establishment of CES. Its function to develop a coordinated interagency climate change research plan is also embodied within development of the CES global change program.

**Department of State  
Coordinates U.S.  
Participation in the IPCC**

Development of interagency planning for U.S. participation in the U.N.-sponsored IPCC effort and U.S. leadership of IPCC's response strategies working group are coordinated by the State Department's Bureau of Oceans and International Environmental and Scientific Affairs, under the direction of the Domestic Policy Council's Working Group on Energy, Natural Resources and the Environment. The group meets as required, often weekly, to develop position papers and coordinate preparation of

IPCC work products. It has a broad membership, composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Interior, and Treasury; NCPO, OMB, CEQ, the Council of Economic Advisers, EPA, OSTP, AID, and the U.S. Trade Representative. The members who participate in the group are often the same individuals who serve on the NCPO/NCPPB and FCCSET/CES coordinating bodies.

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## Conclusions

Many executive branch agencies are engaged in climate-related activities and have responsibility for analyzing the economic, social, health, and other impacts of climate change. Several organizational mechanisms have been established to provide policy leadership, to guide and direct agency research activities, to recommend funding levels, and to determine research priorities for environmental, scientific, and climate-related activities. However, national policy goals and decision-making responsibility for managing a federal program on global climate change have not been established.

Development of a coordinated national policy and implementing global climate change research and program strategies have been impeded by lack of designated leadership and guidance on agency roles and responsibilities, and limited effectiveness of offices responsible for national environmental and climate program policy. Interagency coordination was carried out through formal and ad hoc mechanisms that had overlapping responsibility and constituency. In the absence of executive direction clarifying responsibilities of federal agencies, climate change research activities and policy formulation were being conducted in an atmosphere that lacked effective central and strategic planning and that had operated without full use of existing policy structures and resources.

# U.S. Participation in International Climate Change Activities

The United States and the world community recognize that global warming cannot be attributed to one country or source and, because the potential impact would affect everyone, any overall solution requires the cooperation of all nations.

A principal objective of U.S. international environmental policy is to provide leadership, through international organizations and cooperative efforts, to advance the scientific understanding necessary to responsibly address the implications of predicted global climate change. To meet this objective, federal agencies participate in various global climate change effect studies through a number of multilateral activities and international organizations, and conduct cooperative research activities under international and bilateral agreements with a number of countries.

International organizations, principally WMO and UNEP, coordinate climate change studies. These bodies recently established the Intergovernmental Panel on Climate Change (IPCC), which has become the leading international forum for addressing global warming. The United States has assumed a major role in the panel, chairing a working group that is examining response strategies. However, despite giving rise to expectations among other nations that it was giving high priority and was ready to act on the global warming issue, the United States so far has emphasized the need for continued further study rather than commit too early to specific targets or timetables that could result in unwarranted actions to protect the environment.

## Agency Roles and Responsibilities

The Department of State manages U.S. international science and technology activities as a fundamental element of foreign relations and global environmental policy. It seeks to assure that U.S. international science and technology activities, including such environmental concerns as protecting the ozone layer, control of CFC emissions, and global climate change, are carried out in accord with the nation's foreign policy agenda. State's Bureau of Oceans and International Environmental and Scientific Affairs (OES) coordinates with other bureaus in the department to develop overall U.S. policy positions and strategies, represents the United States in bilateral and multilateral discussions, and negotiates and prepares texts for international agreements in consultation with a number of executive, scientific and technical agencies and private sector organizations. State's Bureau of International Organization Affairs provides funding support for, and coordinates U.S. participation in, international organizations.

Other federal departments and agencies participate in international activities according to their functional areas of responsibility and expertise. They conduct these efforts in direct collaboration with other governments and international organizations and through various domestic interagency mechanisms. In certain circumstances, such as conferences on technical issues, representatives from EPA or other federal agencies may be designated to lead U.S. diplomatic missions abroad. Cooperative research projects on climate change are carried out through multilateral conventions and environmental agreements with various countries. In addition, direct liaisons are maintained with several organizations. For example, the Chief of the National Weather Service, under NOAA, is the U.S. Permanent Representative to WMO for technical and scientific coordination. Similar coordination with other U.N. agencies are handled by State.

## Multilateral Activities

International environmental research and policy development are coordinated principally through two specialized United Nations agencies—WMO and UNEP—and the International Council of Scientific Unions (ICSU), a nongovernmental body of scientific unions, academies, research councils, and associations. WMO coordinates worldwide collection and exchange of weather data and seeks to improve forecasting services. UNEP studies environmental changes throughout the world, promotes and coordinates U.N. programs, and provides policy direction for international environmental projects.

Multilateral activities concerning climate change are principally conducted—and until recently, coordinated—under the World Climate Program, a collaborative effort since 1979. As part of the program, WMO collects and exchanges data on the earth's atmosphere and climate, UNEP monitors and addresses possible policy responses to the impact of significant climate variations, and WMO and ICSU conduct joint research efforts. In addition, ICSU is developing (through nongovernmental organizations) a long-term international geosphere-biosphere program that is focusing on the interactive physical, chemical, and biological processes that regulate the total earth system.

International discussions to protect the earth's ozone layer began in 1981 under UNEP auspices, culminating in a broad international agreement (the 1985 Vienna Convention) addressing this issue. The agreement has formed the basis for current global efforts to phase out CFC usage. In 1987, recognizing the need for a more focused and broad-based

approach to understanding and responding to effects of increased greenhouse gas concentrations on the earth's climate, the governing bodies of WMO and UNEP established the IPCC to

- assess available scientific knowledge of global climate changes to determine if a warming trend has begun and examine its causes;
- review the environmental, economic, and social impact of climate change; and
- formulate response strategies for national and global action.

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## U.S. Participation in the IPCC

The United States actively promoted the IPCC's establishment and the administration firmly supports its work. NCPO and its policy board originally proposed an intergovernmental panel to coordinate and oversee the international assessment of climate change and its impact on society. While NCPO continued to have an active role in IPCC activities, U.S. leadership on the panel has been assumed by the OES Assistant Secretary of State, under the direction of the Domestic Policy Council's Working Group on Energy, Natural Resources, and the Environment. The leadership arrangement was arrived at through interagency consensus.

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## First Panel Meeting in Geneva

IPCC held its first meeting at WMO headquarters in Geneva in November 1988 at which time it established an organizational framework and study program which generally met U.S. objectives for autonomy, reasonableness, and attainability. The panel established three working groups and a small independent secretariat to coordinate activities of the working groups. It also proposed a trust fund arrangement among participants to finance its work, and set a timetable of about 18 months for completion of its study.

The working groups established by the panel to coordinate its work comprised broad regional and developmental membership, with each group consisting of 2 to 5 vice-chairs and a total of 12 to 17 members and responsibilities as follows:

- Working Group 1, chaired by the United Kingdom, is to consider factors affecting climate change, including greenhouse gases, responses of the atmosphere-ocean-land-ice system to these factors, assessment of current capabilities of modeling global and regional climate change and the predictability and timing of such change, past climate record and presently observed climate anomalies, and projections of future climate and

sea level. The range of projections and their regional variations, gaps and uncertainties should be identified.

- Working Group 2, chaired by the Soviet Union, is to make an integrated review of environmental and socioeconomic impacts of climate change, emphasizing national/regional climate warming and sea-level rise (especially in coastal and island areas), agriculture, forestry, health, water resources and floods, droughts and decertification, energy, and other sectors.
- Working Group 3, chaired by the United States, is to address forecasting and assessment of future emissions of greenhouse gases, impacts of changing technology, sources and sinks, adaptation to climate change, strategies to control and reduce emissions (through fossil fuel conservation), and other human activities that may have an impact on climate (e.g., changing land-use, deforestation), the social and economic implications, and legal matters.

The U.S. delegation comprised the largest and most diversified of over 35 nations and international organizations that attended the Geneva meeting. The delegation included a number of congressional observers and advisers from the Departments of Commerce, Energy, and Interior; EPA; NASA; NSF; and OSTP.

WMO and UNEP officials hosting the conference told us that they were generally pleased by the level of support, commitment to action, and overall unity of purpose shown by the U.S. delegation. However, they also pointed out some areas that could be improved. The officials stated that, although it was clear to them that the State Department representative coordinated U.S. efforts at this conference, they were uncertain that this representative would continue to be the designated official U.S. spokesperson for future IPCC and other global climate change activities. They also observed that it was essential for the United States to (1) establish clear lines of authority and responsibility for carrying out U.S. global warming policy, (2) identify "lead" contact points for carrying out the study elements of IPCC's work, (3) designate focal points to obtain funding support for IPCC-sponsored research and conferences, and (4) improve coordination mechanisms to bring in broader governmental and private sector representation as the debate shifts from scientific analysis to policy formulation.

## Working Group Planning Meetings

Planning meetings of the working groups and with the coordinating secretariat in Geneva were held during 1989. Each working group established a steering committee and several subgroups to organize preparation of each report.

The first session of the U.S.-led response strategies working group (Working Group 3), attended by 33 nations and a broad range of international and nongovernmental organizations, convened in Washington, D.C., in late January 1989. The Secretary of State chose the occasion to signal the administration's readiness to act and give high priority to efforts aimed at controlling global warming. The Secretary remarked that action on this transnational issue probably should not wait until the scientific uncertainties have been resolved, but that immediate focus should be on steps that are specific, cost-effective, as fair as possible to everyone, and justifiable on other grounds.

The initial U.S. proposal submitted for organizing the group's work implied a need for additional data-gathering. It was regarded by participants as too time-consuming and revised by the United States in favor of a plan that emphasizes development of short- and long-term limitation and adaptation strategies. The new report plan was to describe existing scientific knowledge and likely impacts of ongoing and future climate change, to be provided by the other two IPCC working groups. Four subgroups were established to address limitation and adaptation strategies by major topic (i.e., energy and industry, agriculture and forestry, coastal zone management, and resource use/management) to conduct its work, with the goals to

- define policy options for national, regional, and international actions, including short-term (18 months) proposals;
- provide estimates of consequences, costs, and benefits;
- set priorities; and
- define implementation mechanisms, analyzing carefully the implications for nations in different stages of development.

The second meeting of the response strategies working group was held in Geneva in October 1989, attended by 43 national delegations representing broadening participation by less developed and eastern bloc countries, and continued heavy involvement of NGO's and international organizations. The broader participation disclosed a wide range of viewpoints and, despite reaching consensus on certain basic issues, it also had the effect of illuminating fundamental differences requiring further dialogue and negotiation. Concerning the major issue discussed at the

meeting, delegates agreed on the need for a framework convention on climate change that would lay down general principles and obligations, provide for continuing assessments, and permit separate protocols to be negotiated on the different greenhouse gases. However, distinct differences existed regarding the specificity of emissions control measures that were to be addressed in the convention. The United States proposed further study of economic consequences and submitted a list of legal measures which were noted without action or consensus.

For working groups chaired by other countries, overall coordination of U.S. participation in the U.K.-led "science" working group is provided by CES, and NCPO was designated lead coordinator for the U.S.S.R.-led "impacts" working group. A Geneva secretariat meeting in May 1989 focused on developing a reporting framework and on seeking increased understanding of deeply felt concerns of developing countries that response strategies adopted to reduce emissions do not impair economic growth and social needs.

## Second Panel Meeting in Nairobi

In June 1989, the full IPCC panel convened in Nairobi, Kenya, to review the progress of its three working groups and to explore ways to increase the participation of developing countries in the IPCC. Each working group is scheduled to complete its work and prepare a report by May 1990. The completed work will become IPCC's first interim report and is scheduled for consideration by the U.N. General Assembly in 1990. It should provide guidelines for global policy formulation and serve as a starting point for formal negotiations on a framework convention. The panel expects to present its reports at the Second World Conference, organized by WMO and UNEP and last held in 1979, in Geneva during November 1990.

Representatives from over 40 countries attended the Nairobi meeting, more than attended the first IPCC meeting in Geneva in November 1988. OES attributes the increased participation to greater attendance by third world countries. To maintain and improve third world participation, the IPCC approved increased funding for travel of third world experts to IPCC-related activities, agreed to sponsor conferences and seminars for third world experts, and to assist in the formation of national committees on climate change in developing countries. The United States and other countries pledged additional travel assistance for less developed countries.



## Coordination by U.S. Agencies

The United States' early involvement in IPCC was coordinated by State/OES, but international environmental officials asserted that the Bureau has not provided the strong leadership sought or expected by some of these officials in the wake of the Secretary of State's welcoming speech in January 1989 to the IPCC response strategies working group. In part, as discussed previously, the officials pointed to a lack of clarity in designating leadership, agency responsibilities, and focal points for coordinating the global warming issue.

The State/OES Assistant Secretary led U.S. delegations at IPCC conferences and Working Group 3 meetings but the principal U.S. delegates to Working Group 1 and 2 meetings were representatives from other agencies. According to State officials, the President was expected to name a permanent chief delegate to the IPCC, but had not yet done so (nor was the OES Assistant Secretary appointed or confirmed in his position in the new administration). An ad hoc working group, meeting under State/OES auspices, guided U.S. participation in the IPCC. Also, at State/OES request, NCPO reported on IPCC and global climate change activities by federal agencies, nongovernment organizations, industry, and other groups. Separately, the EPA administrator was named to lead a ministerial-level conference on global warming hosted by the Netherlands in November 1989.

The administration considers IPCC's formation to be an important first step in providing a central international forum, along with other competent bodies, for addressing the climate change issue. IPCC serves as an interim measure for member governments to critically review information needed to form an international consensus on climate change. Administration policy has been to avoid making specific commitments to regulate greenhouse gas emissions until IPCC submits its final report in November 1990. It is not clear what permanent institutional arrangement may be made to continue to develop internationally recognized climate change assessments and responses beyond 1990. However, during the recent IPCC meeting in Nairobi, the OES Assistant Secretary stated that the conclusions of IPCC's interim report would serve as a starting point for formal negotiations and could be used by countries to form short- and long-term strategies.

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## U.S. Participation in Bilateral Climate Change Programs

Federal departments and agencies also conduct joint research programs in their areas of responsibility with foreign governments through international and bilateral environmental agreements that directly and indirectly relate to the global climate change issue. The following are some examples.

- Under the National Climate Program Act of 1978, as amended, NOAA is responsible for coordinating interagency participation in international climate-related activities and, to this end, is the focal point for U.S. participation in the World Climate Program research. It has working agreements with Canada, China, and the Soviet Union, and has conducted a series of seminars designed to identify emerging policy and technical issues.
- EPA has had a bilateral agreement with the Soviet Union since 1972 on protection of the environment, under which various agencies have participated in global climate change research, including ozone depletion in the polar areas, and formulation of potential policy responses. EPA also has an agreement with its counterpart agency in the People's Republic of China to study environmental pollution and climate change.
- DOE has approximately 150 agreements with about 24 countries, mostly involving fossil and nuclear energy, including a number of them on energy conservation and emission control. One agreement (with China), exploring the relationship of climatic changes and atmospheric levels of carbon dioxide, directly relates to the global climate change issue.
- Representatives of U.S. scientific agencies, including NASA, NOAA, and NSF, conduct various assessments in co-sponsorship with other governments and international organizations.

Although AID does not assist in specific climate change research activities, it exerts some policy influence through projects that it finances in developing countries. Projects include energy conservation and efficiency, forestry assistance, and crop production.

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## Reporting on and Promoting Global Climate Protection

The Global Climate Protection Act of 1987 requires the Secretary of State and EPA Administrator to submit a report to the Congress by December 1989, which is to address many of the same matters that are to be addressed in the IPCC report. In addition, the act requires the Secretary to promote, within the United Nations, the early designation of an International Year of Global Climate Protection. Accordingly, the U.S. representative suggested to IPCC members at their June 1989 meeting in Nairobi that they consider the concept of an international year of climate change within the U.N. system and that 1990 would be a logical

choice for such designation because of a number of important international conferences already scheduled during that year. The IPCC noted the suggestion but made no formal decision on the matter.

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## Conclusions

The United States has participated in collaborative climate research activity through various international organizations and bilateral agreements for many years. Further, it placed itself in strong leadership position to attain international cooperation in formulating policy to limit or adapt to global climate change by gaining chairmanship of the IPCC response strategies working group in November 1988. However, despite giving early indications that it was ready to act and give high priority to this issue, the administration has continued to emphasize the need to conduct further research rather than commit prematurely to possibly unwarranted actions. It has not yet designated a permanent chief delegate to direct U.S. efforts in the IPCC nor agreed to specific targets and timetables for reducing or controlling greenhouse gas emissions pending further study.

International environmental officials that we contacted were generally pleased with the initial pledges of U.S. commitments and resources applied in the IPCC. However, they also expressed some concern regarding the authority of designated U.S. spokespersons at international meetings and the adequacy of how U.S. efforts were being coordinated and would be sustained in future IPCC activity.



# Brief Chronology of Key Events Affecting Global Climate Change

1880-1987	Average global temperature increased about 1 degree Fahrenheit.
1980-1988	1980, 1981, 1983, 1987, and 1988 were the 5 warmest years in the past century.
October 1985	State of scientific knowledge and consensus on greenhouse gases and climate change summarized at a joint UNEP/WMO/ICSU conference in Villach, Austria.
June 1986	Need to consider policy options of greenhouse warming asserted during Senate hearings before a subcommittee of the Environment and Public Works Committee. National Academy of Sciences asked to review policy issues of greenhouse gases.
September 1986	Group of senators requested EPA to prepare two reports for the Congress—one report on the health and environmental effects of climate change and one on policy options for stabilizing greenhouse gas emissions at current levels.
June 1987	WMO and UNEP agreed to establish intergovernmental mechanism to assess available scientific data and formulate response strategies for climate change.
September 1987	Protocol to reduce CFC production and emissions is signed by group of nations in Montreal, Canada.
December 1987	Global Climate Protection Act of 1987 (P.L. 100-204) enacted.
January 1988	President issues report to the Congress on current government research activities related to the greenhouse effect.
April 1988	WMO/UNEP released World Climate Program impact studies report entitled Developing Policies For Responding To Climate Change, based on the results of international workshops held in 1987.
June 1988	Director of NASA's Institute for Space Studies told Senate Committee on Energy and Natural Resources that there was a high probability that global warming due to the greenhouse effect "is here."
July 1988	Comprehensive bills addressing global warming introduced in the Congress.
November 1988	Initial meeting of the WMO/UNEP Intergovernmental Panel on Climate Change held in Geneva to establish reporting plans.
January 1989	Montreal Protocol to reduce CFC production and emissions entered into force.
Jan.-Feb. 1989	President submits to the Congress a "cross-cut" budget and strategy for global change research.
March 1989	The IPCC Response Strategies Working Group convenes first meeting in Washington, D.C.
	EPA's draft "stabilization" report presented to the Congress.
	President announced U.S. decision to join other nations in supporting elimination of CFCs by the year 2000.
May 1989	IPCC Response Strategies Working Group Steering Committee and subgroup meetings held in Geneva, Switzerland.
June 1989	Second meeting of full IPCC panel held in Nairobi.
October 1989	Second meeting of IPCC Response Strategies Working Group held in Geneva.
November 1989	First international conference to specifically address global warming held in the Netherlands.

# Views of Nongovernmental Policy Analysis and Advisory Organizations

Representatives of various domestic policy analysis and advisory organizations have testified before congressional committees, or have issued policy statements on global warming and related environmental issues. We contacted a number of organizations to obtain their views on the matters discussed in this report. The following comments are among some frequently voiced concerns.

## Alliance for Responsible CFC Policy

The Alliance, a coalition of CFC producers and users desiring effective government policy on CFC use, contends that vigorous action by the United States is needed to obtain broad participation in the Montreal Protocol. The Alliance believes that additional unilateral regulation of CFCs by the United States beyond the Protocol's measures is unwarranted without global cooperation and would

- provide little, if any, added environmental protection benefit;
- injure United States industry, thus benefiting international competitors; and
- undermine efforts to obtain an international resolution.

Further, public policy development needs more scientific investigation and international cooperation to determine whether CFCs pose a threat to the environment. Computer model calculations on the theoretical effects of CFCs on ozone have been inconclusive and ever-changing, and do not constitute a sound basis for regulation. There is ample time to conduct needed research and detect any threat before significant environmental harm occurs.

Finally, the Alliance urged that policymakers should remain sensitive to the need for a responsible transition process to potential substitute chemicals, processes, and products, and to avoid disruptions that could threaten the health, safety, and well-being of consumers and workers who rely on the CFC compounds. It said CFC end-users should be encouraged to voluntarily conserve where economically and technologically practical. Also, further CFC restrictions were seen as severely impacting many industries and curtailing the supply of products. Moreover, additional restrictions would force manufacturers to use substitutes that are less efficient, more costly, and potentially hazardous. In many cases, no CFC substitute exists.

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## Carnegie Commission on Science, Technology, and Government

The Commission, established in April 1988, assesses the process by which the government encourages and incorporates scientific and technical knowledge into policy-making and decision-making. It is composed of individuals with broad experience in government and in science and technology. Through its work, the Commission has become concerned that the existing levels of coordination in the administration may be inadequate for the multidisciplinary nature of emerging issues, such as global warming—effecting the atmosphere, climate, and energy.

In an October 1988 report (Science & Technology and the President), the Commission partly addressed this problem. It recommended that the President take early action to upgrade science and technology functions that support him by

- elevating the existing position of Science Adviser to Assistant to the President for Science and Technology, with full participation on White House Councils in policy direction, budgetary choices, and key staff appointments;
- strengthening the Office of Science and Technology Policy, under the direction of the Assistant, by filling vacant positions, increasing staff, and expanding policy functions; and
- providing a medium for drawing on and incorporating the advice of experts from the scientific and technical community outside of the federal government on matters of national concern.

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## Chamber of Commerce of the United States

The Chamber, a national federation of business organizations and regional chambers of commerce, advocates recommendations of the business community on national economic and social issues. The Chamber believes that the United States should take a leadership role in the international community to vigorously investigate causes and effects of global climate change, mitigation strategies and potential options. However, unilateral action by the United States is insufficient, wasteful, and an unfair burden on its society.

Much of the future increase in “greenhouse gases” will come from developing countries. The United States cannot criticize or prevent third world populations from emulating its own practices as they struggle to raise their standards of living. The United States must promote global cooperation in addressing this issue.

The Chamber stated that valid and effective policies based on merit, not speculation, must follow a better scientific understanding of the magnitude and potential of these changes, along with an international dialogue on the issue. It maintained that inappropriate action would ask the world to accept unneeded social, environmental and economic costs. Similarly, inappropriate action would ask the world to suffer changes in their habitats and economies. Any technological or regulatory steps affecting climate are as serious as the changes they seek to rectify.

The Chamber believes it would be wrong not to take the global climate change forecasts seriously. It would be an equally large mistake not to understand the limitations of the forecasts and hence act imprudently. The science of climate change theories are far from perfect and not at all certain. Models must be revised as new data are developed, which will shift predictions by an amount as yet unknown.

The proposed actions should

- educate people internationally about global climate change and the choices that may be necessary to avoid it;
- support international cooperative research to advance everyone's ability to predict and act;
- implement changes that make economic, social and environmental sense on their own merits;
- assist developing nations in joining the global efforts while maintaining their economic growth; and
- encourage alternative energy technologies and conservation, and not force uneconomical choices under the guise of climate change.

Economically, only the wealthier nations and societies can afford strict environmental controls. All nations must have sustainable economic development in order to afford controls. It would be unwise to establish energy and environmental policies that are driven solely by concerns over climate change, without a balance of social, strategic, and economic issues.

## Electric Power Research Institute

The Institute, which provides research and technology development for the electric utility industry, maintains that the United States must rely on multilateral action involving all nations. Third world countries, concerned with their own development, present the greatest challenge as the most significant contributors to future greenhouse gases. Increasing populations and the corresponding energy demands in these developing



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**Appendix II  
Views of Nongovernmental Policy Analysis  
and Advisory Organizations**

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countries require that all nations cooperate. Consequently, unilateral action by the United States will achieve little in the overall global realm. As a leading industrial power, the United States may well take the leadership position, but little will be accomplished if other nations do not follow.

Because of present scientific uncertainties, policymakers should not act prematurely on the current information, without more discussion and research. For example, general circulation models project mean global temperatures moderately well when run against a 30-year temperature record. However, these temperature estimates are of little use in evaluating environmental impact in such areas as agriculture, forest ecosystems, and hydrology, where regional estimates are needed. The models perform less favorably when run against a 30-year temperature record on a subregional basis, for example, for the continental and central United States.

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**The National Association  
of Manufacturers**

The Association, representing the industry and public policy interests of about 13,500 U.S. manufacturers, supports the multilateral approach of the IPCC, since the United States cannot solve this problem alone. If society is asked to change energy use and lifestyles, it follows that any policies adopted will have to be sustained across national boundaries.

Global warming policy decisions should be made only after consideration of the scientific understanding and potential socioeconomic impacts of this phenomenon. Scientific evidence is still inconclusive, making further research essential. As the first priority, scientific research should confirm or refute the theory of unnatural global warming and provide a better understanding of the contributing factors. Then the United States should help educate the global society on the options available to mitigate potential effects, and the costs and relative effectiveness of each measure. Given the uncertainty in science, policies must be favored that make sense in their own right.

Care must be taken that actions do not create economic shocks to the global economy. Precipitous changes in energy supply and demand could jolt the industrialized countries' economies and severely hurt third world development. Scientists, governments, public policymakers, and businesses must assure that international actions encourage economic growth, along with sound environmental policies for all nations.

The National Resources  
Defense Council

The National Resources Defense Council, an environmental law organization, uses the judicial system to protect the environment. The Council believes that the United States must lead the effort to minimize global warming and that additional research is not necessary prior to action. The IPCC and the U.S.-led response strategies working group will play a key role in energizing and coordinating the international system. The IPCC should identify and promote short-range actions for the Western industrialized nations and encourage the groundwork for rapid participation by the Eastern Bloc and major developing nations. It is crucial that developing nations see that the actions needed to prevent global warming are in their self-interest.

A global treaty is probably the long-term solution to the global warming problem. The United States should work through the IPCC and other forums to promote a global treaty convention. Because of the success with the Montreal Protocol, UNEP would be a logical forum for negotiation. Such a treaty would

- require net reductions in greenhouse gas emissions sufficient to stabilize the earth's climate, while providing enforcement mechanisms;
- distribute the responsibility for making reductions equitably among nations; and
- establish a mechanism for planning and coordinating research on a global basis.

The treaty should commit wealthier countries to increased research, and to providing development assistance to enable poorer countries to meet the requirements of the agreement. Restricting assistance to countries accepting the treaty obligations could create incentives for broad participation.

Third world debt must be addressed in a way that enhances the environment and promotes economic development. A direct link exists among sound environmental practices, economic development, and third world debt. Environmental policies, perceived as having high up-front costs, appear expensive to people living on the economic edge. However, the costs of failing to adequately manage crucial natural resources can be far greater. The United States should step up bilateral efforts through AID, and use its influence with the multilateral development banks to enable developing nations to sustain development and help prevent global warming through improved energy efficiency and renewable energy sources.

Public policy must be directed from the highest levels. OSTP is primarily concerned with science and should not lead policy development coordination among the agencies. The greenhouse problem involves economics and political issues, as well as science. In a letter to then President-elect Bush—Blueprint for the Environment, Advice to the President-Elect from America's Environmental Community—the Council and other environmental organizations provided policy development recommendations. The Blueprint recommended that the President

- reorganize the Council on Environmental Quality into a Presidential staff on the environment, headed by a highly qualified director;
- establish high-level interagency groups to ensure action on broad issues, such as global warming, sustainable development in developing countries, and population stabilization, that cut across agency lines; and
- assign members of the Presidential staff to ensure that the work of these groups does not become mired in interagency disputes.

The Blueprint further recommended the creation of a cabinet-level Department of Environmental Protection to replace the Environmental Protection Agency. Organizations with principal responsibility for dealing with environmental problems critical to this nation and the world should be placed in the highest councils of government. Additionally, the National Security Council, the domestic policy staff in the White House, and OMB, must include people highly qualified to deal with environmental issues.

## World Resources Institute

The Institute is a research and policy center that presents information about global resources and environmental conditions, analyzes emerging issues, and develops plausible policy responses to governments and international organizations in more than 50 countries.

The Institute believes that the United States, as a contributor of one-fifth of all greenhouse gases, has a special responsibility to demonstrate leadership and a commitment to find a solution. International leadership should unify environmental protection, resource use, and development. The key to an effective program is “sustainable development”—defined as development that maintains and enhances human and physical productive capacity without damaging the underlying resource base. The approach would require refocusing bilateral aid and influencing multilateral agencies. In addition, the United States should respond to the problem of climate change by implementing those options that are the most cost effective and that provide multiple benefits to society.

The Institute maintains that the challenge facing policymakers and managers today is to identify policy options that will limit greenhouse gas emissions without substantially slowing economic growth over the long-term. Their task is complicated by the significant and persistent uncertainty in regional analyses of the impacts of climate change. They will need to surmount substantial methodological difficulties to develop new analytic approaches and tools. These tools will need to have long time horizons if scientists are to adequately evaluate policies that must be implemented over the next 50 or 100 years.

Problem resolution involves decision-making, coordination, and the means to carry out appropriate action. To ensure priority attention, the President should appoint a White House counselor of Cabinet rank to develop and coordinate this overall effort. Alternatively, the President could elevate the head of the EPA to Cabinet rank. The President should provide the agency with a clear mandate to work with the executive agencies and the Congress to develop concrete proposals for approval by the President, and to monitor their implementation. Also, some organizational changes are needed. The Council on Environmental Quality and OSTP must be reconstituted, strengthened, and given a mandate.

The Institute contends that the task for policymakers will not be simple or quick, and the choice is not between preventing or adapting to climate change. Policymakers will need to establish policies that, in the circumstances peculiar to each region and nation, will slow the rate of change and allow societies to adapt to the climatic changes that cannot be avoided. Their task is politically difficult because the costs of preventing or adapting to climate change are in the present and the potential benefits are both uncertain and far off. The Institute concludes that the risk of ignoring the challenge, however seductive, is enormous.

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