

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF CLIMATE POLICY

THE WHITE HOUSE

WASHINGTON

April 8, 1991

*Memos
NRC*

MEMORANDUM TO GOVERNOR SUNUNU

FROM: D. ALLAN BROMLEY *Alan*

SUBJECT: THE NRC EVANS REPORT

Attached hereto are memoranda prepared by Dr. Nancy Maynard of my staff and by Dr. Howard Gruenspecht of Mike Boskin's staff addressing recommendations from the about-to-be-released Evans report - a copy of which is also enclosed.

As both memoranda emphasize, the Evans report is very parallel to the position of this Administration in a great many of its statements and while it advocates a more activist response to a projected greenhouse effect - beyond the "insurance policy" approach that we have taken thus far. I believe that it will be important for us to be supportive overall when the Evans report is released emphasizing the many points of overlap and agreement.

Enclosure

Bromley, D. Allan, Files
Global Climate Change Files

Global Warming

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

April 8, 1991

MEMORANDUM FOR D. ALLAN BROMLEY

FROM: NANCY G. MAYNARD *NM*
SUBJECT: NAS/Evans Panel Report - "Policy Implications
of Greenhouse Warming"

The Evans Report, using some relatively strong language regarding the need for action now ("Despite the great uncertainties, greenhouse warming is a potential threat sufficient to justify action now."), has made a series of recommendations to both reduce the speed and magnitude of greenhouse warming as well as to mitigate and adapt to possible future conditions resulting from greenhouse warming.

However, the recommendations, while they include more than the present "insurance policy" approach to the climate change issue, are surprisingly similar to many of the actions which have already been put into place or proposed by the Administration in, for example, "America's Climate Change Strategy", the National Energy Strategy, and the Clean Air Act. It is certainly appropriate, therefore, for the Administration to take a positive approach to the report - noting, at the same time (with examples) the similarities between the actions already taken or planned by the Administration and those recommended by the NAS Panel. In fact, this may be our best opportunity to get out front on this issue - through a positive association with an Academy report.

To help provide reference to the actions (with particular emphasis on the scientific arena) taken by the Administration relative to the various recommendations made by the Evans Report, listed below are pertinent recommendations by the NAS/Evans Panel together with examples of Administration actions which address those recommendations. The attached list (Tab A) provides actions which emphasize the scientific/technical aspect of the recommendations. An analysis of the report with an emphasis on the energy and economic recommendations has been prepared by Howard Gruenspecht of CEA. (Tab B)

Bromley, D. Allan, Files
Global Climate Change Files

Global Warming

RECOMMENDATIONS FROM THE NRC REPORT: POLICY IMPLICATIONS OF GREENHOUSE WARMING - SYNTHESIS PANEL

A. GENERAL RECOMMENDATIONS (with responses from America's Climate Change Strategy):

1. a. NAS Recommendation (p. 72)

"Despite the great uncertainties, greenhouse warming is a potential threat sufficient to justify action now...."

b. Response

"The President of the United States has established such a comprehensive [climate change] strategy. The United States, today, is working to curb emissions, promote economic growth, and exercise leadership in meeting our shared responsibilities as stewards of the planet."

"The United States is taking action."

2. a. NAS Recommendation (p. 72)

"...This panel recommends implementation of the options present below through a concerted program to start mitigating further buildup of greenhouse gases and to initiate adaptation measures that are judicious and practical...."

b. Response

"...President Bush has established the comprehensive strategy for action and leadership outlined on the following pages. This strategy flows from his commitment to responsible stewardship of our planet, which includes the promotion of economic growth and sound environmental policies. It is built upon a series of actions which will have broad ranging benefits - from curbing air pollution, to conserving energy, to restoring forest lands - and which will help curb net greenhouse gas emissions...."

3. a. NAS Recommendation (p. 72)

"...It also recommends a strong scientific program to continue to reduce the many uncertainties...."

b. Response

"...The U.S. Global Change Research Program (USGCRP) has been developed as a central component of the US's approach to global change, and more specifically to address the uncertainties identified by the IPCC.

In FY 1992, the US plans to invest almost \$1.2 billion in the USGCRP

4. a. NAS Recommendation (p. 72)

"...International cooperation is essential in all areas..."

b. Response

(1) International Science Cooperation:

U.S. scientists have led the development of an international global change research program. Other countries have joined the U.S. in a coordinated research effort to address critical scientific uncertainties, through such international programs as the World Climate Research Programme (WCRP) and the International Geosphere-Biosphere Programme (IGBP). The total international research program, for which the U.S. provides about 50% of the financial support, is coordinated through United Nations scientific bodies (i.e, WMO, IOC, and UNEP), and through the International Council of Scientific Unions (ICSU).

The USGCRP coordinates closely with a number of agencies of other governments through the informal International Group of Funding Agencies (IGFA) for Global Change Research, and space agencies through the Committee on Earth Observations Satellites (CEOS).

(2) International Policy Cooperation/Negotiation:

The US has been an active participant in international policy meetings and activities on global change issues, For example:

- . President Bush hosted the White House Conference on Science and Economics Research Related to Global Change in April 1990.
- . President Bush hosted the first negotiating session of the Framework Convention on Climate Change - February 1991.
- . The US has actively participated in international conferences dealing with climate change such as: Convention on Long-Range Transboundary Air Pollution, Vienna Convention, Montreal Protocol, Transboundary Movements of Hazardous Wastes and their Disposal, Intergovernmental Panel on Climate Change, Second World Climate Conference, and the United Nations Conference on Environment and Development.

B. SPECIFIC RECOMMENDATIONS - NAS PANEL

I. REDUCE GLOBAL DEFORESTATION

NAS Recommendation:

"Participate in international programs to assess the extent of deforestation, especially in tropical regions, and to develop effective action plans to slow or halt deforestation."

US International Analyses related to Deforestation:

The USG has participated actively in the Intergovernmental Panel on Climate Change (IPCC), subgroup on Agriculture and Forestry. Jointly, EPA, US Forest Service, Department of Energy and American Forestry Association have participated. Cooperative efforts have included research, workshops and conferences.

Research in these areas underway for FY 90-91 include:

Assessment of Tropical Land Available for Reforestation, Forest Protection, and Regeneration. (Analysis in 56 tropical countries to assess absolute amount of land in various categories and social/political feasibility of managing it for carbon benefit.)

Assessment of Potential for Agroforestry and sustainable Agriculture to Slow Deforestation and Reduce Emissions. (USAID/EPA sponsored National Research Council Report due Spring 1991, and development of methodologies to assess emissions from agroforestry compared to traditional agricultural systems.)

Case studies in Key Tropical Countries by Local Experts of Current and Potential Forest Use and Associated Carbon Budgets. (Analysis of carbon budgets for 5-10 key countries by in-country analysts, of current land use and alternative plans for reforestation, forest protection and management.)

Analysis of Potential to Promote Utility Carbon Emission Offsets Through Tree Planting in US and Tropics. (Spring 1990 workshop on potential for reforestation in Central American in connection with utilities, and modeling of forestry offsets for US utilities.)

IPCC/AFOS conference on "Tropical Forestry Response Options to Climate Change", Sao Paulo, Brazil, January 1990.

NAS Recommendation:

Undertake country-by-country programs of technical assistance or other incentives"

Response:

The U.S. has shown support for debt-for-nature swaps. Congressional appropriations for debt-for-nature swaps was granted for \$1.7 billion in FY 90-91.

NAS Recommendation:

"Review U.S. Policies to remove subsidies and other incentives contributing to deforestation in the United States"

Response:

1. Congress passed the President's Tree Planting Initiative last session, encompassed in the 1990 Farm Bill, which contains about \$75 million funding for FY 91 for the Tree Initiative. This program is one of the first in the world designed (in part) to offset greenhouse gases through tree planting. (Australia has a smaller-scale program.)
2. The President's State of the Union address in January 1990 called for an end to below-cost timber sales on seven national forests near urban areas, as a pilot program for FY 91.

NAS Recommendation:

Explore a moderate domestic reforestation program and support international reforestation efforts.

Response:

USDA has undertaken assessments in support of the America the Beautiful afforestation and reforestation program and has provided to policy makers the potential effects of planting one billion new trees per year. USDA is currently seeking to initiate new research programs to assess the potential for using large increments of wood, (long term fixing of carbon dioxide) in expanded building programs. Additional alternatives for uses of wood as a fuel source and source of other biologically derived hydrocarbons has been explored in sporadic studies over the years. There is a need to expand this area of study and develop adequate economic assessments of the reforestation program and the long term sociological effects of expanding forests to lands currently used for other land uses, specifically agriculture and human communities.

NAS Recommendation:

Maintain basic, applied, and experimental agricultural research to help farmers and commerce to adapt to climate change and thus ensure ample food.

Response:

Research within the Federal agricultural experiment stations and in partnership with the university agricultural experiment station systems has conducted and continues to conduct research to improve the production capability of plants and animals under a variety of stresses. This has included stresses from disease, insects, drought, salinity, etc. The concerns raised by potential climate changes has caused a change in focus of some research to provide a greater emphasis on those stresses likely to occur should climate changes result in a shifting of temperature and moisture regimes from one region to another. This change in focus enhances the ability of the U.S. to help sustain agricultural and forestry systems into the future. Additional studies on improved water use efficiency for irrigated regions of the country are also underway.

NAS Recommendation:

"Make water supply more robust by coping with present variability by increasing efficiency of use through water markets and by better management of present systems of water supply."

Response:

A Federal program coordinated by the CEES Subcommittee on Water Resources is focused on improving the scientific and technological understanding of the Nation's surface and ground-water systems and evaluating cost-effective water research related technologies. A report being developed by the Subcommittee entitled "Federal Ground-Water Science and Technology Programs" provides a detailed discussion of ongoing and future activities in this area. A similar report was also produced in 1989. Objectives of this multi-agency program include assessing the various threats to the resources and providing a scientific basis for the evaluation of the social, economic, and environmental effects of water resources policies and management practices.

NAS Recommendation:

Plan margins of safety for long-lived structures to take into consideration possible climate change.

Response:

USDA is currently seeking to initiate a set of studies that will enable the assessment of the feasibility for such long-lived structures with a much higher wood component than currently in use. Long-lived wood structures would serve to keep carbon fixed for long periods of time, but also allows for the integration of new wood product uses, such as wood-chip/concrete structural sheets to withstand changes in temperature and moisture regime.

IMPROVING KNOWLEDGE FOR FUTURE DECISIONS

NAS Recommendation:

"Improve weather forecasts, especially of extremes, for weeks and seasons to ease adaptation to climate change."

Response:

The CEES Subcommittee of Atmospheric Research, which has been in existence for 25-30 years under many parent committees, has developed a multi-agency strategy for improving numerical weather prediction and its practical use. (Predicting Our Weather: A Strategic Plan For U.S. Weather Research Program, in press under FCCSET review). Research will improve short forecasts, improve extended range forecasts, and focus on connection between global change and frequency and intensity of severe weather events including changes in regional and seasonal precipitation patterns.

NAS Recommendation:

Conduct field research on entire systems of species over many years to learn how CO₂ enrichment alters the mix of species and changes the total production of quality of biomass. research should be accelerated to determine how greenhouse warming might affect biodiversity.

Response:

The Mitigation and Adaptation Research Strategies (MARS) program will be coordinating an expanding set of programs in this area. Currently, research conducted by the USDA and DOE have focused in the following areas. Carbon dioxide enrichment studies have been underway for the past three years, in relation to agricultural productivity, known as Free Air Carbon Exchange (FACE). Competition between shrubs and grasses in the rangeland ecosystems under enriched carbon dioxide has also been underway for about three years. The multi-agency study, Ecosystems Management and Assessment Program (EMAP), is a preliminary program to develop a data base for future reference to the effects of changing temperature and moisture regimes. Additional studies are getting started in the USDA to assess the effects of temperature and moisture changes on the alpine forest ecosystems.

NAS Recommendation:

Strengthen research on social and economic aspects of global change and greenhouse warming

Response:

As noted in the Evans report, the need is great for more social science and economic research on the fundamental ways that humans impact on and respond to changes in the natural environment. Basic research needs in these areas have been outlined in the sections on Human Interactions in the CEES Global Change Research Program documents and in the report of a special CEES ad hoc task force on economic research related to global environmental change. In response to recognition of these needs, the Human Interactions-related funding has been one of the most rapidly growing parts of the U.S. Global Change Research Program. Federal support of the basic research in these areas has already contributed to the scientific literature on this topic. Dale Jorgenson and colleagues at Harvard University, for example, have addressed relationships between environmental regulations and economic growth in the U.S. At Clark University, Roger Kasperson and colleagues are coordinating a multi-national project that is comparing the ways that human activities modify environments and the ways that societies become aware of and respond to natural changes are especially critical. The regions where these analyses are underway range from highly developed settings like South Florida and the nations facing the North Sea to developing areas like the Mexico City basin and rainforests of Brazil and Indonesia.

II ENHANCING ADAPTATION TO GREENHOUSE WARMING

NAS Recommendation:

Undertake research and development projects to improve our understanding of both potential of geoengineering options to offset global warming and their possible side-effects.

Response:

MARS program has identified this as an issue that should come under consideration with the formulation of the FY 93 research and development program. The Issues identified at the present time, however, are focused at the levels of the Human Community in the Adaptation Element of the MARS program. This may involve studies to understand how Human Community infrastructure can be adapted to rapid changes in temperature and moisture. The examples that may be considered would include road and highway systems, bridge and other concrete support structures, municipal and industrial water supply systems, etc. The MARS program has not yet designed the necessary assessments and program planning to move this particular issue forward.

In response to the specific example cited, which is a global change issue, rather than a climate change issue, USDA is instituting a study this year to develop a protocol monitoring network to determine the long term trends of UV-B radiation reaching the surface of the earth. It is assessments such as this that must take place before many geotechnical engineering options can be planned.

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

2101 Constitution Avenue, N.W.
Washington, D.C. 20418
(202) 334-1517

For further information contact:
Rob Coppock Tel. 202-334-~~1517~~ 1637
Fax 202-334-1597

NAS/NAE/IOM Study on
Policy Implications of Greenhouse Warming

At the request of Congress, the U.S. Environmental Protection Agency has commissioned a study on policy implications of greenhouse warming by the Committee on Science, Engineering and Public Policy, a unit of the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The panel is expected to prepare a report before the end of 1990.

Potential warming of the global climate is now of concern to governments throughout the world, and was a major focus of the Paris economic summit in June. But it is hard to assess the costs and benefits of environmental policies, and it is even more difficult to achieve international agreement on what to do about the human activities with the greatest potential impact on global climate: stationary and mobile burning of fossil fuels, use of chlorofluorocarbons (CFCs), deforestation, and various releases of methane.

In light of this growing domestic and international concern, the study will review research and analysis relevant to greenhouse warming. A careful assessment will be made of existing data and what must be done to improve current understanding of the underlying phenomena. The report will include, if appropriate, recommendations for actions that would be needed to mitigate and adapt to greenhouse effects if such actions be warranted. It will examine both the underlying phenomena and the expected efficiency and effectiveness of policy interventions in a comprehensive analysis.

A main focus of the study will be on policy interventions and their relative effectiveness. Although the study will be addressed in large part to U.S. policy officials, many of the options to be assessed may require multinational effort. The study is expected to contribute a careful, technically-sound review that will be of use to the Congress as well as to the Executive Branch and the international community.

The study's "Synthesis" panel is being chaired by the Honorable Daniel J. Evans, until last year U.S. Senator from the State of Washington.

Global
Brom

Year A
Kim

Global Warmin

Senator Evans, a registered civil engineer and former college president was Governor of the State of Washington from 1965-77. He chaired the Pacific Northwest Power and Conservation Planning Council from 1981-83. Among other activities he is a member of the Board of Directors of the Nature Conservancy.

In carrying out its charge, the Synthesis panel membership is being augmented by three groups looking at three interrelated sets of issues.

[A] Direction and rate of change

The "Effects" group will assess current knowledge about climate change and predictions of physical effects. The objective is to judge the adequacy of present research, uncertainties in that research, and ways our understanding could be improved. The quality of the data record, uncertainties in the evidence, and time and effort required to reduce uncertainties all need to be examined. It may also be necessary to interpret existing information in terms of new indices of warming (e.g., degree-years, peak temperature), not just change in mean global temperature.

[B] Mitigation policies and their effectiveness

The "Mitigation" group will examine the range of policy interventions that might mitigate changes in the earth's radiative balance, assessing these options in terms of their expected impacts, costs, and at least in qualitative terms, their relative cost-effectiveness. This analysis will attempt to identify options that could be implemented with reasonable confidence within a decade, more speculative possibilities requiring substantial additional development, and proposals that are not worth pursuing because of faulty physics, chemistry, or biology.

[C] Adaptation strategies

The "Adaptation" group will examine both the consequences of climate change and strategies for adapting to those changes. The group will attempt to develop appropriate indices and units of measurement; considerations include rates of change, peak stresses, regional distribution, and timing. The analysis will attempt to examine the sensitivity of systems or subsystems, their capacity to adapt or adjust to changes, the speed with which this natural adjustment can be accomplished, and possible interventions that would help systems cope with anticipated changes. The group will consider costs and benefits of such interventions and attempt to set the stage for choosing among alternatives, including examination of what will be done locally and privately and what should be done by government, should actions be warranted.

The list of individuals participating in the study is attached.

POLICY IMPLICATIONS OF GREENHOUSE WARMING

SYNTHESIS PANEL ROSTER

Daniel J. Evans (Chair), Daniel J. Evans & Associates, Seattle, Washington

Robert McCormick Adams, Secretary, Smithsonian Institution, Washington, DC (Member NAS)

George F. Carrier, T. Jefferson Coolidge Professor of Applied Mathematics, Emeritus, Harvard University, Cambridge, Massachusetts and chair of the 1985 NAS Committee on Atmospheric Effects of Nuclear Explosions (Member NAS, NAE)

Richard N. Cooper, Professor of Economics, Harvard University, Cambridge, Massachusetts and former Under-Secretary of State

Robert A. Frosch, Vice President, General Motors Research Labs, Warren, Michigan, former Administrator of the National Aeronautics and Space Administration, and former Assistant Executive Director of the United Nations Environment Program (Member NAE)

Thomas H. Lee, Professor Emeritus, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, Massachusetts and former Director of the Laboratory for Electromagnetic and Electronic Systems at Massachusetts Institute of Technology (Member NAE)

Jessica T. Mathews, Vice President, World Resources Institute, Washington, DC and former Director of the Office of Global Issues at the National Security Council

William D. Nordhaus, Professor of Economics, Yale University, New Haven, Connecticut, former member of the President's Council of Economic Advisors and member of the 1983 NAS Carbon Dioxide Assessment Committee

Gordon H. Orians, Professor of Zoology and Director of the Institute for Environmental Studies, University of Washington, Seattle, Washington (Member NAS)

Stephen H. Schneider, Head, Interdisciplinary Climate Systems, National Center for Atmospheric Research, Boulder, Colorado and an expert on global climate models

Maurice Strong, Under-Secretary-General, United Nations, Chair, Stovest Holdings, Inc., Ottawa, Ontario, Canada, and former Director-General of the Canadian Office of External Aid

Sir Crispin Tickell, Ambassador to the United Nations from the United Kingdom, New York, New York and author of Climate Change and World Affairs

Office of (OSTP)

Br
Glob

George
Kim

Global Warming

Victoria J. Tschinkel, Senior Consultant, Landers Parsons & Uhlfelder,
Tallahassee, Florida and former Secretary of the Florida State
Department of Environmental Regulations

Mahbub ul Haq, Special Advisor to the Administrator, United Nations
Development Programme, New York, New York

Paul E. Waggoner, Distinguished Scientist, Connecticut Agricultural
Experiment Station, New Haven, Connecticut and chair of the American
Association for the Advancement of Science Panel on Climatic
Variability, Climate Change and the Planning and Management of U.S.
Water Resources (Member NAS)

Robert D. Cook, Leading Professor, Atmospheric Sciences, State
University of New York, Stony Brook, New York

Samuel Charnoff, Professor of Statistics, Harvard University,
Cambridge, Massachusetts (Member NAS)

John Scaife, M.S. Degree, Professor of Oceanography, Department of
Biological Sciences, Brown University, Providence, Rhode Island
(Member NAS)

Thomas E. Karl, Meteorologist, Climate Research & Applications,
National Climate Data Center, Asheville, North Carolina

Michael T. McFarland, Physicist and Division Leader, Atmospheric and
Geophysical Sciences, Lawrence Livermore Laboratory, University of
California, Livermore, California and Principle Scientist, Department
of Energy's Carbon Dioxide Research Program

Samuel Morse, Associate Professor of Mathematics, University of New
Hampshire, Durham, New Hampshire and member, National Research
Council Committee on Global Change

Executive Panel Member

Office of (OSTP)

Glob
B7

Yeon Ah
Kim

Global Warming

POLICY IMPLICATIONS OF GLOBAL WARMING

EFFECTS PANEL ROSTER

*George F. Carrier (Chair), T. Jefferson Coolidge Professor of Applied Mathematics, Emeritus, Harvard University, Cambridge, Massachusetts and chair of the 1985 NAS committee on Atmospheric Effects of Nuclear Explosions (Member NAS, NAE)

Wilfried Brutsaert, Professor of Hydrology, Civil and Environmental Engineering, Cornell University, Ithaca, New York

Robert D. Cess, Leading Professor, Atmospheric Sciences, State University of New York, Stony Brook, New York

Herman Chernoff, Professor of Statistics, Harvard University, Cambridge, Massachusetts (Member NAS)

John Imbrie, H.L. Doherty Professor of Oceanography, Department of Geological Sciences, Brown University, Providence, Rhode Island (Member NAS)

Thomas B. Karl, Meteorologist, Climate Research & Applications, National Climate Data Center, Asheville, North Carolina

Michael C. MacCracken, Physicist and Division Leader, Atmospheric and Geophysical Sciences, Lawrence Livermore Laboratory, University of California, Livermore, California and Principle Scientist, Department of Energy's Carbon Dioxide Research Program

Berrien Moore, Associate Professor of Mathematics, University of New Hampshire, Durham, New Hampshire and member, National Research Council Committee on Global Change

*Synthesis Panel Member

Bl
Glob
Year Ab
Kim

Global Warming

POLICY IMPLICATIONS OF GREENHOUSE WARMING

MITIGATION PANEL ROSTER

*Thomas H. Lee, (Chair), Professor Emeritus, Department of Electrical Engineering & Computer Science, Massachusetts Institute of Technology, Cambridge, Massachusetts and former director of the Laboratory for Electromagnetic and Electronic Systems at Massachusetts Institute of Technology (Member NAE)

Peter G. Brewer, Senior Scientist, Chemical Oceanography, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts and Program Director, Marine Chemistry, National Science Foundation

Robert Grandall, Senior Fellow, Brookings Institution, Washington, DC and former deputy director, Council on Wage and Price Stability

*Richard N. Cooper, Professor of Economics, Harvard University, Cambridge, Massachusetts and former Under-Secretary of State

Robert E. Evenson, Professor of Economics, Economic Growth Center, Yale University, New Haven, Connecticut

*Robert A. Frosch, Vice President, General Motors Research Labs, Warren, Michigan, former Administrator of the National Aeronautics and Space Administration, and former Assistant Executive Director of the United Nations Environment Program (Member NAE)

Richard Garwin, Fellow, Thomas J. Watson Research Center, IBM, Yorktown Heights, New York, former consultant, President's Science Advisory Committee, and former chair, National Research Committee's Solar Energy Research Committee (Member NAS, NAE, IOM)

Joseph Glas, Director, Freon Products Division, E. I. du Pont, Wilmington, Delaware

Kai N. Lee, Associate Professor, Institute for Environmental Studies and Department of Political Science, University of Washington, Seattle, Washington, former member, advisory panel on radioactive waste disposal, Office of Technology Assessment, and member, NAS Board on Radioactive Waste Management

Gregg Marland, Scientist, Environmental Science Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee

*Jessica T. Mathews, Vice President, World Resources Institute, Washington, DC and former Director of the Office of Global Issues at the National Security Council

Arthur H. Rosenfeld, Professor of Physics, University of California, Berkeley, and Director, Center for Building Science, Lawrence Berkeley Laboratory, Berkeley, California

Office of (OSTP)

Global

Year Al
Kim

Global Warming

Edward S. Rubin, Professor, Mechanical Engineering & Public Policy
Director, Center for Energy and Environmental Studies,
Carnegie-Mellon University, former member National Research Council
Energy Research Board, and former member advisory committee on
national air pollution control technology, US EPA

Milton Russell, Professor of Economics and Senior Fellow, Energy,
Environment and Resources Center, University of Tennessee, Knoxville,
Tennessee, Collaborating Scientist, Oak Ridge National Laboratory,
Oak Ridge, Tennessee, and former assistant administrator for policy,
planning, and evaluation, US EPA

*Stephen H. Schneider, Head, Interdisciplinary Climate Systems,
National Center for Atmospheric Research, Boulder, Colorado
and an expert on global climate models

Eugene B. Skolnikoff, Professor of Political Science,
Massachusetts Institute of Technology, Cambridge, Massachusetts and
member, advisory committee on science and technology, US Department
of State

Thomas H. Stix, Associate Director of Academic Affairs, Plasma
Physics Laboratory, and Associate Chairman, Department Astrophysical
Science, Princeton University, Princeton, New Jersey

*Maurice Strong, Under-Secretary-General, United Nations, Chair,
Strovest Holdings Inc., Ottawa, Canada, and former Director-General
of the Canadian Office of External Aid

Edith Brown Weiss, Professor, Georgetown University Law Center,
Washington, DC, former advisor, US arms control and disarmament
agency, and former member, National Research Council Water Science
and Technology Board

*Synthesis panel members

Office of (OSTP)

Global

Team A
Kim

Global Warming

POLICY IMPLICATIONS OF GLOBAL WARMING

ADAPTION PANEL ROSTER

*Paul E. Waggoner (Chair), Distinguished Scientist, Connecticut Agricultural Experiment Station, New Haven, Connecticut and chair of the American Association for the Advancement of Science Panel on Climatic Variability, Climate Change and the Planning and Management of U.S. Water Resources (Member NAS)

Jesse Ausubel, Rockefeller University, New York, New York and former director, Programs Office, National Academy of Engineering

Clark Binkley, Associate Professor, School of Forestry & Environmental Studies, Yale University, New Haven, Connecticut

Darius Gaskins, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts and former head of the International Commerce Commission

Mary Kritz, Department of Rural Sociology, Cornell University, Ithaca, New York and chair of the Committee on International Migration of the International Union for the Scientific Study of Population

Joshua Lederberg, President, Rockefeller University, New York, New York and recipient of Nobel Prize (1958) (Member NAS, IOM)

William Lewis, Partner, McKinsey & Company, Washington, DC, former senior operations officer, the World Bank, and former assistant secretary for policy and evaluation, US Department of Energy

Jon Liebman, Professor of Environmental Engineering, University of Illinois, Urbana, Illinois

*William D. Nordhaus, Professor of Economics, Yale University, New Haven, Connecticut, former member of the President's Council of Economic Advisors and member of the 1983 NAS Carbon Dioxide Assessment Committee

*Gordon H. Orians, Professor of Zoology and Director, the Institute for Environmental Studies, University of Washington, Seattle, Washington (Member NAS)

William E. Riebsame, Director, Natural Hazards Research and Applications Information Center, University of Colorado, Boulder, Colorado and author of the United Nations Environmental Programme volume Assess Social Implications of Climate Fluctuation: A Guide to Climate Impact Studies

Office of (OSTP)

Global

Year A
Kim

Global Warming

Norman Rosenberg, Senior Fellow and Director, Climate Resources Program, Resources for the Future, Washington, DC, consultant to National Oceanic and Atmospheric Administration and to the Water Resources Institute of the US Department of Interior, and former member, National Research Council Board on Atmospheric Science and Climate

*Sir Crispin Tickell, Ambassador to the United Nations from the United Kingdom, New York, New York and author of Climate Change and World Affairs

Daniel P. Sheer, President, Water Resources Management, Columbia, Maryland and Technical Director, Interstate Commission on the Potomac River Basin

*Synthesis Panel Member

Office of (OSTP)

Br
Glob

Kevin A
Kim

Global Warming