CEQ 418 PC

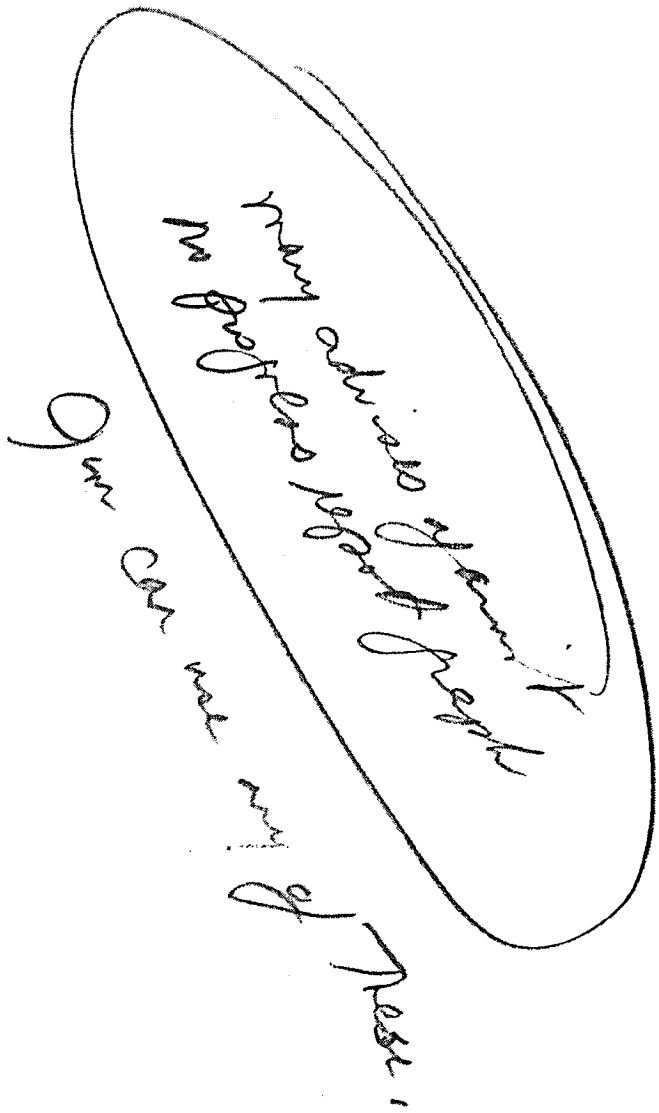
Cooney, Phil

From: Hutzler, Mary [MARY.HUTZLER@eia.doe.gov]
Sent: Wednesday, January 07, 2004 4:23 PM
To: Cooney, Phil
Subject: Some graphs

ghg03_report_presentation_wtal...

Can you look at these and let me know if they are what you are looking for? These are US graphs only. I will get you the others shortly.

<<ghg03_report_presentation_wtalkpoints.ppt>>



000937

CEQ 650 K

Cooney, Phil

From: Margarita Gregg [Margarita.Gregg@noaa.gov]
Sent: Wednesday, January 07, 2004 5:08 PM
To: CCSP@usgcrp.gov
Cc: CCSP_INFO@usgcrp.gov; ipo@usgcrp.gov
Subject: CCSP Update

CCSP Update 7Jan04.pdf (372 K.

Attached is a brief update of items which were to be covered at the CCSP meeting on 7 January. The first three updates contain items for action, the rest are for information purposes only.

Also note, the tentative date for the next CCSP Principal's Meeting (re-scheduled from 7 January) is Friday 23 January from 1:00-3:00 p.m.. at the Climate Change Science Program Office 1717 Pennsylvania Avenue, NW, Suite 250

Margarita

--
PLEASE NOTE NEW ADDRESS

M.E. Conkright Gregg, Ph.D.
Temporarily at:
Climate Change Science Program Office
1717 Pennsylvania Avenue
Suite 250
Washington, D.C. 20006
Phone: (202)419-3466 or (202)482-3252
Fax: (202)223-3064
Email: Margarita.Gregg@noaa.gov

II A1.2

Cooney, Phil

From: Holbrook, William F.

Sent: Thursday, January 08, 2004 10:06 AM

To: Perino, Dana M.; Cooney, Phil; Connaughton, James; Peel, Kenneth L.; Hannegan, Bryan J.; Onley, Kameran L.; Anderson, David R.; Fiddelke, Debbie S.

Subject: FWS quietly working on carbon capture projects in wildlife refuges (Land Letter)

Update for Thursday
January 8, 2004

LAND MANAGEMENT

FWS quietly working on carbon capture projects in wildlife refuges

Brian Stempeck, *Land Letter* reporter

Although climate change mitigation is typically the domain of the Energy and Agriculture departments, for the past several years officials at the Fish and Wildlife Service have been stepping up their involvement, partnering with private companies to launch carbon sequestration projects in national wildlife refuges.

"We have a lot of lands within existing refuges that were unforested that we had plans to reforest," said Lee Andrews, FWS state field office supervisor for Kentucky and the former Southeast regional carbon sequestration coordinator. "We weren't able to do those immediately."

At the same time, Andrews explained, several industry groups and private corporations were looking to prepare for the eventual possibility of a carbon cap-and-trade system and were willing to reforest FWS lands in exchange for future carbon credits.

"They're responsible for credit-related activities," Andrews said. "We still have discretion to do what we feel is necessary for forest and wildlife management."

Reforestation projects tend to be several hundred acres in size, Andrews said, and there will often be several sequestration projects per refuge. Keith Taniguchi, current coordinator of the carbon program for the Southeast regional office, said there are currently a half-dozen significantly sized projects, mostly in wildlife refuges. During the past five years, FWS officials have restored more than 60,000 acres of fish and wildlife habitat via partnerships with private companies, Taniguchi said.

Most of the FWS sequestration partnerships take place in the Southeast, Taniguchi said, with many projects in the lower Mississippi region in Arkansas, Louisiana and Mississippi. Recently, more projects have been started farther east, in Florida, Georgia and North Carolina, he said.

American Electric Power, the Conservation Fund and FWS have worked cooperatively on one of the agency's largest sequestration projects, adjacent to the Catahoula National Wildlife Refuge in Louisiana. The partnership has planted more than 3 million hardwood trees in the region, which the Interior Department calls "a major haven for migratory birds." FWS says the project, which is helping restore 18,000 acres next to the refuge, could capture as much as 5 million tons of carbon dioxide (CO2) in the form of biomass.

In another major project, Entergy Corp. donated 600 acres of fallow agricultural land along northwest Louisiana's Red River to create the first tract of land for the nation's newest wildlife refuge, the 50,000-acre Red River National Wildlife Refuge. Trees planted on the land will trap 275,000 tons of CO2 over the next 70 years and the

trees will not be harvested during the life of the project (*Land Letter*, Sept. 5, 2002).

There is no formal program or dedicated funding for FWS's carbon capture efforts, which began about three years ago, necessitating the public-private partnerships. In lieu of a formal organization, the projects are typically administered through existing agency divisions such as migratory bird management, the national wildlife refuge system or through federal-state programs.

"We don't have any budget assigned to terrestrial carbon sequestration," Taniguchi said. "That's where the partnership is of vital importance to us."

But the agency is "fully integrated" with other federal agencies such as DOE and USDA to help develop guidelines for carbon sequestration, including reporting and measurement standards, Andrews said.

The Agriculture Department has stepped up its efforts regarding terrestrial carbon sequestration recently as well. Last summer, Secretary Ann Veneman announced that farmers who manage their lands to maximize the amount of carbon stored in soil and crops will get credit for those techniques when they apply for some federal programs.

Veneman said USDA will consider the amount of carbon stored on a landowner's property when the department evaluates applicants for the Environmental Quality Incentives Program, the Conservation Reserve Program and the Forest Land Enhancement Program. USDA estimates that the amount of carbon sequestered by crops and trees is about 154 million metric tons of carbon per year -- more than the total emissions of greenhouse gases by agricultural and forestry activities (*Land Letter*, June 12, 2003).

II M. 13

CEQ 479 PC

Cooney, Phil

From: Kruger.Dina@epamail.epa.gov
Sent: Tuesday, January 20, 2004 4:05 PM
To: adele.morris@do.treasIgov; arthur.rypinski@hq.doe.gov; Irving.Bill@epamail.epa.gov; Godwin.Dave@epamail.epa.gov; Ottinger.Deborah@epamail.epa.gov; Scheehle.Elizabeth@epamail.epa.gov; igoklany@ios.doi.gov; Mangino.Joseph@epamail.epa.gov; kbarrett@usaid.gov; KBICKEL@mailoce.oce.usda.gov; linda.moodie@noaa.gov; mitchell.baer@hq.doe.gov; Anastas, Paul T.; Patel-weynandTO@state.gov; paul.mcardle@eia.doe.gov; perry.lindstrom@eia.doe.gov; Saile.Sharon@epamail.epa.gov; Wirth.Tom@epamail.epa.gov; william.breed@hq.doe.gov; Hannegan, Bryan J.; Halpern, David; Camille.Mittelholtz@ost.dot.gov; valdezpm2@state.gov; Hanle.Lisa@epamail.epa.gov
Cc: reifsnyderda@state.gov; richard.moss@pnl.gov; watsonhl@state.gov; WHOHENST@mailoce.oce.usda.gov; Cooney, Phil
Subject: Near Final Authors List -- IPCC Guidelines

us-matrix-4.xls (60 KB)

Everyone,

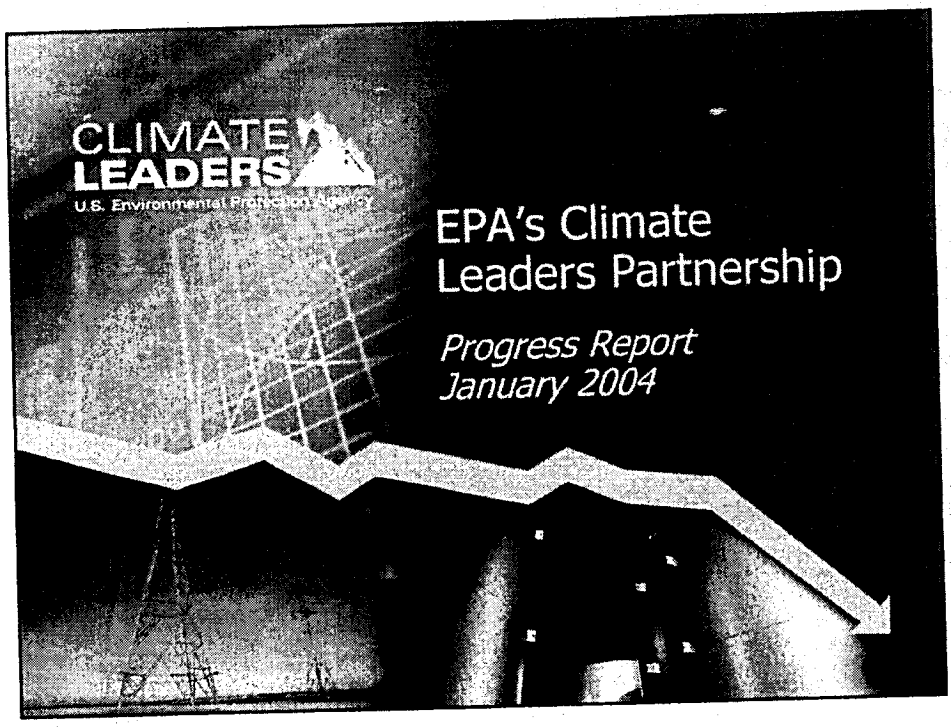
Regards & thanks for your help with this effort,
Dina

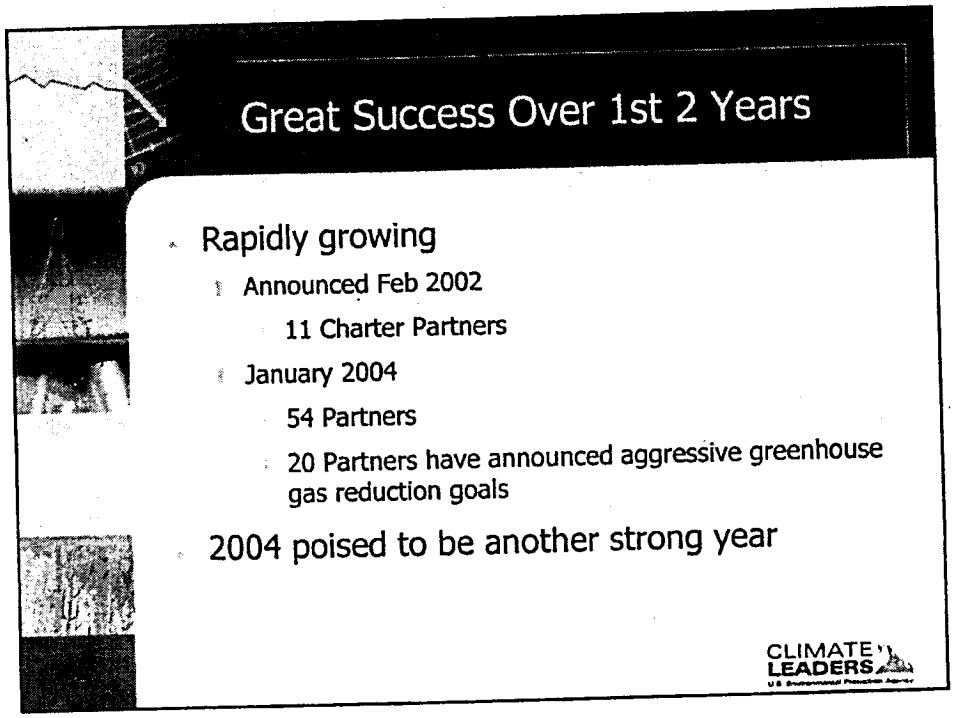
(See attached file: us-matrix-4.xls)

Dina Kruger
Chief, Non-CO2 Gases & Sequestration Branch
USEPA

202-343-9039 (phone)
202-343-2208 (fax)

000970


CLIMATE LEADERS
U.S. Environmental Protection Agency
EPA's Climate Leaders Partnership
Progress Report
January 2004


Great Success Over 1st 2 Years
Rapidly growing
Announced Feb 2002
11 Charter Partners
January 2004
54 Partners
20 Partners have announced aggressive greenhouse gas reduction goals
2004 poised to be another strong year
CLIMATE LEADERS

The Climate Leaders

- Combined U.S. revenues equal 6% of U.S. GDP
- Diverse representation across business
- The 20 targets avoid 7.5 MMTCE
  - over sector-wide business as usual improvement efforts
  - equivalent to the ghg emissions of five million cars.

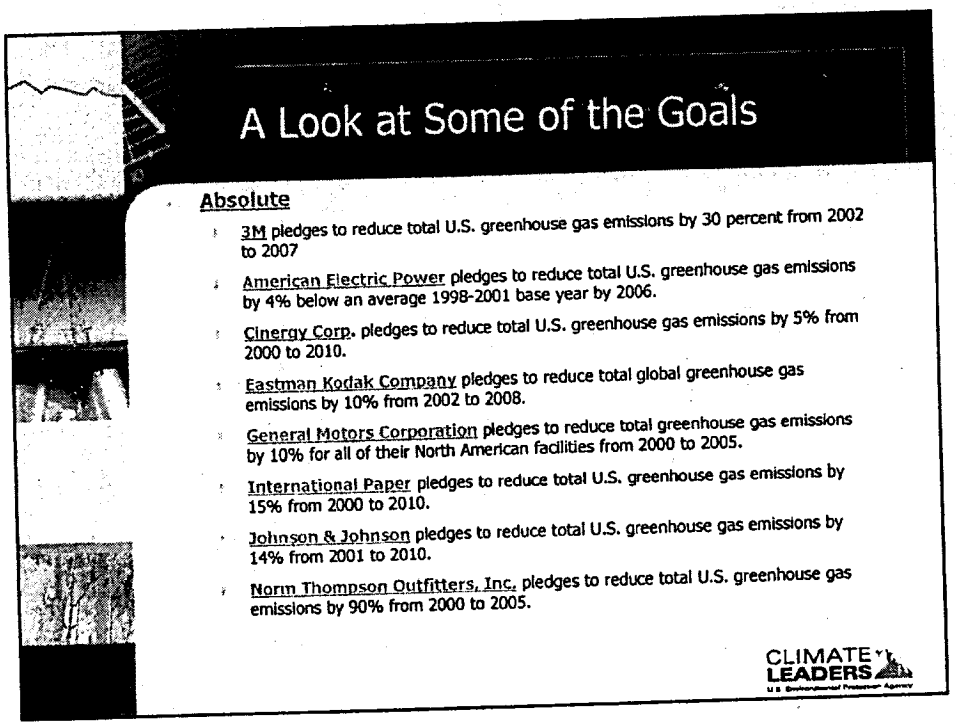
CLIMATE LEADERS
U.S. Environmental Protection Agency

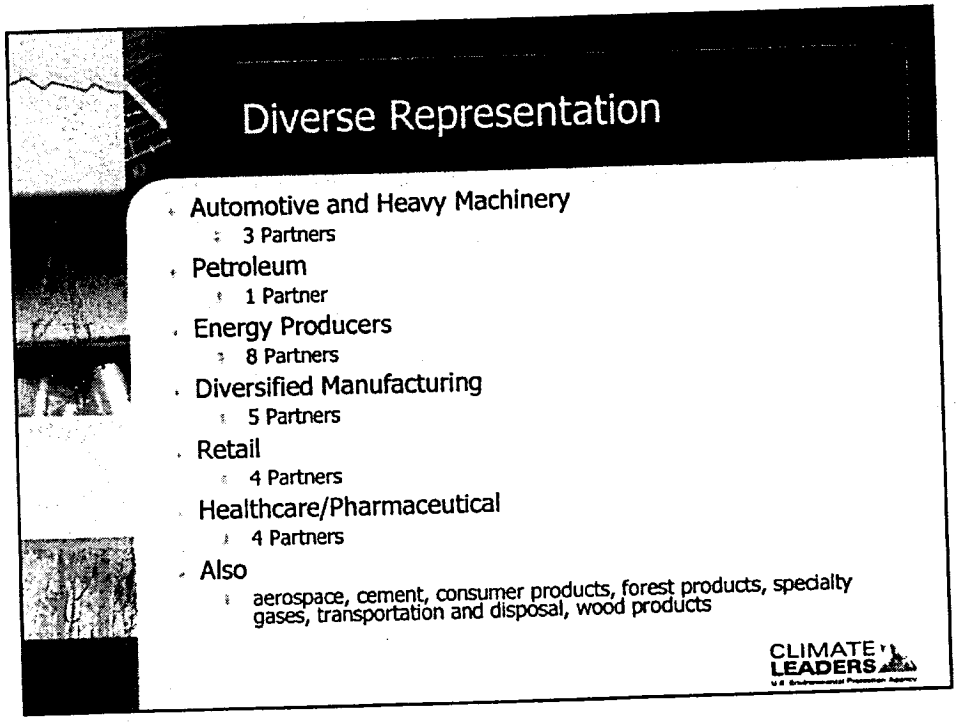
A Look at Some of the Goals

Relative

- Advanced Micro Devices, Inc. pledges to reduce global greenhouse gas emissions by **40%** per Manufacturing Index from 2002 to 2007
- FPL Group, Inc. pledges to reduce U.S. greenhouse gas emissions by **18%** per kWh from 2001 to 2008.
- Holcim (US) Inc. pledges to reduce U.S. greenhouse gas emissions by **12%** per ton of cement from 2000 to 2008.
- Miller Brewing Company pledges to reduce U.S. greenhouse gas emissions by **18%** per barrel of production from 2001 to 2006.
- Pfizer, Inc. pledges to reduce global greenhouse gas emissions by **35%** per dollar of revenue from 2000 to 2007.
- PSEG pledges to reduce U.S. greenhouse gas emissions by **18%** per kWh from 2000 to 2008
- S.C. Johnson & Son, Inc. pledges to reduce U.S. greenhouse gas emissions by **23%** per pound of product from 2000 to 2005.
- St. Lawrence Cement pledges to reduce global greenhouse gas emissions by **15%** per ton of cementitious product from 2000 to 2010.
- United Technologies Corporation pledges to reduce global greenhouse gas emissions by **16%** per dollar of revenue from 2001 to 2006.

CLIMATE LEADERS
U.S. Environmental Protection Agency


A Look at Some of the Goals
Absolute
3M pledges to reduce total U.S. greenhouse gas emissions by 30 percent from 2002 to 2007
American Electric Power pledges to reduce total U.S. greenhouse gas emissions by 4% below an average 1998-2001 base year by 2006.
Cinergy Corp. pledges to reduce total U.S. greenhouse gas emissions by 5% from 2000 to 2010.
Eastman Kodak Company pledges to reduce total global greenhouse gas emissions by 10% from 2002 to 2008.
General Motors Corporation pledges to reduce total greenhouse gas emissions by 10% for all of their North American facilities from 2000 to 2005.
International Paper pledges to reduce total U.S. greenhouse gas emissions by 15% from 2000 to 2010.
Johnson & Johnson pledges to reduce total U.S. greenhouse gas emissions by 14% from 2001 to 2010.
Norm Thompson Outfitters, Inc. pledges to reduce total U.S. greenhouse gas emissions by 90% from 2000 to 2005.
CLIMATE LEADERS


Diverse Representation
Automotive and Heavy Machinery
3 Partners
Petroleum
1 Partner
Energy Producers
8 Partners
Diversified Manufacturing
5 Partners
Retail
4 Partners
Healthcare/Pharmaceutical
4 Partners
Also
aerospace, cement, consumer products, forest products, specialty gases, transportation and disposal, wood products
CLIMATE LEADERS

Goals for 2004

- 25 Additional Companies
  - many prospects
- 10 Additional Announced Goals
- Enhanced focus on Quality Data Management
  - maintain program integrity
- Other Highlights
  - Partner meeting -- June 04

CLIMATE LEADERS

Climate Leaders

ALCOA, ALCAN, AEP American Electric Power, AMD, Ball, Baxter, bp, B.A.C., CATERPILLAR, The Collins Companies, Bank of America, casella, CINERGY, Exelon, FETZER, FIRST ENVIRONMENT, GM, Hasbro, Holcim, IBM, INTERFACE, FPL GROUP, INTERNATIONAL PAPER, LOCKHEED MARTIN, Johnson & Johnson, Pfizer, PSEG, Raytheon, Miller, NREL, Norm Thompson, Shaklee, Creating Healthier Lives, STI, ST.LAWRENCE CEMENT, Johnson, Sun, WB energies, STAPLES, TARGET, Unilever, USS, The Document Company XEROX, CLIMATE LEADERS

From: Catanzaro, Michael (EPW) [Scott.Rayder@noaa.gov] on behalf of Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Tuesday, January 13, 2004 8:00 PM
To: Matt Englehart; Lisa Camooso; Jordan St. John; Hopkins, Robert; Perino, Dana M.; Cooney, Phil
Subject: [Fwd: EPW: AL GORE]

FYI

-------- Original Message --------
Subject: EPW: AL GORE
Date: Tue, 13 Jan 2004 17:40:56 -0500
From: "Catanzaro, Michael (EPW)" <Michael_Catanzaro@epw.senate.gov>
To: "Catanzaro, Michael (EPW)" <Michael_Catanzaro@epw.senate.gov>

On Thursday, former Vice President Al Gore, in a speech sponsored by MoveOn.Org, will attack President Bush's record on the environment.
Undoubtedly, Gore's speech will be a bilious, thoughtless reiteration of the threadbare charges, most exhaustively crafted by radical environmental groups, leveled against the Administration: it is "Orwellian," it has the "worst environmental record in history," it is "censoring science for political ends," etc. In other words, it will be an exemplary, Gore-like exercise in factless, baseless demagoguery of the worst kind.

The following are some of the expected lines of attack from Mr. Gore:

GORE: President Bush recklessly walked away from the Kyoto Protocol, and because of the lack of U.S. involvement, effectively put the international treaty on life support.

FACT: First, EVEN HOWARD DEAN, AS HE ANNOUNCED LAST WEEK, OPPOSES KYOTO.

Second, EVEN THE WASHINGTON POST EDITORIAL PAGE THINKS KYOTO IS A BAD IDEA, AND THAT PRESIDENT BUSH MADE THE RIGHT DECISION BY REJECTING IT:
"The Bush administration may have been right to abandon the treaty, given its unrealistic targets and its failure to include developing nations such as China." [December 5, 2003]

Third, a bit of history: Mr. Gore never submitted Kyoto to the U.S. Senate, probably because he knew the treaty could never overcome the 95 to 0 vote on the Byrd-Hagel resolution that rejected Kyoto. The Senate spoke again last October, when the McCain-Lieberman bill-a bill that resembles Kyoto in many key respects-failed by a vote of 55 to 43.
Simply put, even if President Bush supported Kyoto, it would never be ratified by the U.S. Senate.

Further, much of the failure to commence Kyoto was placed squarely on the Europeans. As the Vancouver Sun reported on April 9, 2001:
"European intransigence, and not U.S. President George W. Bush, is behind the 'fallen down' Kyoto accord on reducing greenhouse gases, [Canadian] Environment Minister David Anderson said Thursday. 'This Kyoto (deal) had fallen down, had ceased to functioning effectively in November...Nothing that Mr. Bush has done since has altered that fact..'"

The Europeans, before President Bush came into office, pointed fingers at each other, as the BBC reported on November 26, 2000: "[British] Deputy Prime Minister John Prescott has blamed the French for the failure of the global warming summit to agree on curbing greenhouse gas emissions." Prescott "attacked European colleagues for failing to back a deal on emissions which he had brokered with the United States."

The Europeans are now valiantly pressing ahead, pushing for reductions that, according to the EU Environment Ministry, they cannot, and will not, achieve. All

but two EU countries will meet their Kyoto targets..
And now Canada, which ratified Kyoto last year, is expressing serious doubts that they can achieve their targets by 2010. Prime Minister Paul Martin, according to the Canadian Business Journal, points out that no clear framework exists to ensure that Canada meets its goal of cutting annual emissions by 240-million tons by 2010. Not to mention Russia, which has lambasted the treaty's scientific basis and its negative impact on the Russian economy.

So even now, in the face of overwhelming evidence of Kyoto's utter failure, Mr. Gore thinks this is a good idea?

GORE: We should be very afraid of global warming because, as the IPCC says, temperatures could increase by as much as 10 degrees F by 2100, unleashing a torrent of extreme weather events that pose catastrophic consequences for generations to come.

FACT: The IPCC's work has been systematically dismantled over the past year. Pursuant to a new study undermining the IPCC's temperature assumptions, the Economist accused the UN body of "dangerous incompetence."

As the Economist wrote: "Disaggregated projections published by the IPCC say that-even in the lowest-emission scenarios-growth in poor countries will be so fast that by the end of the century Americans will be poorer on average than South Africans, Algerians, Argentines, Libyans, Turks, and North Koreans. Mr. Castles and Mr. Henderson can hardly be alone in finding that odd."

Dr. James Hansen of NASA recently threw cold water on extreme temperature scenarios. "Future global warming can be predicted much more accurately then is generally realized ... we predict additional warming in the next 50 years of 0.75 °C [plus or minus] 0.25°C, a warming rate of 0.15°C [plus or minus] 0.05°C per decade." This warming rate is approximately 4 times less than the lurid top figure widely trumpeted by the IPCC, and, indeed, not a cause of concern.

GORE: The White House is ignoring the science of climate change, as there is a very clear consensus in the scientific community, reflected by the 2001 NAS study requested by the Administration, that man-made emissions are largely to blame for global warming.

FACT: Gore will most likely cite the now infamous line from the report's summary: "Temperatures are, in fact, rising. The changes observed over the last several decades are likely mostly due to human activities, but we cannot rule out that a significant part of these changes is also a reflection of natural variability."

To cite this is misleading and disingenuous, for on page 1 of the report the uncertainty surrounding climate change and global warming becomes clear: "Because there is considerable uncertainty in current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warming should be regarded as tentative and subject to future adjustments upward or downward."

The report states further: "A causal linkage between the buildup of greenhouse gases in the atmosphere and the observed climate changes during the 20th century cannot be unequivocally established."

GORE: The White House censored and suppressed climate change science from the EPA's "State of the Environment Report" for political ends..

FACT: This is nonsense. Nothing was censored. The report includes references to the Administration's 10-year strategic plan on climate change policy--which, incidentally, was crafted pursuant to a 2001 National Academy of Sciences study on climate change--and a statutorily
required document called "Our Changing Planet."

Question: how can there be suppression of climate change when the Administration has put out hundreds of pages of documents on climate change research, including the Climate Action Report, released last summer?

GORE: A recent study in Nature shows that global warming, clearly a man-made phenomenon, will cause thousands of species to go extinct by 2050.

FACT: Iain Murray of the Competitive Enterprise Institute penned a devastating critique of this study. Here's an excerpt: "[Researchers] have extrapolated to all species a model that looked at only 1,103 species in certain areas (243 of those species were South African proteaceae, a family of evergreen shrubs and trees). For one thing, we don't know how many species there are-estimates vary from 2 million to 80 million-and have only documented 1.6 million. However, assuming the 14 million figure widely used in the press reports is anywhere near accurate, the sample size is a mere 0.008 percent of the total species population of the planet, with certain species vastly over-represented (there are only 1,000 species of proteaceae on the planet). All the researchers have demonstrated is that, if their model is correct, certain species in certain habitats will run a risk of extinction."

GORE: President Bush is recklessly rolling back environmental protections in the Clean Air Act to pay back his corporate contributors. In December, he announced yet another rollback of reductions for mercury.

FACT: Greg Easterbrook, a senior editor with The New Republic, put it this way last year: "[N]othing you hear about worsening air quality is true. Air pollution is declining under President Bush, just as it declined under President Clinton." If you don't believe Easterbrook, just look at the most recent EPA data on air quality.

Question: did Gore, or former President Clinton, ever propose a 70 percent reduction in NOx, SO2, and mercury? No.

Did Gore, or former President Clinton, ever go forward with regulations to reduce off-road diesel emissions? No. NRDC called President Bush's proposal to reduce diesel emissions from off-road vehicles "the biggest public health step since lead was removed from gasoline more than two decades ago." According to the Washington Post, an NRDC official referred to the emissions plan as "the biggest health advance in a generation."

How about anything like President Bush's Interstate Transport Rule, largely modeled on Clear Skies, to reduce NOx and SO2 by 70 percent by 2018? No.

Did Gore, or former President Clinton, ever address mercury emissions? No. In fact, the Clinton Administration did nothing until, of all dates, December 15, 2000, two days after Gore conceded the election. On that day, after doing nothing for 8 years, EPA miraculously announced a settlement agreement with NRDC to regulate mercury. The Bush Administration went forward with a regulation that will reduce mercury emissions, using a proven market-based approach, by nearly 70 percent by 2018.

What about New Source Review? Yes, Carol Browner's EPA crafted a proposal in 1996 to reform it, but never followed through. President Bush did.

GORE: The Administration, at the behest of the White House, lied to New Yorkers about air quality after September 11.

FACT: On this issue, the New York Times editorial page said it best, dismissing the entire controversy as "retrospective nitpicking." The Times, no friend of the Bush Administration, also agrees with the most recent scientific findings about air quality since September 11: "The broader public faced little or no risk from

breathing the outdoor air
once the initial cloud settled."

The EPA IG report, the source of the controversy, was unequivocal about the Administration's intentions: "In regard to the monitoring data, we found no evidence that EPA attempted to conceal data results from the public." In a September 4 NBC interview with EPA IG Nikki Tinsley, Lisa Myers reported that Tinsley "stopped short of accusing anyone of lying
or of knowingly providing false information." And EPA IG staff told aides from the Senate EPW Committee that there was no conspiracy or attempt to suppress information.

From: Holbrook, William F.
Sent: Tuesday, January 13, 2004 11:53 AM
To: 'paul_georgia@rpc.senate.gov'
Subject: Hello
Paul:

Phil Cooney here at CEQ gave me your name and asked me to forward you our most recent fact sheet on climate change (please see below, along with the link). I have also attached the "year-end review" issue of our CEQ E-Notes electronic newsletter. This is basically a synopsis of our largest 2003 environmental accomplishments.

Hope you find these materials helpful.

I'd look forward to meeting you at some point – perhaps lunch in the near future. I used to work for Sen. Hank Brown from Colorado in the mid-1990's, and more recently before coming over here to be deputy director for communications, the RNC.

My phone number is 456-6293. Also, if you have any reports on our issues you would like share from RPC, I'd very much appreciate receiving those.

Thanks.

- Bill Holbrook

http://www.whitehouse.gov/news/releases/2003/09/20030930-4.html

Climate Change Fact Sheet

- **THE BUSH ADMINISTRATION'S ACTIONS ON GLOBAL CLIMATE CHANGE**
  - "I've asked my advisors to consider approaches to reduce greenhouse gas emissions, including those that tap the power of markets, help realize the promise of technology and ensure the widest-possible global participation....Our actions should be measured as we learn more from science and build on it. Our approach must be flexible to adjust to new information and take advantage of new technology. We must always act to ensure continued economic growth and prosperity for our citizens and for citizens throughout the world." --- President Bush (6/11/01)
- **The Bush Administration has delivered on the President's commitment with a comprehensive, innovative program of domestic and international initiatives:**
- **National Goal to Reduce Emissions Growth:** In February 2002, President Bush committed the United States to a comprehensive strategy to reduce the greenhouse gas intensity of the American economy (how much we emit per unit of economic activity) by 18 percent over the next 10 years. Meeting this commitment will prevent more than 500 million metric tons of carbon-equivalent emissions through 2012.
- **Large Budget Increases for Global Climate Change:** President Bush's FY '04 budget sought a 15 percent increase in funding for climate change-related programs, bringing total U.S. Government spending this year to $4.3 billion. If enacted, it will be the highest level ever. In addition, substantial funding for conservation programs under the 2002 Farm Bill will significantly increase the amount of carbon storage from agriculture.
- **Tax Incentives for Renewable Energy and Hybrid and Fuel-Cell Vehicles:** The President's FY '04 budget proposes tax incentives totaling $4.2 billion through FY '08 to spur the use of clean, renewable energy and energy efficient technologies. Consistent with the President's National Energy Policy, the tax incentives include credits for the purchase of hybrid and fuel-cell vehicles, residential solar heating systems, energy produced from landfill gas, electricity produced from alternative energy sources such as wind and biomass, and combined heat and power systems.
- **Cabinet Committee on Climate Change Science and Technology Integration:** President Bush has created an interagency, cabinet-level committee, co-chaired by the Secretaries of Commerce and Energy, to coordinate and prioritize Federal research on global climate science and advanced energy technologies. This Committee develops policy recommendations for the President and oversees the sub-cabinet interagency programs on climate science and energy technologies.

- **Federal Energy and Carbon Sequestration Programs:** FY '04 budget request includes $1.7 billion to fund Federal technology research, development, and deployment activities. Major new initiatives for FY '04 and beyond include:
  - **Hydrogen Energy.** President Bush launched his Hydrogen Fuel Initiative in this year's State of the Union address. The goal is to work closely with the private sector to accelerate our transition to a hydrogen economy, both on the technology of hydrogen fuel cells and a fueling infrastructure. The President's Hydrogen Fuel Initiative and the FreedomCAR Partnership launched last year will provide $1.7 billion over the next 5 years to develop hydrogen-powered fuel cells, a hydrogen infrastructure, and advanced automobile technologies, allowing for commercialization by 2020. The United States will pursue international cooperation to affect a more rapid, coordinated advance for this technology that could lead to the reduction of air pollutants and a significant reduction of greenhouse gas emissions in the transportation sector worldwide. For more information on this initiative, please visit http://www.whitehouse.gov/ceq/hydrogen-fuels.html.
  - **"FutureGen" -- Coal-Fired, Zero-Emissions Electricity Generation.** In February 2003, President Bush announced that the United States would sponsor, with international and private-sector partners, a $1 billion, 10-year demonstration project to create the world's first coal-based, zero-emissions electricity and hydrogen power plant. This project is designed to dramatically reduce air pollution and capture and store greenhouse gas emissions. This initiative is part of an international Carbon Sequestration Leadership Forum, chaired by the Secretary of Energy, to work cooperatively with our global partners--including developing countries--on research, development and deployment of carbon sequestration technologies in the next decade. In June 2003, the inaugural Forum meeting was held in Virginia, and attended by representatives of Australia, Brazil, Canada, China, Colombia, India, Italy, Japan, Mexico, Norway, Russian Federation, the United Kingdom, and the European Commission. These global partners signed the first international charter setting the framework for international cooperation in research and development. For more information, please visit http://www.fe.doe.gov/programs/powersystems/futuregen/.
  - **Fusion Energy.** January 2003, President Bush committed the United States to participate in the largest and most technologically sophisticated research project in the world to harness the promise of fusion energy, the same form of energy that powers the sun. If successful, this $5 billion, internationally supported research project will advance progress toward producing clean, renewable, commercially available fusion energy by the middle of the century. Participating countries include the United Kingdom, Russia, Japan, China, and Canada. To read the President's statement, please visit http://www.whitehouse.gov/news/releases/2003/01/20030130-18.html.
- **Federal Climate Change Science Program (CCSP):** Includes $1.7 billion in FY '04 budget request to fund Federal, multi-agency research program, with $185 million requested for the Climate Change Research Initiative in FY '04.
  - **10-year Federal Strategic Research Plan Released.** The Interagency U. S. Climate Change Science Program proposed a 10-Year Strategic Plan in November 2002, accompanied by a 1300-person workshop, with representatives from over 35 countries. The final, comprehensive plan was released in July 2003 by Secretary Abraham and Secretary Evans, as well as White House Office of Science and Technology Policy Director Marburger. The document describes a strategy for developing knowledge of variability and change in climate and related environmental and human systems, and for encouraging the application of this knowledge. Secretary Evans also announced a $103 million, two-year Federal initiative to accelerate the deployment of new global observation technologies, focused on oceans, atmospheric aerosols, and the natural carbon cycle. To read the plan, please visit http://www.climatescience.gov/Library/stratplan2003/default.htm.
  - **U.S. Hosts Inaugural Earth Observation Summit.** The first-ever Earth Observation Summit was held July 31, 2003 to generate strong, international support to link thousands of individual technological assets into a coordinated, sustained, and comprehensive global Earth observation system. The purpose of the system is to provide the tools needed to substantially improve our ability to identify and address critical environmental, economic, and societal concerns. More than 30 countries and 20 international organizations participated in the Summit. Participants adopted a Summit Declaration recognizing the need to support development of a comprehensive, coordinated Earth observation system. For more information, please visit http://www.climatescience.gov/Library/observation-summit2003.htm.

- **Fuel Economy Increase for Light Trucks:** On April 1, 2003, the Bush Administration finalized regulations requiring an increase in the fuel economy of light trucks for Model Years 2005 - 2007, the first such increase since 1996. The increase from 20.7 miles per gallon to 22.2 miles per gallon by 2007 more than doubles the increase in the standard that occurred between Model Years 1986 and 1996, when it increased from 20.0 miles per gallon to 20.7 miles per gallon. The new standards are projected to result in savings of approximately 3.6 billion gallons of gasoline over the lifetime of these trucks with the corresponding avoidance of 31 million metric tons of carbon dioxide emissions.
    - **Voluntary Greenhouse Gas Reduction Initiatives with Business and Industry:** The Federal government administers nearly 60 different voluntary programs on energy efficiency, agricultural practices, and greenhouse gas reductions. Major initiatives announced by the Bush Administration include:
    - **"Climate VISION" Partnership.** In February 2003, President Bush announced that twelve major industrial sectors and the membership of the Business Roundtable have committed to work with four of his cabinet agencies (DOE, EPA, DOT, and USDA) to reduce greenhouse gas emissions in the next decade. Participating industries included America's electric utilities; petroleum refiners and natural gas producers; automobile, iron and steel, chemical and magnesium manufacturers; forest and paper producers; railroads; and the cement, mining, aluminum and semiconductor industries. To read the President's statement, please visit http://www.whitehouse.gov/news/releases/2003/02/20030212.html.
    - **Climate Leaders.** Announced by EPA Administrator Whitman in February 2002, Climate Leaders is an EPA partnership encouraging individual companies to develop long-term, comprehensive climate change strategies. Under this program, partners set corporate-wide GHG reduction goals and inventory their emissions to measure progress. Over 35 major companies are now participating, including General Motors, Alcoa, BP, Pfizer, Staples, International Paper, IBM, Miller Brewing, Eastman Kodak, and Target. For more information, please visit http://www.epa.gov/climateleaders/.
    - **Voluntary Registry for Reporting GHG Reductions.** Responding to President Bush's February 2002 charge, the Secretaries of Energy, Commerce, and Agriculture, and the EPA Administrator provided the President with their initial recommendations for enhancing and improving the DOE's greenhouse gas emissions reduction registry. The improvements are intended to enhance the accuracy, reliability, and verifiability of greenhouse gas reductions measurements. As part of the 2002 public comment process, DOE hosted workshops in Houston, Washington, San Francisco, and Chicago. Final guidelines are anticipated in early 2004.
    - **Targeted Incentives for Greenhouse Gas Sequestration.** On June 6, 2003, Agriculture Secretary Veneman announced that, for the first time, consideration will be given to management practices that store carbon and reduce emissions of greenhouse gases in setting priorities and implementing USDA's forest and agriculture conservation programs, such as the Environmental Quality Incentives Program and Conservation Reserve Program. USDA would provide financial incentives, technical assistance, demonstrations, pilot programs, education, and capacity building, along with measurements to assess the success of these efforts. For more information, please visit http://www.usda.gov/news/releases/2003/06/0194.htm.
- **International Outreach:**
    - **International Cooperation.** The U.S. is engaged in extensive international efforts on climate, both through multilateral and bilateral activities. Multilaterally, the U.S. is by far the largest funder of the activities of the UN Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change, and leads R & D projects through the Generation IV International Forum, which is developing the next-generation nuclear systems to produce electricity and hydrogen for transportation use without emitting greenhouse gas emissions. Bilaterally, the U.S. has developed a number of agreements with major international partners to pursue research on global climate change and deploy climate observation systems, collaborate on energy and sequestration technologies, and explore methodologies for monitoring and measuring GHG emissions. Since June 2001, the United States has engaged in bilateral partnerships with Australia, Canada, China, seven Central American countries (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), the European Union, India, Italy, Japan, New Zealand, Republic of Korea, the Russian Federation and South Africa on issues ranging from climate change science to energy and sequestration technologies to policy approaches.
    - **Global Environmental Facility (GEF).** As part of a $2.2 billion international replenishment agreement, the Bush Administration has pledged $500 million to the GEF over the next 4 years to help developing countries address environmental problems, including global climate change. The GEF is the financial mechanism under the United Nations Framework Convention on Climate

Change and the United States' contribution is the largest of any country. This commitment, which will fund technology transfer and capacity building in developing countries, represents a 16 percent increase over the U.S. contribution in the previous replenishment.

- **United States Agency for International Development.** The Administration intends to spend at least $175 million in FY '04 for all USAID climate change programs including those that fund the transfer of advanced technologies to developing countries, including cleaner, more efficient energy technologies, technologies to make manufacturing and agriculture more productive and efficient, and programs to foster responsible forestry practices.
- **President's Initiative Against Illegal Logging.** On July 28, 2003, Secretary of State Powell launched the President's Initiative Against Illegal Logging, developed with the objective of assisting developing countries in their efforts to combat illegal logging, including the sale and export of illegally harvested timber, and in fighting corruption in the forest sector. The initiative represents the most comprehensive strategy undertaken by any nation to address this critical sustainable development challenge, and reinforces the U.S. leadership role in taking action to counter the problem and preserve forest resources that store carbon. For more information, please visit http://www.state.gov/r/pa/prs/ps/2003/22843.htm.
- **Tropical Forest Conservation.** In FY '04, the Bush Administration will direct $50 million for tropical forest conservation. These funds will provide the resources needed to pursue additional "debt-for-nature" projects under the Tropical Forest Conservation Act and contribute to the Congo Basin Forest Partnership launched by Secretary of State Powell and then-EPA Administrator Whitman in September 2002 to preserve eleven key landscapes in Cameroon, the Central African Republic, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, and the Republic of the Congo. To view the fact sheet, please visit http://www.state.gov/g/oes/rls/fs/2003/22973.htm.

Cooney, Phil

From: Dobriansky, Larisa [Larisa.Dobriansky@hq.doe.gov]
Sent: Monday, February 02, 2004 7:05 PM
To: Cooney, Phil
Subject: Utility/DOE working agreement/MOU

Here are the materials to date. We welcome your reactions and guidance on this.

<<GCC Climate VISION MOU Between DOE and Utilities.doc>> <<GCC Climate VISION MOU Attachment.doc>> <<GCC Climate VISION MOU Utilities Incentives overview.doc>> This attachment on policy issues and incentives is what the Power Partners would like to include in the MOU.

<<GCC Climate VISION MOU DOE and Utilities Action Memo for Review.doc>> This is the entire package.

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Conover, David

From: Conover, David
Sent: Thursday, February 05, 2004 12:22 PM
To: Booher, Patrick; Braitsch, Jay; Stamos, John; DeLorenzo, Ralph; Trottier, Paul; John Beale (John Beale); Hratch Semerjian (Hratch Semerjian); William Hohenstein; Chris Kearney; Harlan Watson; James Andrews; James Mahoney; Linda Lawson; Margaret Leinen; Mary Cleave
Cc: Marcus Peacock (Marcus_Peacock@omb.eop.gov); Rob Sandoli (Sandoli@omb.eop.gov); Kevin Hurst (Kevin Hurst); Hannegan, Bryan J.; Card, Robert; Garman, David; Smith, Mike; Magwood, William; Glotfelty, Jimmy; Orbach, Ray; Maddox, Mark; Salmon, Jeffrey; Knox, Eric; Kolevar, Kevin; Stephen Seidel (Stephen Seidel); Ari Patrinos (Ari Patrinos); Bob Marlay (Bob Marlay); Dina Kruger (Dina Kruger); Fred Humphrey (Fred Humphrey); Gail Marcus (Gail Marcus); John Stamos (John Stamos); Mark Ginsberg (Mark Ginsberg); Ron Birk (Ron Birk)
Subject: Action Request - Revising CCTP R&D Inventory
Importance: High

MEMORANDUM

To: Agency Representatives to the Climate Change Technology Program (FOR ACTION)

From: Marcus Peacock, Associate Director, Office of Management and Budget

David Conover, Director, Climate Change Technology Program

Copies: Interagency Working Group on Climate Change Science and Technology (FOR INFORMATION)

Subject: **Update of Interagency Inventory and Budgets for Climate Change Technology Programs**

As you know, in 2003 CCTP, OMB, CEQ and OSTP developed new criteria for determining which research, development, demonstration and deployment activities should be classified as climate change technology RDD&D. Using these criteria, CCTP member agencies have submitted inventory reports for use by the CCTP in our baselining activities.

The purpose of this memo is to ask you to refine your inventory reports to accomplish several goals:

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David.Conover@hq.doe.gov. Please contact David Conover at (202) 586-3994 if you have any questions.


CCTP Criteria Oct 14 2003.doc ...


CCTP DOE only FY01-05 update F...


CCTP All Agency FY01-05 update...


CCTP All Agency FY01-04 EarMar...

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Cooney, Phil

From: Watson, Harlan L (OES) [WatsonHL@state.gov]
Sent: Tuesday, February 10, 2004 2:23 PM
To: Reifsnyder, Dan A (OES); Talley, Trigg (OES); Turekian, Vaughan C
Cc: Cooney, Phil; Peel, Kenneth L.
Subject: EPA PowerPoint on the 2002 US GHG Inventory

1-29-04.EPA Briefing on 2002 U..

FYI--Attached is a PowerPoint prepared by EPA on the 2002 US GHG Inventory that will be out for public review in a couple of weeks. Note that 2002 emissions are still below 2000.

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AF&PA®

AMERICAN FOREST & PAPER ASSOCIATION
Office of the President

Copies to....
D. Anderson
P. Cooney done!
B. Hannegan

February 11, 2004

The Honorable Ann M. Veneman
Secretary, Department of Agriculture
1400 Independence Avenue, S.W.
Washington, D.C. 20250

The Honorable Spencer Abraham
Secretary of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

The Honorable Michael Leavitt
Administrator, Environmental Protection Agency
Ariel Rios Federal Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

The Honorable James L. Connaughton
Chairman, Council on Environmental Quality
730 Jackson Place, N.W.
Washington, D.C. 20530

Dear Secretaries Veneman and Abraham, Administrator Leavitt, and Chairman Connaughton:

The members of the American Forest & Paper Association (AF&PA) are pleased to affirm their commitment to the President's initiative to reduce greenhouse gas emissions. During 2003, we have carefully analyzed our commitment and are fully confident that we can reduce our greenhouse gas emissions intensity by 12 percent by 2012 relative to 2000 (as stated in our initial letter dated January 21, 2003). By committing to support the Administration's objectives, we hope to make a substantial contribution toward achieving President Bush's national goal by 2012. Furthermore, with appropriate policies, incentives, and reductions in regulatory barriers, we might be able to achieve even greater reductions.

We believe that our success will depend in part on the Administration's efforts to manage the activities of all government agencies, especially with respect to the promulgation of regulatory requirements that may result in increases in greenhouse gas emissions. Our ability to meet or exceed the commitment also will naturally depend on the measurement and accounting methods and implementation guidelines that are being developed. We very much want to work with the Administration and others in establishing methodologies and guidelines applicable to recycling and forest and product sequestration. We continue to strongly encourage the Administration to address regulatory requirements where the negative climate impacts outweigh any environmental benefits.

In addition, governmental policies and incentives will play a large part in determining whether voluntary targets, such as the 12 percent intensity goal will be the minimum or whether we make much greater strides. We would welcome the opportunity to work with the federal government to identify both barriers and opportunities for achieving greater carbon reductions.

We plan to achieve the reductions through actions to enhance sequestration in managed forests and products, development, and implementation of improved technologies, improved energy efficiency,

and increased use of renewable energy and fiber recovery. Furthermore, our commitment assumes continued access to the grid, success in commercializing technologies under development, and recognition of forest and product sequestration as well as biomass fuel. Our commitment does not include any emissions that may result from new regulatory requirements.

Our specific plans for reductions include improvements from programs such as:

Technology Improvement: Agenda 2020, a research partnership with DOE - aimed at developing energy efficient technology - is producing promising technologies. One project with great potential for reducing CO_2 emissions is biomass gasification. It is estimated that biomass gasification, if fully developed and adopted, could make the U.S. forest products industry energy self-sufficient and a generator of surplus power created from renewable resources.

Energy Efficiency: The industry will continue to derive over half of its energy requirements from renewable energy or biofuels and to seek opportunities for additional improvements. We recover energy from our waste stream by utilizing residual biomass as a primary energy source for our manufacturing processes. Moreover, the forest products industry leads all other manufacturing sectors in onsite electricity generation, meeting more than half of our own energy needs through highly efficient co-generation processes. At many mills, self-generated electricity goes beyond serving onsite production needs by providing supplemental electricity to the surrounding electric power grid.

Fiber Recovery: AF&PA members support aggressive fiber recovery goals. In 2003, AF&PA announced a new paper recovery goal of 55 percent of all paper consumed in the U.S. by 2012. AF&PA expects that achieving the recovery rate of 55 percent will lead to corresponding reductions in greenhouse gas emissions by reducing emissions from landfills. This recovery goal will be supported through partnerships with EPA, Keep America Beautiful, CarrAmerica, and others.

Forest Sequestration: The nation's forests remove carbon dioxide from the atmosphere and store it for long periods of time, and correct management of forests is central to climate policy. AF&PA's Sustainable Forestry Initiative® Program – or SFI® – is the largest sustainable forestry program in the world. Under the program, forestlands are managed according to rigorous standards for protecting soil and water resources, contributing to biological diversity, conserving unique features and aesthetic values, and enhancing forest productivity.

Product Sequestration: A portion of the carbon that trees remove from the atmosphere remains fixed in wood and paper products. The harvesting and manufacturing of forest products essentially transfers carbon from the forest to the product pool. The carbon contained in these products continues to be sequestered from the atmosphere, and in some cases – such as building materials – products remain in use for very long periods of time. As worldwide demand for forest products increases, the amount of carbon stored in the product pool increases thus withholding carbon from the atmosphere and offsetting greenhouse gas emissions.

Again, we look forward to working with you and your respective organizations to further develop frameworks that will bring about mutually beneficial results.

With kindest personal regards, I remain,

Sincerely yours,

W. Henson Moore
President and Chief Executive Officer

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February 11, 2004

CCSP Synthesis and Assessment Products
Table of Agency Leads

#	Time Frame for Completion	Topic	Agencies *(Participating agencies are subject to change)*	Working Group	Contact Point *(Contact points are subject to change)*
CCSP Goal 1 ***Improve knowledge of the Earth's past and present climate and environment, including its natural variability, and improve understanding of the causes of observed variability and change***					
1.1	October 2004-September 2005	Temperature trends in the lower atmosphere—steps for understanding and reconciling differences.	NOAA (Lead) NASA (Supporting)	Climate Variability and Change Observations	Karl (NOAA) Dodge (NASA) Petty (DOE)
1.2	October 2004-September 2005	Past climate variability and change in the Arctic and at high latitudes.	USGS/NSF (Lead) NOAA/NASA (Supporting)	Climate Variability and Change	Ager (USGS) Verardo (NSF) Calder (NOAA) Abdalati (NASA) Ferrell (DOE)
1.3	October 2006-September 2007	Re-analyses of historical climate data for key atmospheric features. Implications for attribution of causes of observed change.	NOAA/NASA (Lead) DOE (Supporting)	Observations	Laver/Dole (NOAA) Lee (NASA) Petty (DOE)
CCSP Goal 2 ***Improve quantification of the forces bringing about changes in the Earth's climate and related systems***					
2.1	October 2004-September 2005	Updating scenarios of greenhouse gas emissions and concentrations, in collaboration with the CCTP. Review of integrated scenario development and application.	DOE (Lead) NOAA/NASA (Supporting)	Atmospheric Composition Human Contributions Decision Support	Houghton (DOE) Hofman (NOAA) DeCola/Birk/Johnston (NASA)
2.2	October 2004-September 2005	North American carbon budget and implications for the global carbon cycle.	DOE/NOAA/NASA (Lead) USDA/USGS (Supporting)	Carbon Cycle	Dahlman (DOE) Wickland/Sheffner (NASA) Hoffman (NOAA) Stokes (USDA) Schultz (USGS)
2.3	October 2006-September 2007	Aerosol properties and their impacts on climate.	NOAA/NASA (Lead)	Atmospheric Composition	Albritton (NOAA) Anderson (NASA) Lunn (DOE)
2.4	October 2006-September 2007	Trends in emissions of ozone-depleting substances, ozone layer recovery, and implications for ultraviolet radiation exposure and climate change.	NOAA/NASA (Lead)	Atmospheric Composition	Albritton (NOAA) Kurylo (NASA) Lunn (DOE)

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CCSP Goal 3 ***Reduce uncertainty in projections of how the Earth's climate and environmental systems may change in the future***					
3.1	October 2004-September 2005	Climate models and their uses and limitations, including sensitivity, feedbacks, and uncertainty analysis.	DOE (Lead) NOAA/NASA/NSF (Supporting)	Human Contributions Decision Support Climate Variability and Change Modeling	Amthor (DOE) Leetmaa (NOAA) Lee (NASA)
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3.3	October 2006-September 2007	Climate extremes including documentation of current extremes. Prospects for improving projections.	NOAA (Lead) NASA/USGS/DOE (Supporting)	Observations Climate Variability and Change, Data Management	Karl/Miller NOAA) Lee (NASA) Poore (USGS) Amthor (DOE)
3.4	October 2006-September 2007	Risks of abrupt changes in global climate.	TBD (Lead) NOAA/USGS/EPA/DOE/NSF (Supporting)	Climate Variability and Change	Eakin (NOAA) Cronin (USGS) Grambsch (EPA) Amthor (DOE) Verardo (NSF)
CCSP Goal 4 ***Understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes***					
4.1	October 2004-September 2005	Coastal elevation and sensitivity to sea level rise.	USGS/EPA/NOAA (Lead) NASA/DOE (Supporting)	Human Contributions	TBD (USGS) Titus (EPA) Szabados (NOAA) Lindstrom/Friedl (NASA) Palmisano (DOE)
4.2	October 2006-September 2007	State-of-knowledge of thresholds of change that could lead to discontinuities (sudden changes) in some ecosystems and climate-sensitive resources.	TBD (Lead) EPA/NOAA/USGS/DOE/NSF (Supporting)	Ecosystems	Rogers (EPA) Cyr/Scavia (NOAA) Thompson (USGS) Amthor (DOE) NSF contact TBD
4.3	October 2006-September	Relationship between observed ecosystem changes and climate change.	USGS/USDA (Lead) EPA/NOAA/NASA/NSF/ USGS/ DOE/USAID (Supporting)	Ecosystems	Thompson (USGS) Shaffer (USDA) West (EPA)

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	2007				Cyr/Scavia (NOAA) Bontempi (NASA) Amthor (DOE)
4.4	October 2006-September 2007	Preliminary review of adaptation options for climate-sensitive ecosystems and resources.	USDA/EPA (Lead) NOAA/NASA/USGS/DOE/USAID (Supporting)	Decision Support	Shaffer (USDA) Julius (EPA) Cyr/Scavia (NOAA) Turner/Sheffner (NASA) Thompson (USGS) Amthor (DOE) USAID contact TBD
4.5	October 2006-September 2007	Scenario-based analysis of the climatological, environmental, resource, technological, and economic implications of different atmospheric concentrations of greenhouse gases.	Special CCSP mgmt. structure; topical leads among agencies NASA/USGS/EPA/NOAA/DOE (Supporting)	Decision Support	Friedl/Lee (NASA) Clow (USGS) Grambsch (EPA) Goodrich (NOAA) Houghton (DOE)
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4.7	October 2006-September 2007	Within the transportation sector, a summary of climate change and variability sensitivities, potential impacts, and response options.	DOT (Lead) USGS/DOE (Supporting)	Decision Support	Savonis (DOT) Burkett (USGS) Petty (DOE)
CCSP Goal 5 ***Explore the uses and identify the limits of evolving knowledge to manage risks and opportunities related to climate variability and change***					
5.1	October 2004-September 2005	Uses and limitations of observations, data, forecasts, and other projections in decision support for selected sectors and regions.	NASA (Lead) EPA/NOAA/USGS/DOE (Supporting)	Human Contributions Decision Support	Birk/ McPherson (NASA) Bierwagen (EPA) Livezey (NOAA) Berenknopf (USGS) Amthor (DOE)
5.2	October 2004-September 2005	Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decisionmaking.	NASA (Lead) EPA/NOAA/USGS/DOE/NSF (Supporting)	Decision Support Communications.	Birk/McPherson (NASA) Gamble (EPA) Simpson (NOAA) Berenknopf.(USGS) Ferrell (DOE) O'Connor/Eavey (NSF)

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5.3	October 2004-September 2005	Decision support experiments and evaluations using seasonal to interannual forecasts and observational data.	NOAA (Lead) NASA/EPA/USGS/USAID/DOE (Supporting)	Decision Support	Nierenberg/Livezey (NOAA) Bilk/Habib (NASA) Gamble (EPA) Berenknopf (USGS) Tokar (USAID) DOE contact TBD

CEQ 450PC

INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY
Meeting #04-1

Wednesday, February 11, 2004, 2:00 to 4:00 PM
Department of Commerce, Conference room (#5851)

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	US Card, DOE
2:05 – 2:15	Science Update • Program funding • FY04/05 priorities	Dpty Bodman, Commerce Ari Patrinos, DOE Acting
2:15 – 2:30	Science – NASA perspective	Adminstrator O'Keefe, NASA
2:30 – 2:45	Policy Update • Discussion of policy implications of recent events • Review of key dates and issues for CY04 o Voluntary programs annev Feb 11 o Climate strategy annev. Feb 14 o NEP annev, May o Energy bill o Clear Skies	Chm. Connaughton, CEQ
2:45 – 3:00	Technology Update • Program funding and CCTP cross cuts • Update in initiatives (IPHE, CSLF, Gen IV, ITER) • FY04/05 priorities and initiatives under consideration • Draft strategic plan	US Card / CCTP Dr. Conover, DOE
3:00 – 3:15	Registry (1605(b)) and Voluntary Programs • Review of draft guidelines and finalization schedule • Review of registry public comments following release of draft guidelines • Voluntary programs update (Climate Vision/DOE, Climate Leaders/EPA)	US Card, DOE Asst Admin, Holmstead, EPA
3:20 – 3:30	Agriculture Update • Sequestration guidelines • Farm Bill implementation	Dpty Moseley, AG
3:30 – 3:50	International • Review of key events and activities for CY04 o Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment plan • Other international developments	US Dobriansky, State
3:50 – 3:55	Cleanup Items • Discussion of meeting plan for the year • Discussion of inviting guest presentations	US Card, DOE
3:55 – 4:00	Next meeting plans and schedule contingency • Next meeting (at Energy) – proposed for Tuesday, April 13	US Card, DOE

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February 11, 2004

CCSP Synthesis and Assessment Products
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CCSP Goal 5 *Explore the uses and identify the limits of evolving knowledge to manage risks and opportunities related to climate variability and change*					
5.1	October 2004-September 2005	Uses and limitations of observations, data, forecasts, and other projections in decision support for selected sectors and regions.	NASA (Lead) EPA/NOAA/USGS/DOE (Supporting)	Human Contributions Decision Support	Birk/ McPherson (NASA) Bierwagen (EPA) Livezey (NOAA) Berenknopf (USGS) Amthor (DOE)
5.2	October 2004-September 2005	Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decisionmaking.	NASA (Lead) EPA/NOAA/USGS/DOE/NSF (Supporting)	Decision Support Communications.	Birk/McPherson (NASA) Gamble (EPA) Simpson (NOAA) Berenknopf.(USGS) Ferrell (DOE) O'Connor/Eavey (NSF)

IWGCCST

#	Time Frame for Completion	Topic	Agencies *(Participating agencies are subject to change)*	Working Group	Contact Point *(Contact points are subject to change)*
5.3	October 2004-September 2005	Decision support experiments and evaluations using seasonal to interannual forecasts and observational data.	NOAA (Lead) NASA/EPA/USGS/USAID/DOE (Supporting)	Decision Support	Nierenberg/Livezey (NOAA) Birk/Habib (NASA) Gamble (EPA) Berenknopf (USGS) Tokar (USAID) DOE contact TBD

1605 CEQ
USS PC

INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY

Meeting #04-1

Wednesday, February 11, 2004, 2:00 to 4:00 PM
Department of Commerce, Conference room (#5851)

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	US Card, DOE
2:05 – 2:15	Science Update • Program funding • FY04/05 priorities	Dpty Bodman, Commerce Ari Patrinos, DOE Acting
2:15 – 2:30	Science – NASA perspective	Adminstrator O'Keefe, NASA
2:30 – 2:45	Policy Update • Discussion of policy implications of recent events • Review of key dates and issues for CY04 o Voluntary programs annev Feb 11 o Climate strategy annev. Feb 14 o NEP annev, May o Energy bill o Clear Skies	Chm. Connaughton, CEQ
2:45 – 3:00	Technology Update • Program funding and CCTP cross cuts • Update in initiatives (IPHE, CSLF, Gen IV, ITER) • FY04/05 priorities and initiatives under consideration • Draft strategic plan	US Card / CCTP Dr. Conover, DOE
3:00 – 3:15	Registry (1605(b)) and Voluntary Programs • Review of draft guidelines and finalization schedule • Review of registry public comments following release of draft guidelines • Voluntary programs update (Climate Vision/DOE, Climate Leaders/EPA)	US Card, DOE Asst Admin, Holmstead, EPA
3:20 – 3:30	Agriculture Update • Sequestration guidelines • Farm Bill implementation	Dpty Moseley, AG
3:30 – 3:50	International • Review of key events and activities for CY04 o Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment plan • Other international developments	US Dobriansky, State
3:50 – 3:55	Cleanup Items • Discussion of meeting plan for the year • Discussion of inviting guest presentations	US Card, DOE
3:55 – 4:00	Next meeting plans and schedule contingency • Next meeting (at Energy) – proposed for Tuesday, April 13	US Card, DOE

2/12/2004

U.S. Department of Energy's 1605(b) Draft General Guidelines

Update

February 2004

President's February 14th, 2002 Directive

1. Established U.S Goal to reduce GHG intensity by 18% by 2012.
2. **Directed Improvements to DOE's GHG Voluntary Emissions Registry.**
   - **The Registry was established Section 1605(b) of the Energy Policy Act of 1992 and currently about 220 reporters provide data on emissions and emissions reductions.**
3. Sought recommendations on protecting real reductions against future climate policy and on giving transferable credits.
4. Challenged businesses to take action (Climate VISION, Climate Leaders).

Actions to Date

- Issued a public Notice of Inquiry, May 2002.
- Led extensive interagency staff level and policy level consultations to draft General Guidelines, which were published November 26, 2003.
- Established website to distribute information and receive comments.
- Held **seven** public workshops (DOE hosted 5, USDA hosted 2).
- Interagency groups developing Technical Guidelines for reductions and inventories.
- EIA developing reporting forms and instructions.
- Met and continue to meet with numerous stakeholder groups.

Timeline

- General Guidelines in public review until February 17, 2004.
- Review comments, revise General Guidelines - with Deputy level input – February to March, 2004.
- Draft Technical Guidelines (3 parts: Core Reporting Requirements; Calculating GHG Reductions;GHG Inventories) – January to April, 2004.
- Issue revised General Guidelines and Technical Guidelines for combined review in late Spring/early Summer, 2004.
- EIA initiates OMB process and public comment period for revised forms and instructions, Summer – Fall, 2004.
- Initiate revised program in early 2005.

Key Features of Proposed Revisions

1. **Create a more credible registry.** DOE is creating an improved registry for emissions and reductions that can support trading and future policy.

2. **Emphasize entity-wide inventories and reductions.** Entities may *register* reductions if they provide entity-wide emissions data and can demonstrate they achieved entity-wide emission reductions after 2002.

3. **Encourage small entity participation.** Those without significant emissions may register reductions without filing full entity-wide reports, under special circumstances.

4. **Encourage reporting even if not *registering* reductions.** Entities may elect to report emissions and reductions without having to provide an entity-wide inventory and account for entity-wide emissions.

5. **Enhance corporate responsibility GHG report.** Companies are encouraged to report at the highest level but may report at a subsidiary or affiliate level. High-level official should certify reports. Independent verification is encouraged, but not required.

January 2004 Workshop

- January 12, 2004, Washington, D.C.
- 180 attendees representing wide range of stakeholder groups, include power generation, manufacturers, renewables, waste management, forestry, environmental groups.
- DOE, USDA, EPA, CEQ participated: EIA, State attended.
- Reviewed entity definition, program structure, inventories, reductions, and certification issues.
- Overall response was quite positive in terms of breath and depth of issues covered.

January 2004 Workshop: Stakeholder Issues

1. **Entity Boundaries.** Many want more restrictive definition of "entity" to avoid sub-entity reporting. Others want DOE to maintain or enhance flexibility in the definition of entities.

2. **International Emissions and Reductions.** Many want to report and register international emissions and reductions. For some, this means emissions and reductions from all non U.S. operations; for others it mean registering overseas "projects" as offsets to U.S. emissions

3. **Reductions Prior to 2002.** Many support registering reductions achieved prior to 2002 as long as they meet the revised criteria. For many, the proviso is that revised criteria must be more project-friendly.

4. **Treatment of Projects.** Many want to register reductions generated by "projects" in lieu of corporate reductions (and/or corporate inventories). Project reductions raise threshold and calculation issues.

5. **"Credits".** Several participants objected to the lack of any reference to transferable credits; some want "registered reductions" to be directly linked to "transferable credits"; others support lack of reference to transferable credits. Most wanted decision to be explicitly stated and explained.

Objectives for Revising 1605(b)

- Strive for accuracy, transparency, consistency, completeness.
- Balance rigor with practicality; stringency with flexibility.
- Recognize entities that contribute to the President's goal of reducing the emissions intensity of the U.S. economy;
- Encourage reporters – particularly those with large emissions – to provide a more accurate, consistent, and complete record of emissions and emission reductions.
- Create a central program for recording achievements associated with voluntary emission reduction programs, such as Climate Leaders and Climate VISION.

USDA Climate Change Activities – Status Report
William Hohenstein
Director, Global Change Program Office

Wednesday, February 11, 2004, 2:00 to 4:00 PM

1. USDA Responsibilities in Developing 1605(b) Accounting Rules and Guidelines for Agriculture and Forestry

Chapter/Section	Status	Schedule
Chapter 3: Greenhouse Gas Inventories Section H. Agricultural Emissions and Sequestration Lead USDA Agency: NRCS	Drafting group preparing initial draft based on DOE format. Preparing separate appendices with default coefficients and measurement protocols.	Initial draft section and appendices by mid/late-February. Two rounds of interagency review in late February and March. Send to OMB for formal OIRA review in April 1, 2004.
Chapter 3: Greenhouse Gas Inventories Section I. Forestry Emissions and Sequestration Lead USDA Agency: Forest Service	Drafting group preparing initial draft based on DOE format. Preparing separate appendices with default coefficients and measurement protocols.	Same as for Chapter 3 Section H
Chapter 2: Calculating Greenhouse Gas Reductions Section E. Reductions for Small Emitters Section F. Project Specific Reductions Section G. Offsets	DOE preparing initial drafts. USDA will provide input and comments. Coordination through staff-level inter-agency team, with guidance from Deputy/Under-Secretaries.	Rough draft February 1. Continual interagency review and edit up until April 1. To OMB April 1, 2004.
Chapter 2: Calculating Greenhouse Gas Reductions Section I. Reductions from Carbon Storage	Draft section to be prepared by USDA based on DOE outline provided on 2/1.	Draft section by late February based on format provided by DOE on 2/1. Continual interagency review and edit up until April 1. To OMB April 1, 2004.

2. USDA Farm Bill Implementation and Related Activities

Environmental Quality Incentives Program (EQIP)

- USDA provided guidance to States to incorporate GHG considerations in setting EQIP priorities.
- USDA developed new Practice Standards for GHG mitigating technologies and practices, including new standards for:
  - Anaerobic digesters; atmospheric resource quality management systems; and nutrient management planning.

Conservation Reserve Program (CRP)

- USDA revised the index used to rank bids to include carbon sequestration.
  - New index was used in latest CRP sign-up (September 2003); that sign-up included some continuation and additional enrollments for 2004 and 2005.
- USDA launched effort to enroll 500,000 acres of bottomland hardwoods.
- USDA will track progress of CRP through a carbon sequestration GPRA measure.
- Private sale of carbon, water, or other environmental credits are considered permissive uses.

Forest Land Enhancement Program (FLEP)

- Farm Bill authorized a five-year, $100 million program.
- In 2003, $20 million was allocated and distributed to States.
- Carbon sequestration was one of six objectives.
- OMB has indicated it will not provide funds for 2004 and the future – given redirection of Forest Service resources to fire fighting and prevention. Future of program is uncertain.

Biomass Energy and Biobased Products Initiatives

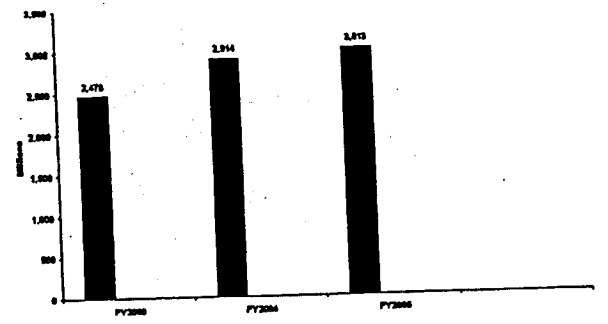
- In 2003, Rural Utilities Service made available $200 million to their borrowers (Rural Electric Cooperatives) in loans and loan guarantees for renewable energy systems; of that $71.5 million was used.
  - The same offer will be extended in 2004
- Renewable Energy Systems and Energy Efficiency Improvements, administered by Rural Business Cooperative Service.
  - In 2003, $21 million in awards were made to 113 recipients in 24 States for renewable energy systems and energy efficiency improvements.
  - Proposed regulation establishing the program is expected to be published in the Federal Register in Spring 2004.
- Biomass Research and Development Initiative
  - In FY 2003 USDA and DOE issued $23 million in grants.
  - FY 2004 roughly the same level of support will be available.
  - FY 2004 RFP issued in December 2003
- Memorandum of Understanding with the National Renewable Electric Cooperative Association.

Climate Change Technology Program Update

- FY2004 Program Goals
  - R&D portfolio analysis and input
    - Need IWG assistance
  - Strategic Plan
  - NCCTI Competitive Solicitation Program
  - IPCC Working Group III (Mitigation)
- FY2004 Resources
  - DOE funding
  - Interagency volunteers

2/11/2004 1

CCTP Federal RDD&D Investments



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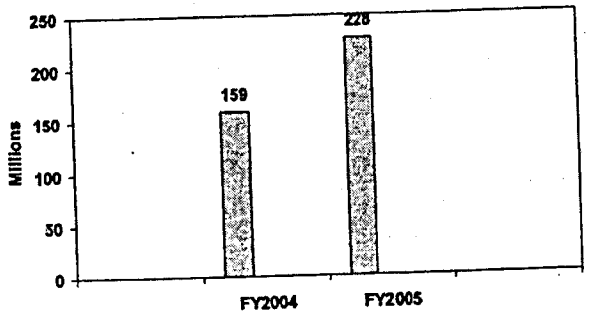
Hydrogen Fuel Initiative



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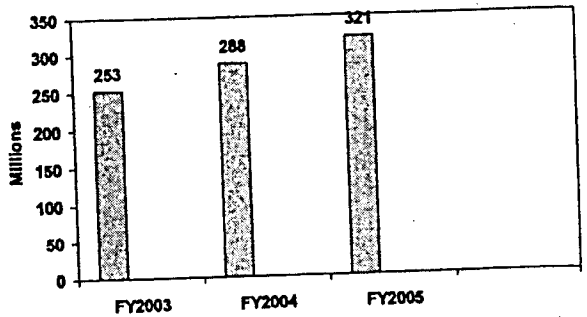
Total Hydrogen Investment



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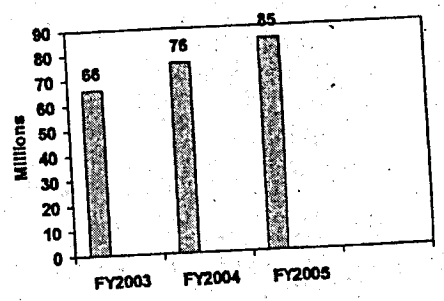
Sequestration Initiative



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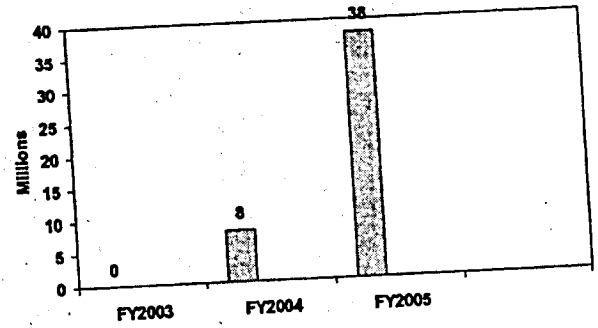
ITER Initiative



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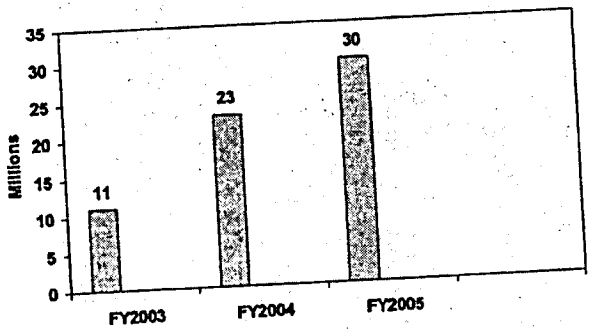
GEN IV Initiative



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Climate Change Technology Initiative Updates - IPHE

- Structure
  - Steering Committee: US (Chair), Canada, India, Italy, Japan (Vice-Chairs)
  - Implementation and Liaison Committee: Germany, Iceland (Co-Chairs) Brazil, EC, Russia (Vice-Chairs)
- IPHE Partner's Economy:
  - > $35 Trillion in GDP, 85% of Global GDP
  - ~ 3.5 billion people
  - > 75% of electricity used worldwide
  - > 2/3s of CO2 emissions and energy consumption
- Progress: Roadmaps and Program Initiated by
  - Australia, Brazil, Canada, China, EU, France, Germany, Iceland, India, Italy, Republic of Korea, Norway, Russia, Japan, UK, US
- Next meeting
  - China in May?

8

2/11/2004

Climate Change Technology Initiative Updates – CSLF

- Technical and Policy Groups met 19-22 January in Rome
- Outcomes:
  - Project Recommendation Guidelines
  - Terms of Reference and Procedures
  - Technical Group reviewing 13 proposed projects and revising Technical Roadmap
  - Secretariat to develop Action Plan issue papers
- Next ministerial will announce endorsed projects
  - Melbourne, Summer/Fall 2004

Climate Change Technology Initiative Updates – GEN IV

- Generation IV International Forum negotiated multi-lateral agreements 26-27 January in Switzerland
  - Based on US-prepared draft agreement recently cleared in inter-agency review
- Technology Review Group (US, Japan, France, Euratom) evaluating leading reactor technology concepts for NGNP
  - Increased sustainability/waste minimization; safety; proliferation-resistance; economics

Climate Change Technology Initiative Updates – ITER

- Current parties to negotiation – US, China, EU, Japan, Russian Federation, South Korea
  - Canada withdrew December 2003 due to lack of Federal Government support
- Two sites in contention with cost sharing agreement: Rokkasho (Japan), Cadarache (France)
- Meeting to attempt to break site deadlock Vienna February 2004
- Comprehensive International Agreement for 35 year program to be completed April 2004 pending site agreement

CCTP Strategic Plan

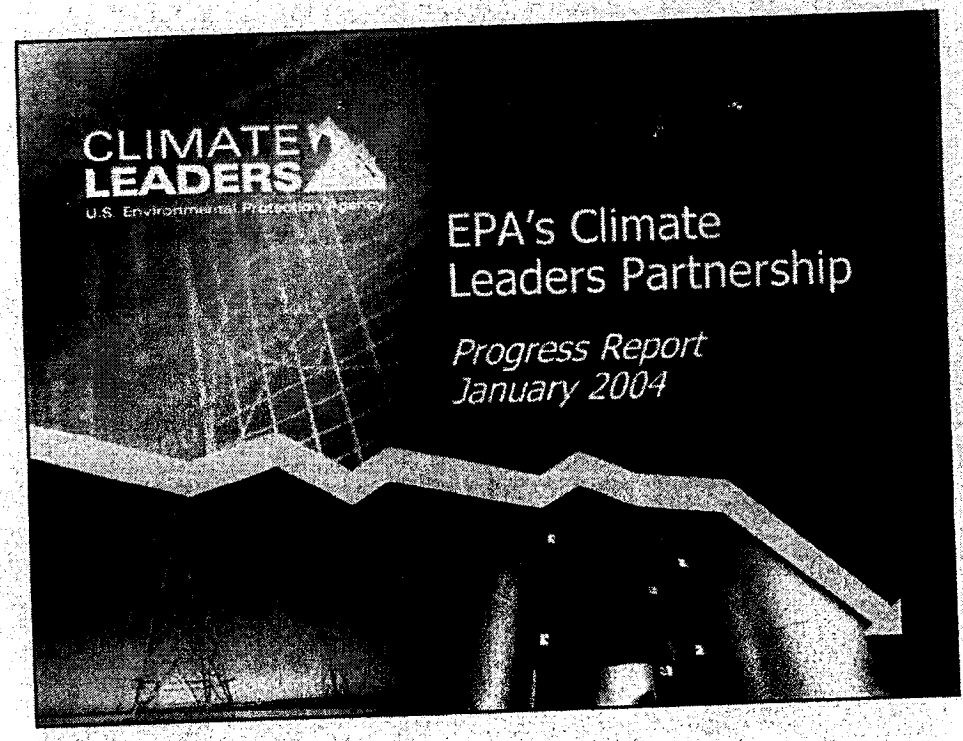
- Proposed Outline
  - Introduction: Comprehensive US climate change strategy and description of CCTP
  - CCTP Mission, Goals and Approaches
  - Scenario Analysis
  - Goal Chapters
    - Context
    - Role for Technology
    - Portfolio Rationale & Current Emphasis
    - Future R&D Opportunities
    - Potential Contributions
  - Fortifying Foundations
  - Conclusion and Appendices

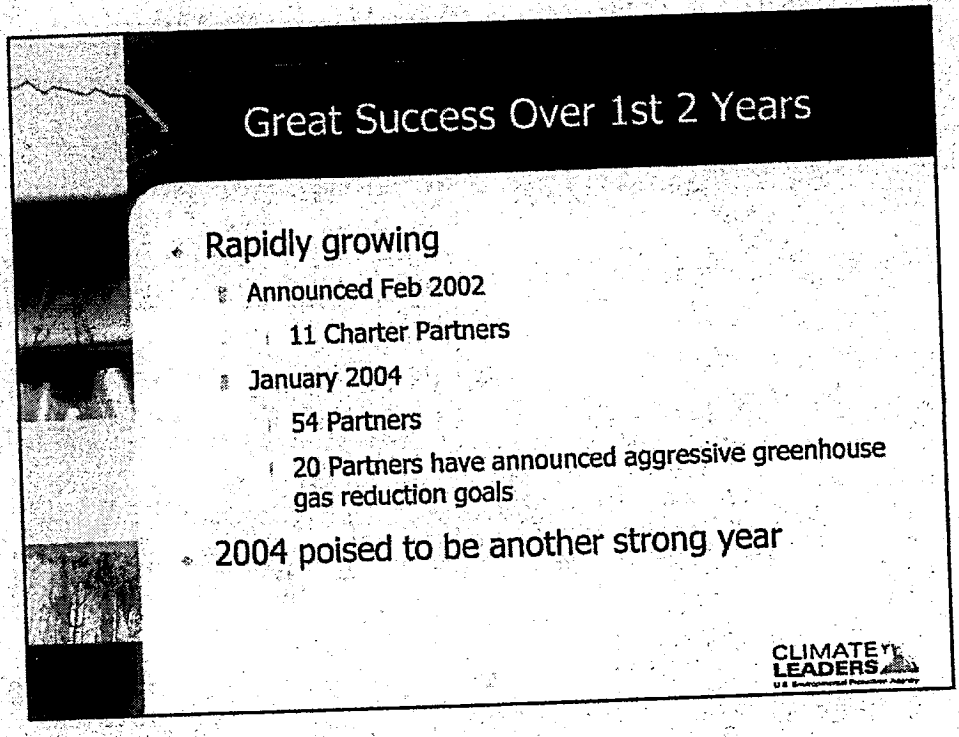
CCTP Strategic Plan

- Proposed Timeline
  - –WGs reviewing chapters
  - – OMB Interagency review March 24-31
  - – IWG review April 9-16
  - – Public draft release April 30
  - – Engage in public, primarily web-based dialogue through September 30
  - – Respond to comments/revise draft by December 31

CCTP Review of IPCC Nominations

- IPCC Fourth Assessment Report (AR4), 2004-2007
- IPCC Working Group III (Mitigation) – 13 Chapters
  - – Coordinating Lead Authors (CLA) and Review Editors (RE)
  - – Lead Authors (LA)
  - – Contributing Authors, Expert Reviewers
- CCTP Deputy Director Marlay & Interagency Team Reviewed 80+ Candidates, with Distinguished Technical or Academic Careers
  - – Recommended 19 for CLA & RE Jobs
  - – Recommended 37 for LA Jobs
  - – Focused on Ch. 2, 3, 11, 12, and 13 (Policy, Issues, and Scenarios)
  - – Focused on Ch. 4, 5, 8, 9 (Energy Supply, Transport, Ag. & Forestry)
- Intensive Effort, Quick Turn-Around, Over Holiday Period
  - – Kudos to Bob, Dina Kruger, Michael Shelby, Linda Lawson, Karrigan Bork, Ron Birk, Bill Hohenstein, Ted Gayer, Trig Talley
- CCTP Can Lead Interagency Coord. on IPCC WG III (Mitigation)


CLIMATE LEADERS
U.S. Environmental Protection Agency
EPA's Climate Leaders Partnership
Progress Report
January 2004


Great Success Over 1st 2 Years
Rapidly growing
Announced Feb 2002
11 Charter Partners
January 2004
54 Partners
20 Partners have announced aggressive greenhouse gas reduction goals
2004 poised to be another strong year
CLIMATE LEADERS

The Climate Leaders

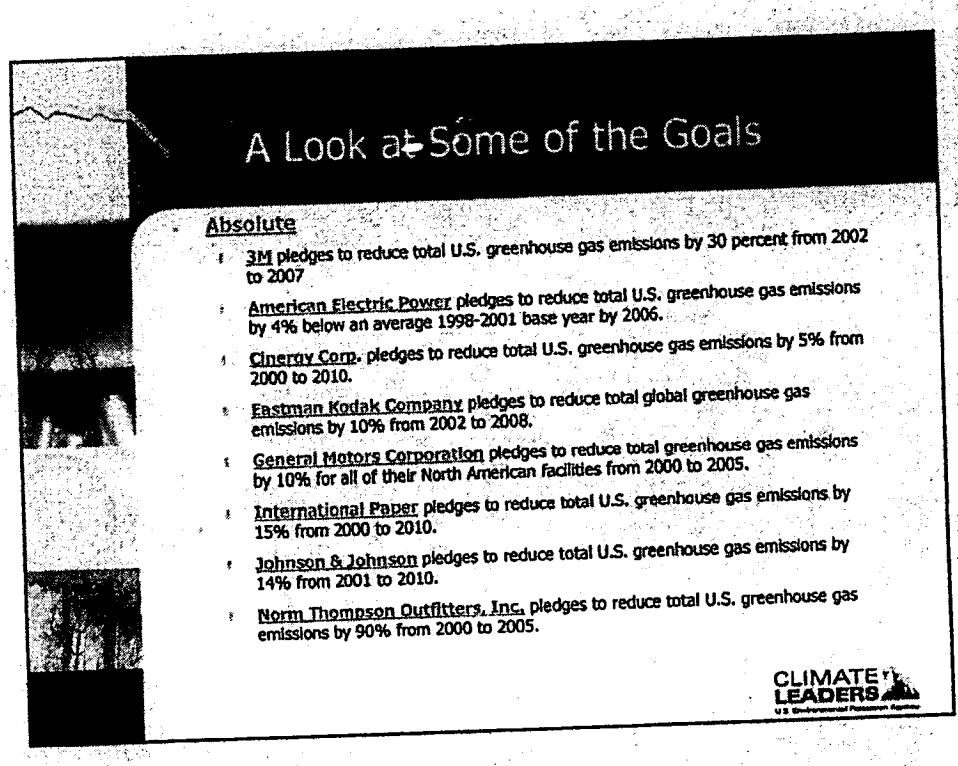
- Combined U.S. revenues equal 6% of U.S. GDP
- Diverse representation across business
- The 20 targets avoid 7.5 MMTCE
  - over sector-wide business as usual improvement efforts
  - equivalent to the ghg emissions of five million cars.

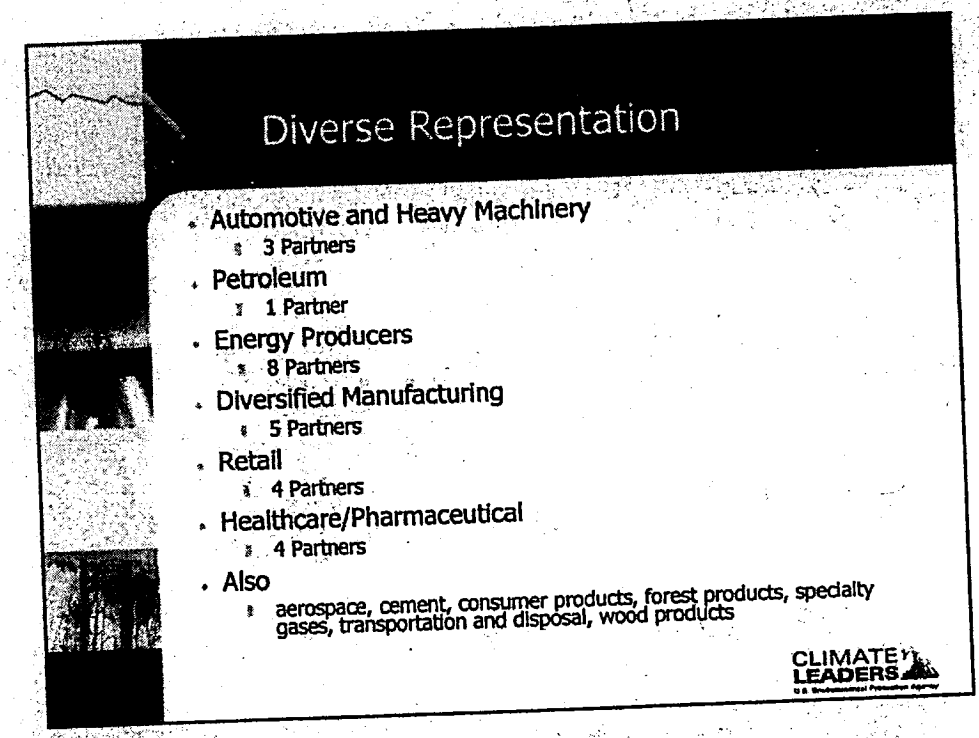
CLIMATE LEADERS
U.S. Environmental Protection Agency

A Look at Some of the Goals

- **Relative**
  - Advanced Micro Devices, Inc. pledges to reduce global greenhouse gas emissions by **40%** per Manufacturing Index from 2002 to 2007
  - FPL Group, Inc. pledges to reduce U.S. greenhouse gas emissions by **18%** per kWh from 2001 to 2008.
  - Holcim (US) Inc. pledges to reduce U.S. greenhouse gas emissions by **12%** per ton of cement from 2000 to 2008.
  - Miller Brewing Company pledges to reduce U.S. greenhouse gas emissions by **18%** per barrel of production from 2001 to 2006.
  - Pfizer, Inc. pledges to reduce global greenhouse gas emissions by **35%** per dollar of revenue from 2000 to 2007.
  - PSEG pledges to reduce U.S. greenhouse gas emissions by **18%** per kWh from 2000 to 2008
  - S.C. Johnson & Son, Inc. pledges to reduce U.S. greenhouse gas emissions by **23%** per pound of product from 2000 to 2005.
  - St. Lawrence Cement pledges to reduce global greenhouse gas emissions by **15%** per ton of cementitious product from 2000 to 2010.
  - United Technologies Corporation pledges to reduce global greenhouse gas emissions by **16%** per dollar of revenue from 2001 to 2006.

CLIMATE LEADERS
U.S. Environmental Protection Agency


A Look at Some of the Goals
Absolute
3M pledges to reduce total U.S. greenhouse gas emissions by 30 percent from 2002 to 2007
American Electric Power pledges to reduce total U.S. greenhouse gas emissions by 4% below an average 1998-2001 base year by 2006.
Cinergy Corp. pledges to reduce total U.S. greenhouse gas emissions by 5% from 2000 to 2010.
Eastman Kodak Company pledges to reduce total global greenhouse gas emissions by 10% from 2002 to 2008.
General Motors Corporation pledges to reduce total greenhouse gas emissions by 10% for all of their North American facilities from 2000 to 2005.
International Paper pledges to reduce total U.S. greenhouse gas emissions by 15% from 2000 to 2010.
Johnson & Johnson pledges to reduce total U.S. greenhouse gas emissions by 14% from 2001 to 2010.
Norm Thompson Outfitters, Inc. pledges to reduce total U.S. greenhouse gas emissions by 90% from 2000 to 2005.
CLIMATE LEADERS


Diverse Representation
Automotive and Heavy Machinery
3 Partners
Petroleum
1 Partner
Energy Producers
8 Partners
Diversified Manufacturing
5 Partners
Retail
4 Partners
Healthcare/Pharmaceutical
4 Partners
Also
aerospace, cement, consumer products, forest products, specialty gases, transportation and disposal, wood products
CLIMATE LEADERS

Goals for 2004

- 25 Additional Companies
  - many prospects
- 10 Additional Announced Goals
- Enhanced focus on Quality Data Management
  - maintain program integrity
- Other Highlights
  - Partner meeting -- June 04

CLIMATE LEADERS

Climate Leaders

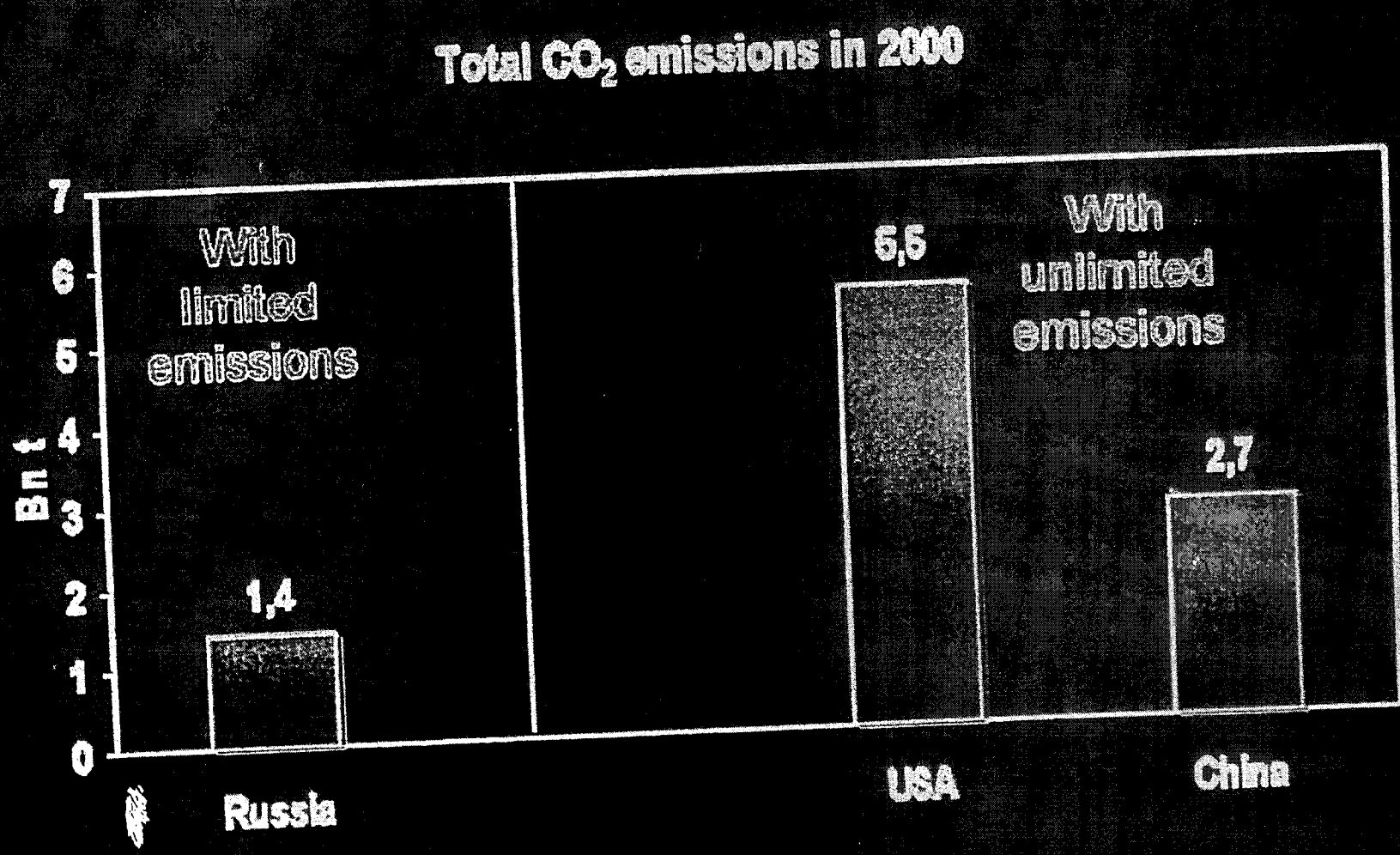
THE KYOTO PROTOCOL AND THE WORLD: WHAT IS TO BE DONE?

A. Illarionov
Adviser to the President of Russia

CERAWeek2004, Houston, Texas
February 8, 2004

The Kyoto Protocol is discriminatory against Russia

Russia's total CO_2 emissions are lower than those of other countries not adopting emission limits



The Kyoto Protocol is discriminatory against Russia

Russia's CO_2 emissions per capita are lower than those of other countries not adopting emission limits

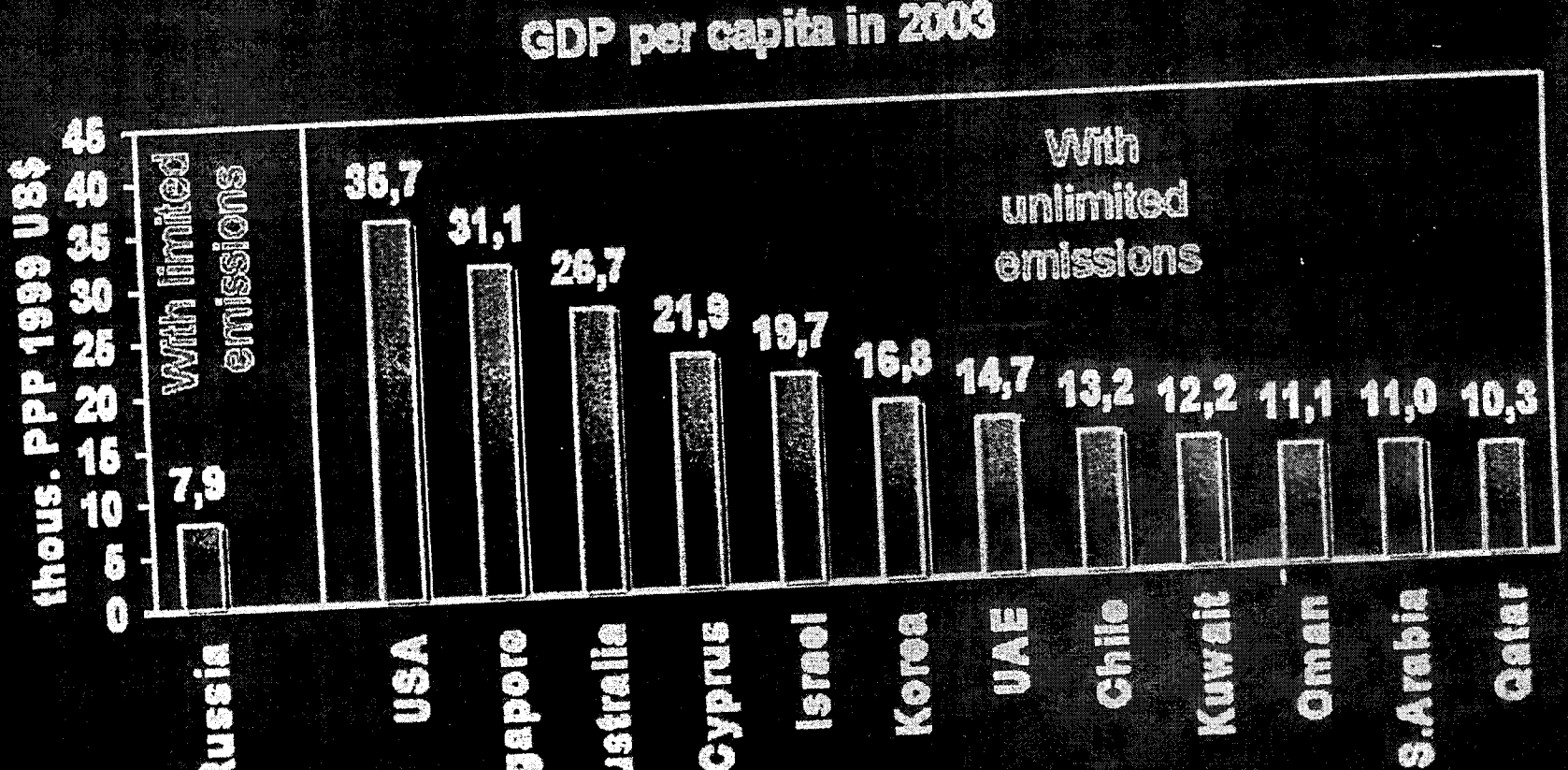
The Kyoto Protocol is discriminatory against Russia

Russia's CO_2 emissions per unit of GDP are lower than those of other countries not adopting emission limits

CO_2 emissions per unit of GDP in 2000

The Kyoto Protocol is discriminatory against Russia

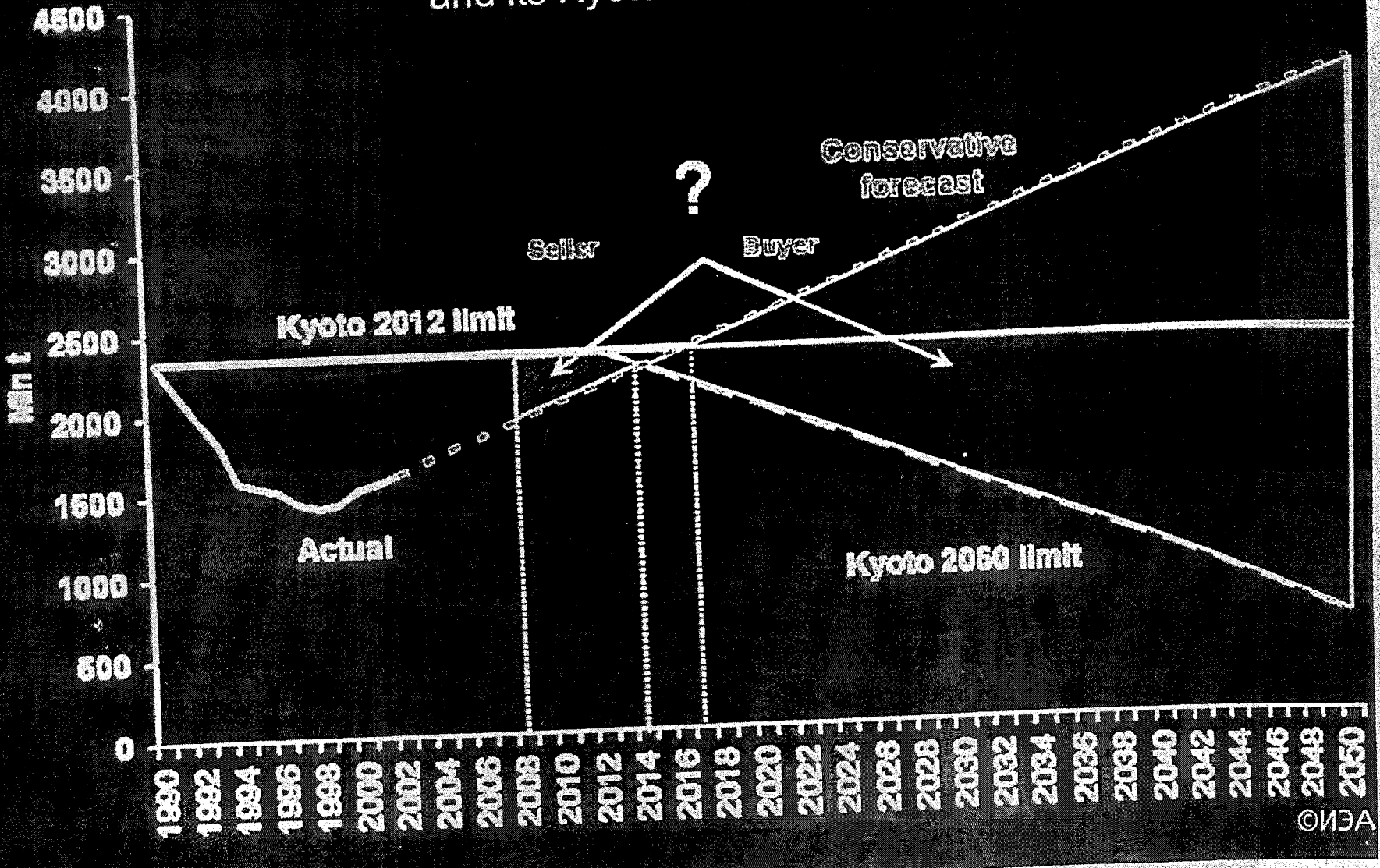
Russia's GDP per capita is lower than those of other countries not adopting emission limits



The Russia's Kyoto Cross.

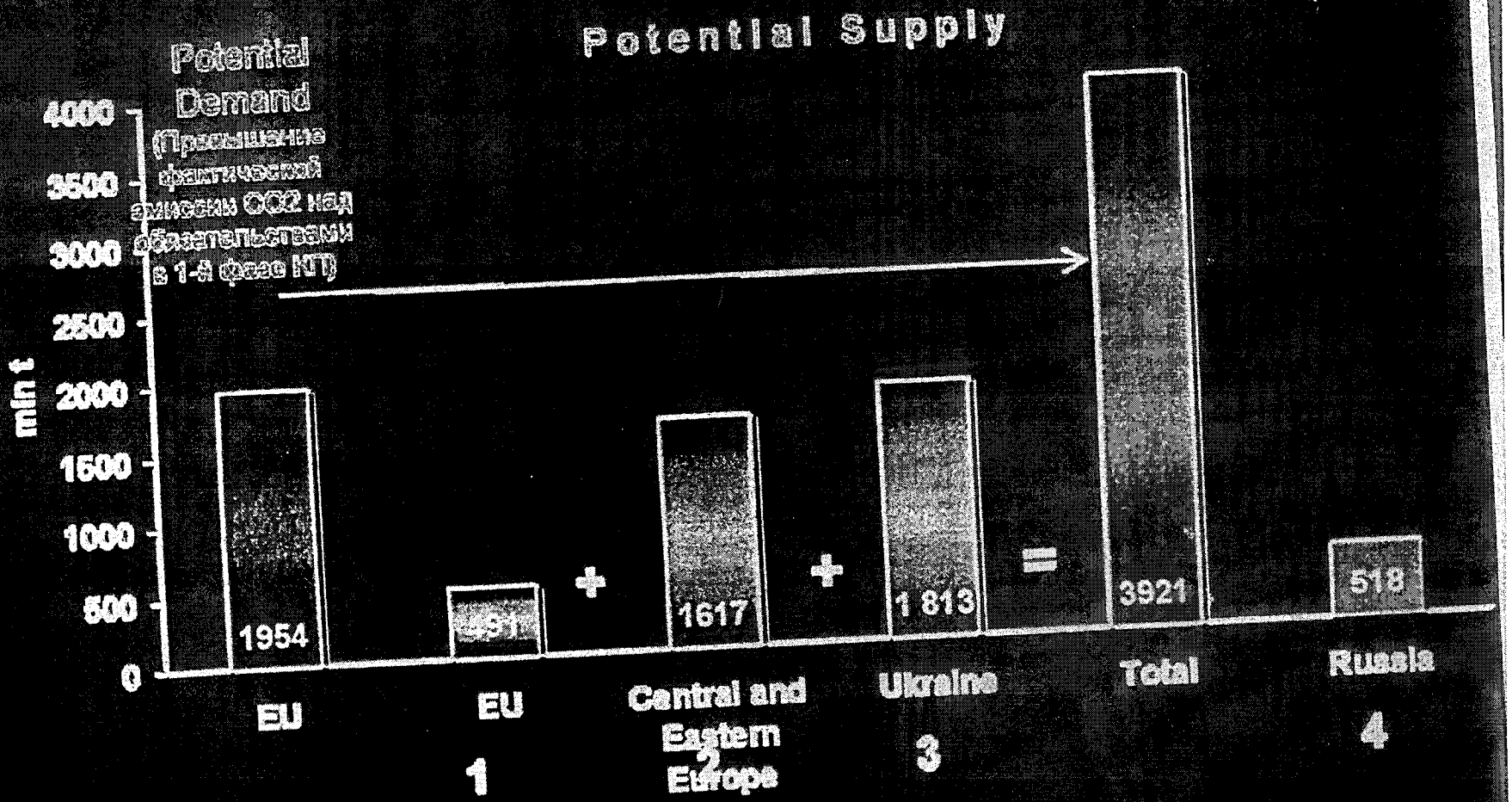
Under the Kyoto Protocol Russia will be a buyer, not a seller of CO_2 quotas.

(Actual Russia's CO_2 emissions, conservative forecast and its Kyoto Protocol limits)



The Russia's Kyoto Trap.

Under the Kyoto Protocol Russia won't be able to sell its CO_2 quotas.
(Forecast of CO_2 quotas market in the EU in 2008-2012)

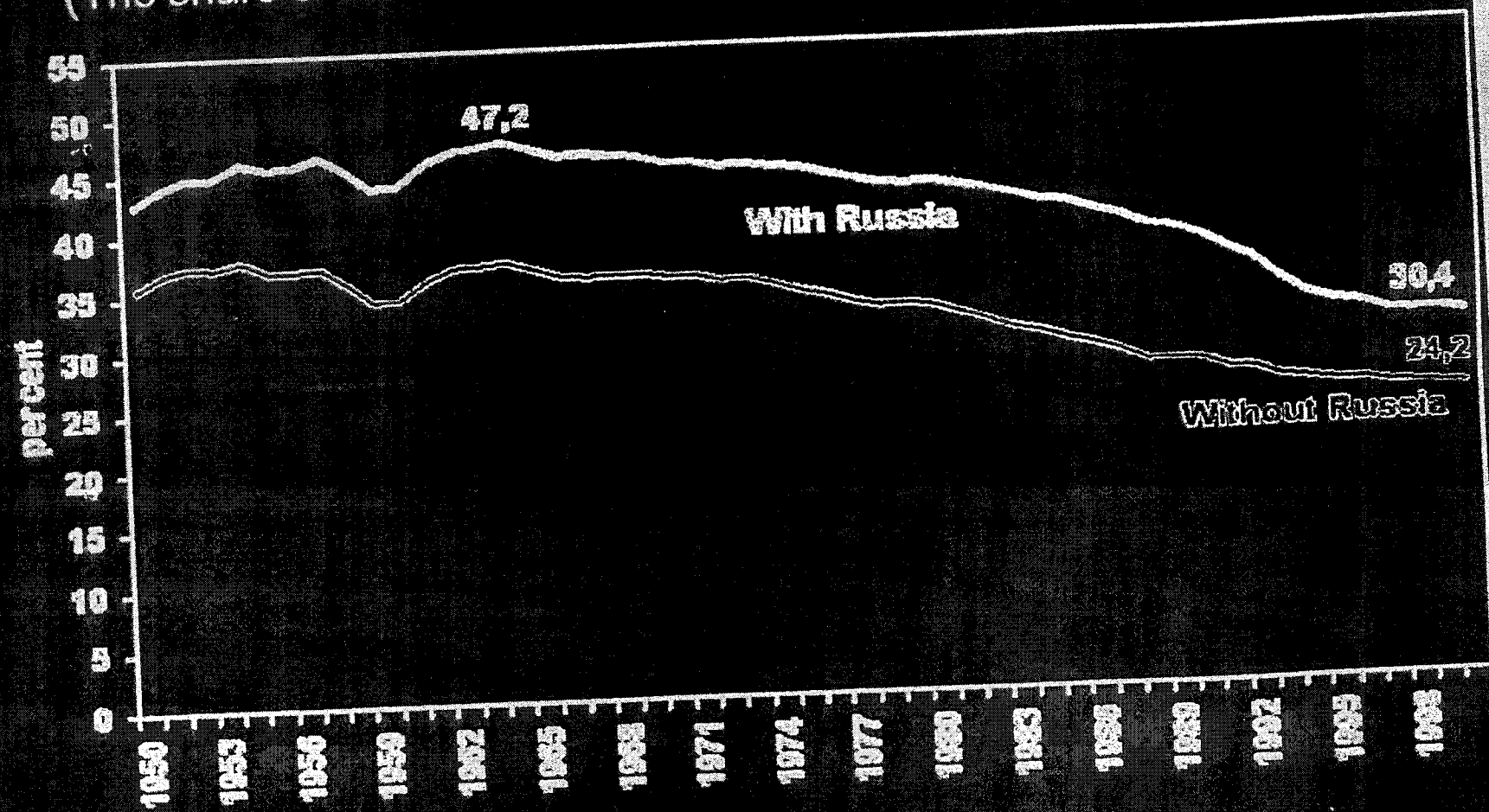


Sequence of purchases according to the EU Directive adopted by the EU Parliament 02.07.03 and accepted by the EU Council 22.07.03

The Kyoto protocol's inefficiency

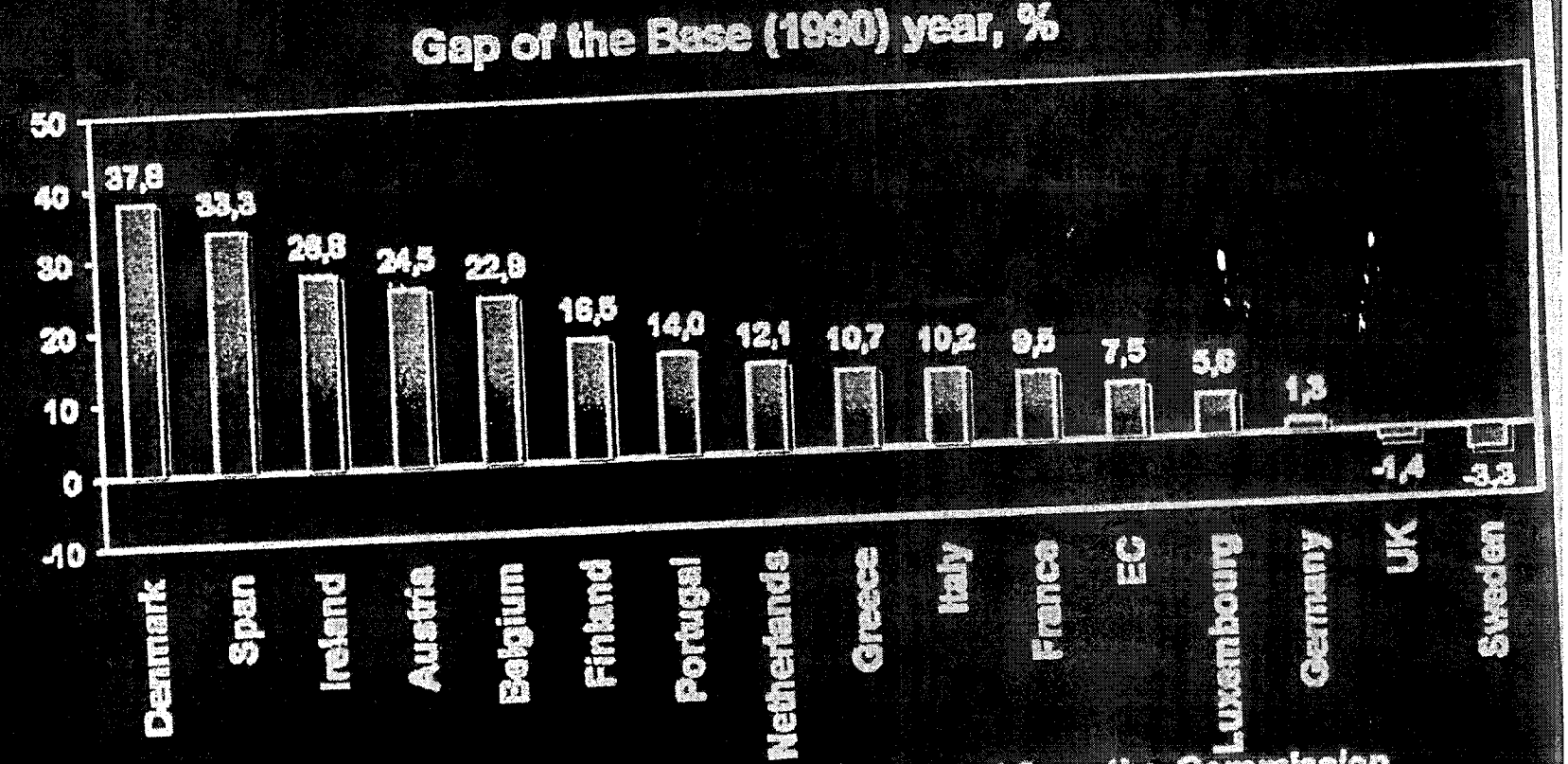
The Kyoto Protocol is unable to achieve its proclaimed goals.

(The share of the KP Annex B countries in the World's CO_2 emissions)



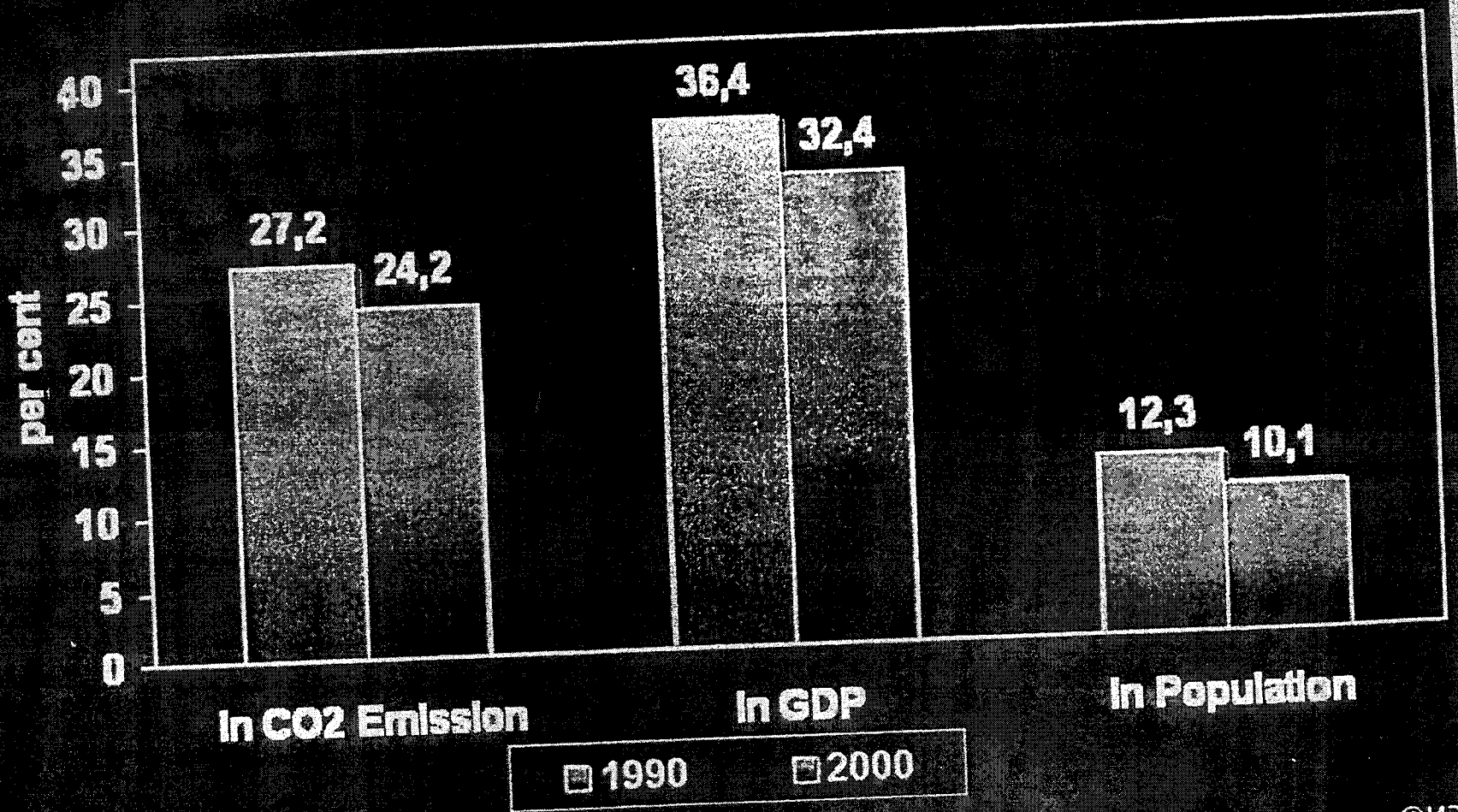
The Kyoto Protocol targets can hardly be achieved by majority of the EU members.

The Gap by 2010 between the Kyoto commitments of the EU Member States and their total emission projections "with existing policies"

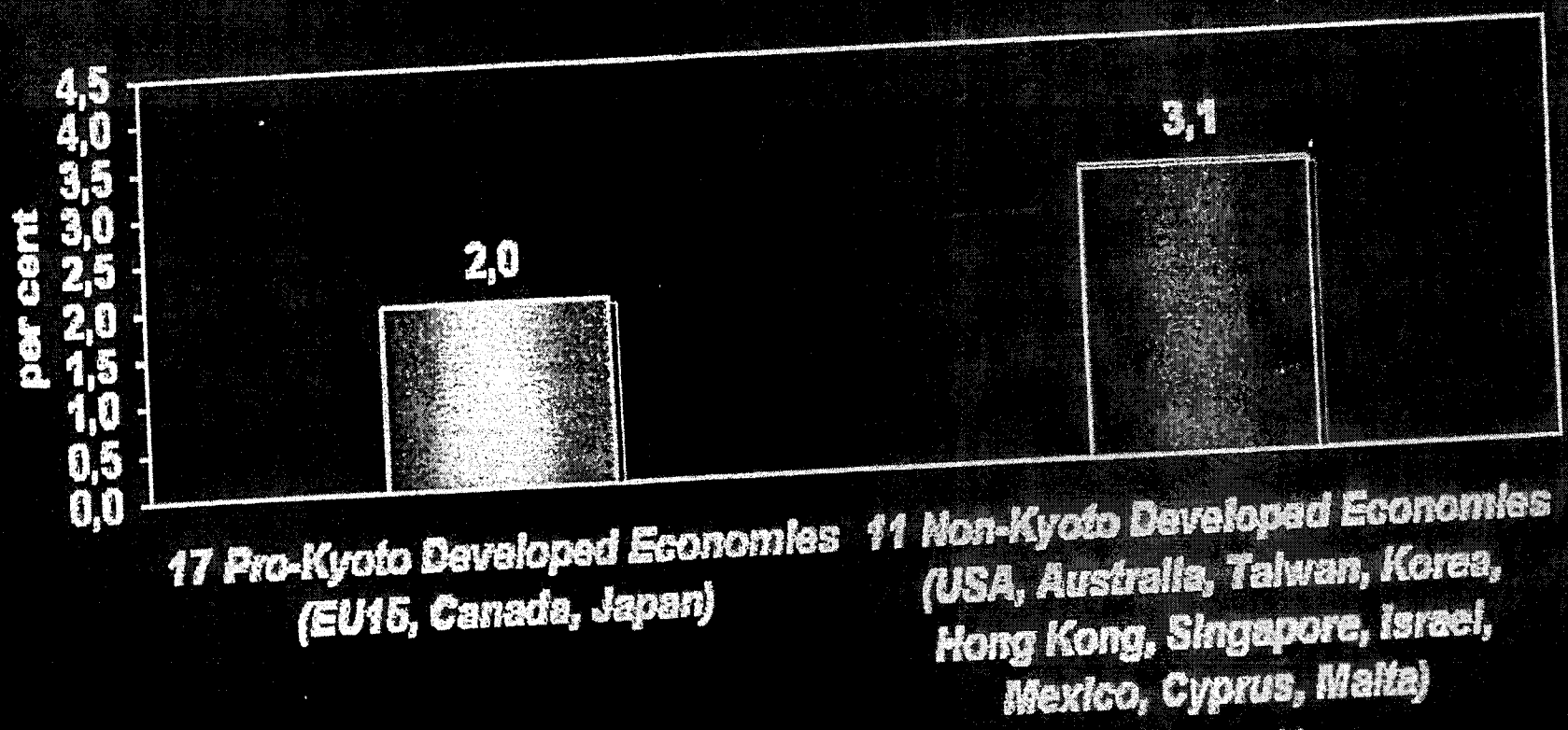


Source: Commission of the European Communities, Report from the Commission under Council Decision 93/389/EEC as amended by Decision 99/296EC for a monitoring mechanism of Community greenhouse gas emissions. COM(2003) 735 final. Brussels, 28.11.2003, p. 12.

The Kyoto Protocol is not universal.
It is backed by the World minority.
The World majority did not adopt the Kyoto Protocol limits.
(The share of the KP Annex B countries in the World aggregates)

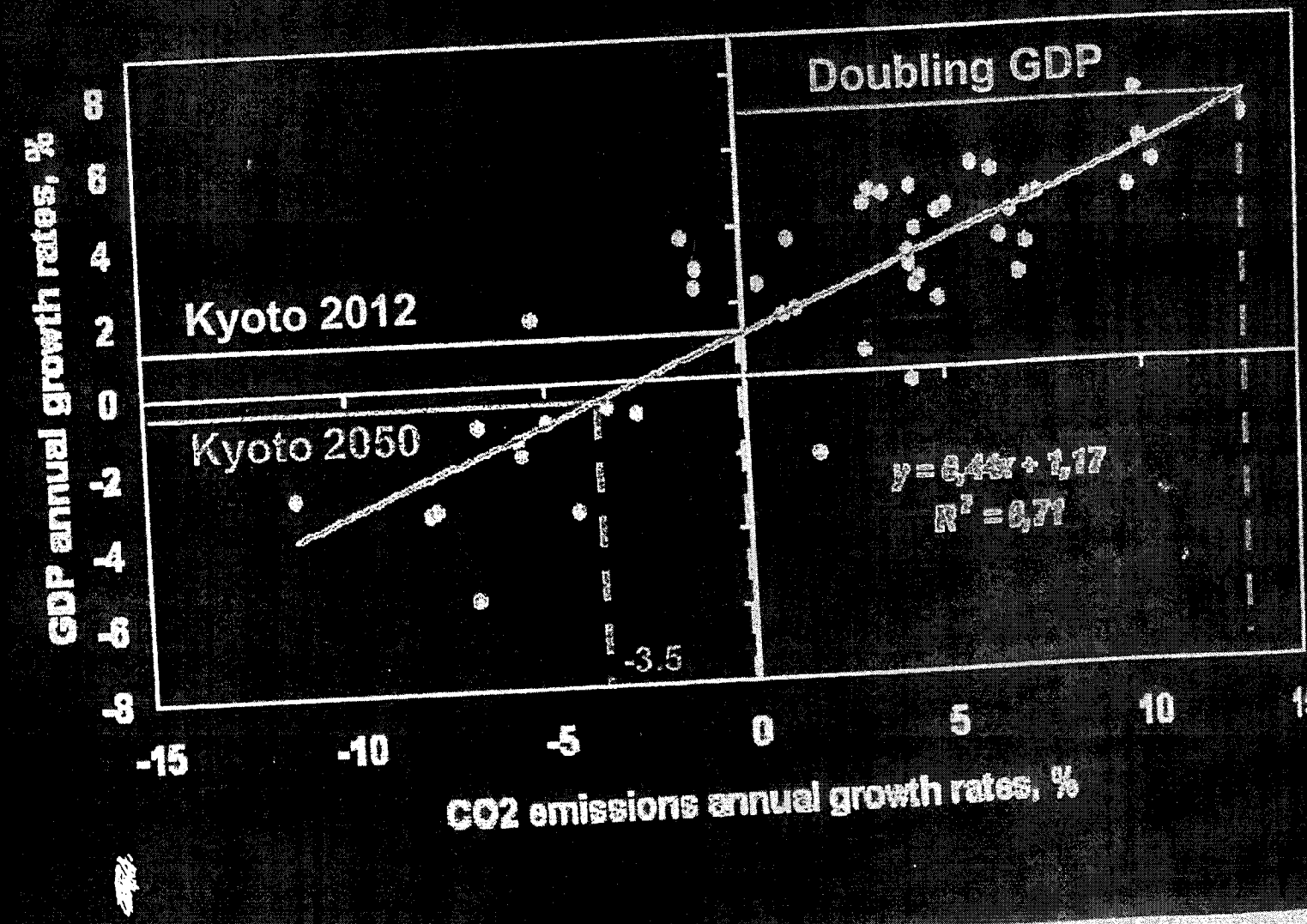


The Kyoto Protocol puts brakes on economic growth



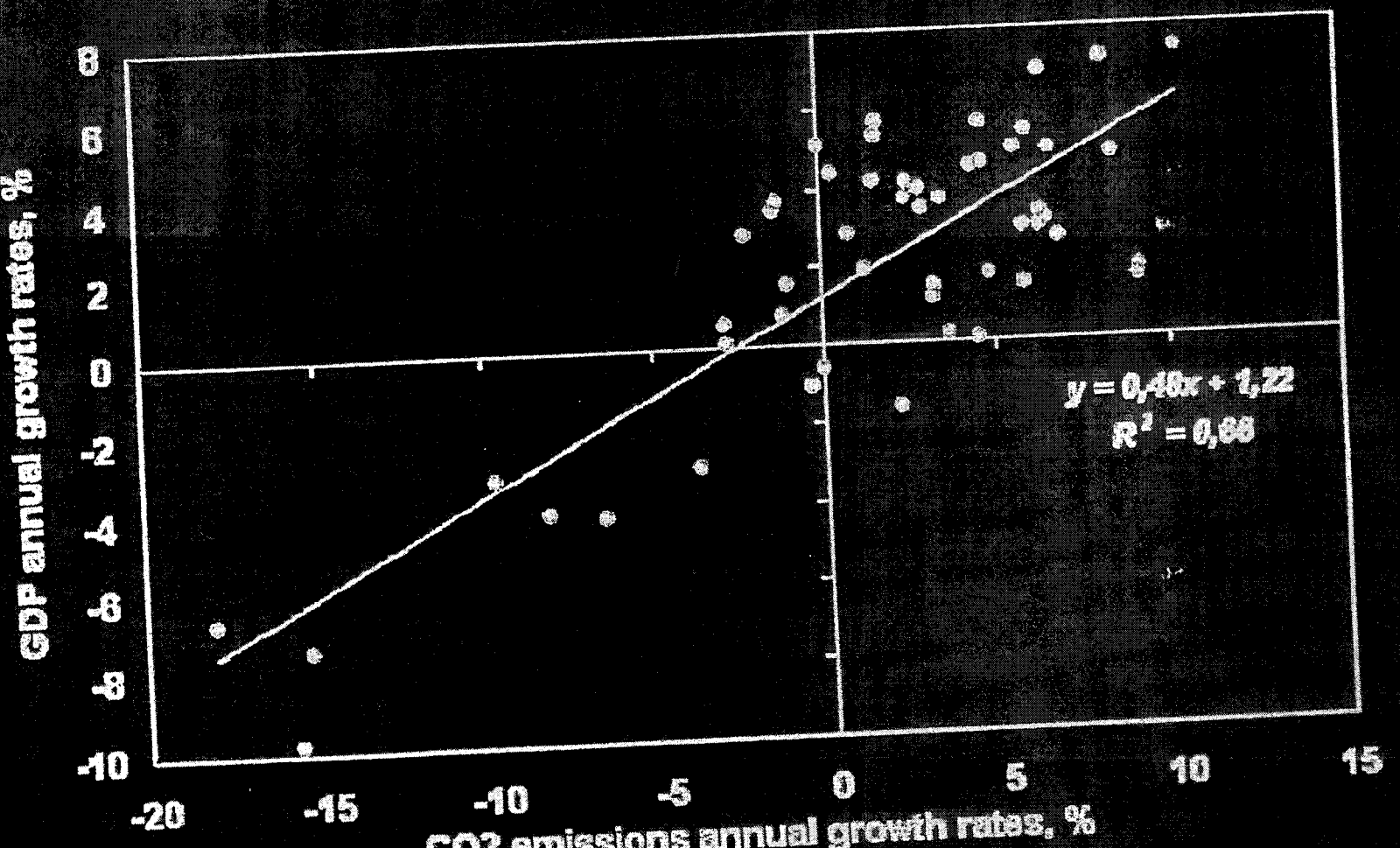
The Kyoto Protocol incompatible with economic growth.

CO_2 emissions are associated with economic growth in the mid-income countries (47 countries), 1960-2000



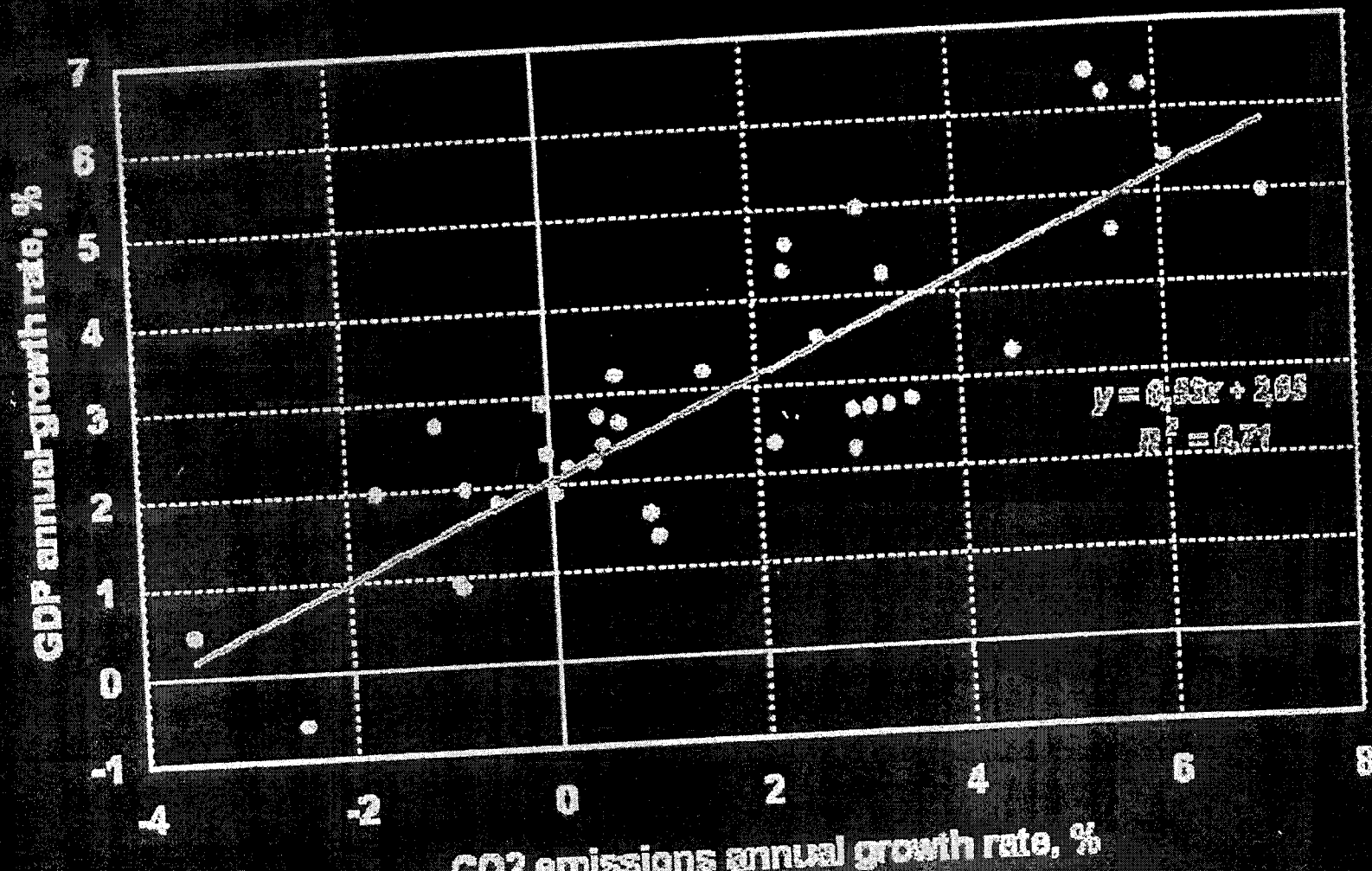
The Kyoto Protocol is incompatible with poverty reduction.

CO_2 emissions are associated with economic growth in the low-income countries (52 countries), 1960-2000



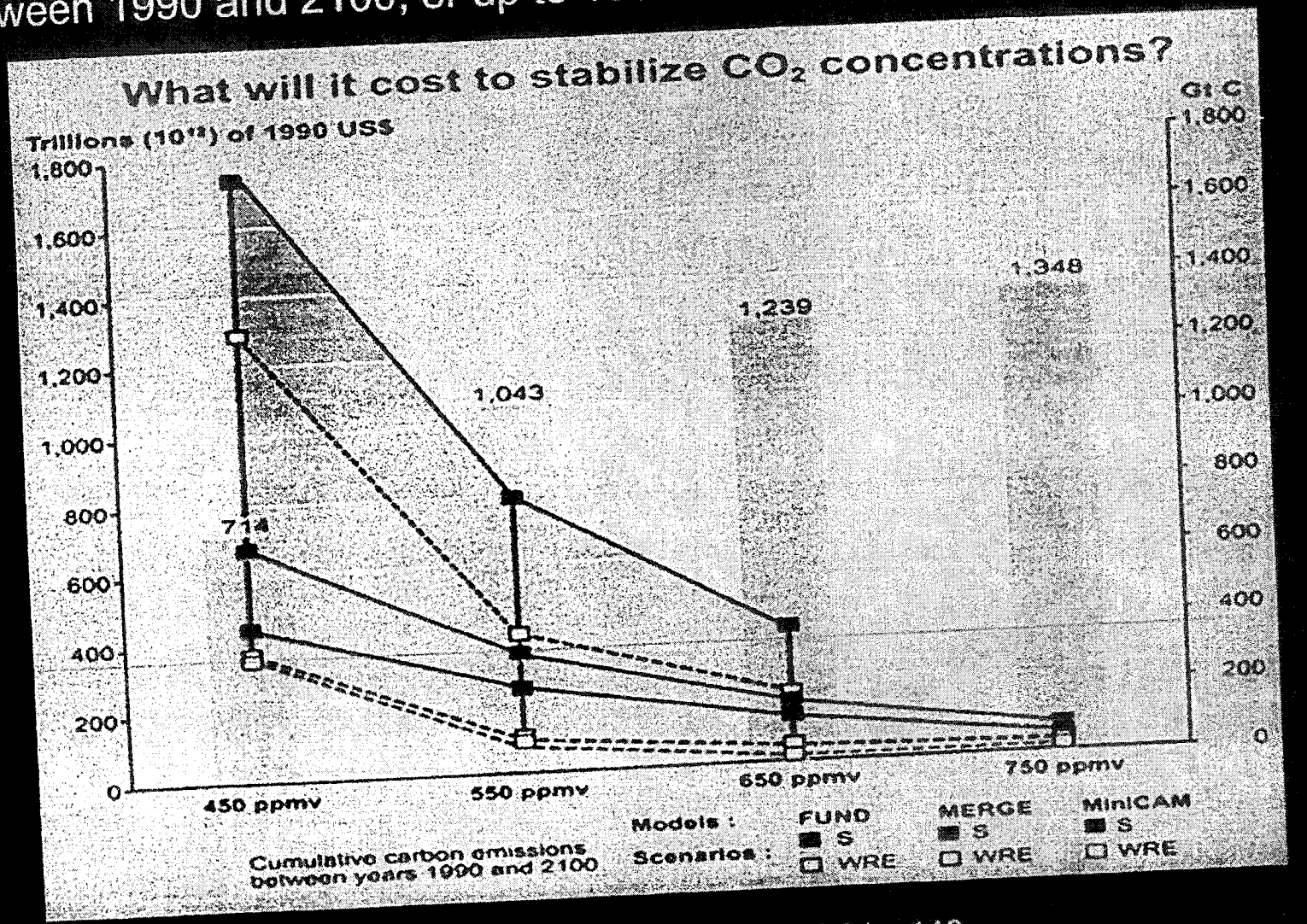
The Kyoto Protocol is incompatible with wealth accumulation.

CO_2 emission are associated with economic growth in developed economies, too (38 countries), 1991-2000



The Kyoto Protocol is unbearably expensive.

The cost of compliance can be as high as 1750 US$ tln between 1990 and 2100, or up to 15% of annual GDP in affected countries

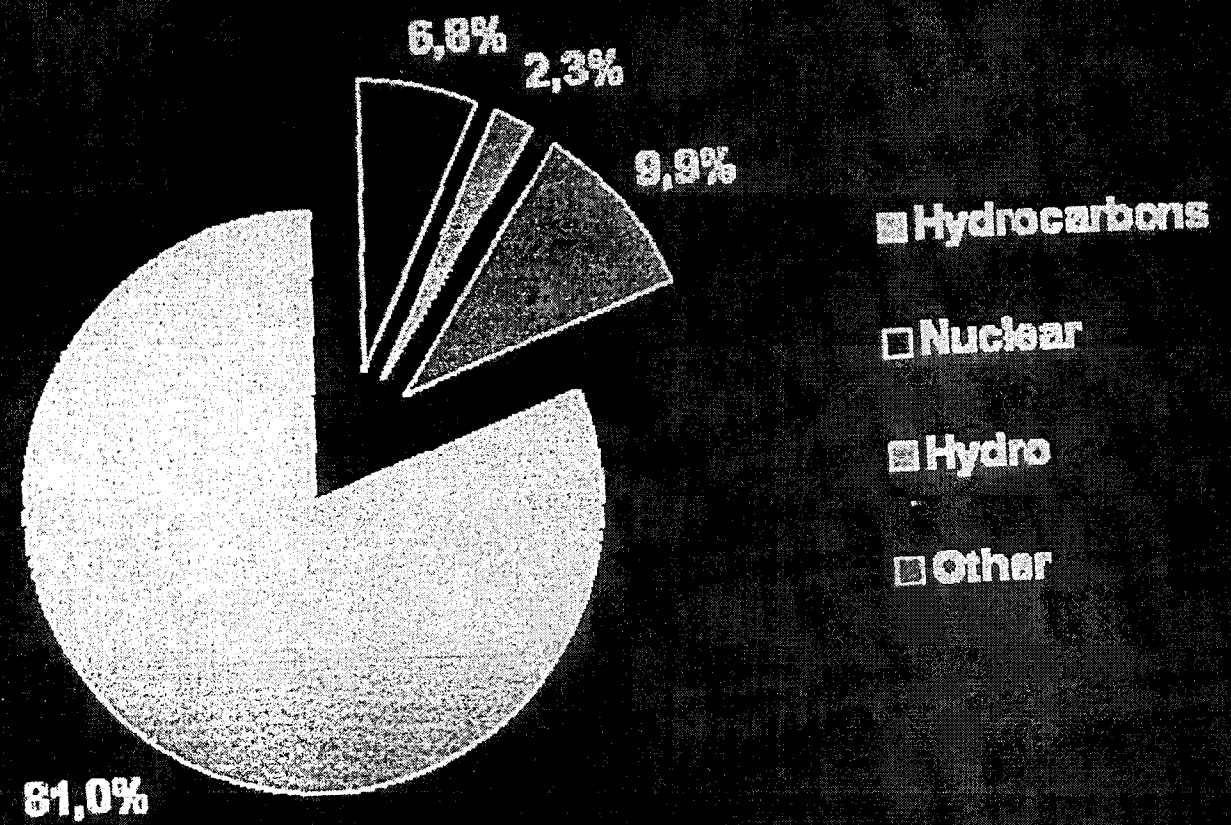


Source: Climate Change 2001 Synthesis Report, IPCC, p.119.

The Kyoto Protocol is oriented on technological illusions.

It's impossible to switch away from hydrocarbons to another energy base in a short period of time

World energy consumption by source of origin



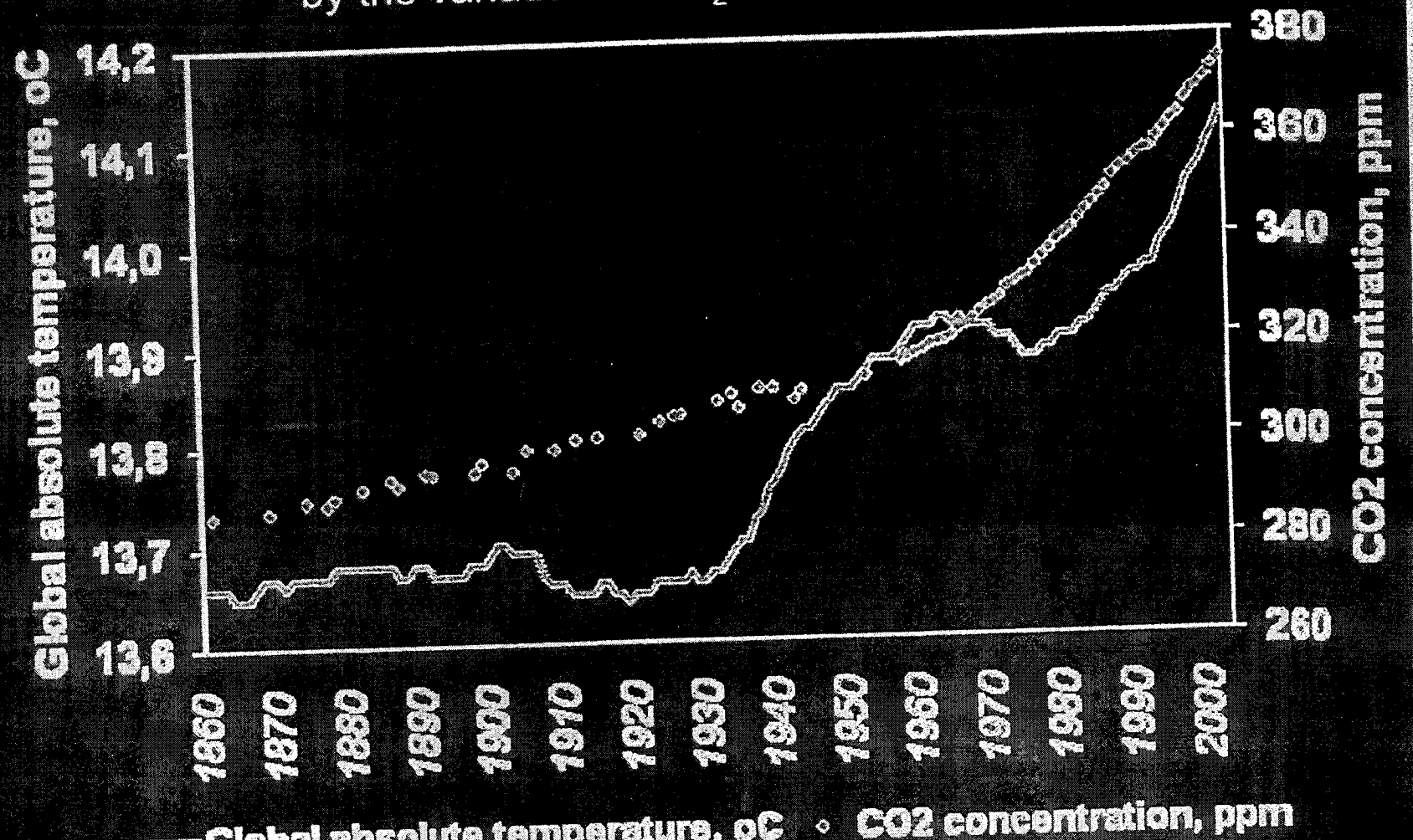
The Kyoto protocol is based on flawed science.

The variation of CO_2 concentration can not be explained by variation in CO_2 emissions of anthropogenic character

Source: *Carbon Dioxide Information Analysis Center, 2003.*

The Kyoto protocol is based on flawed science.

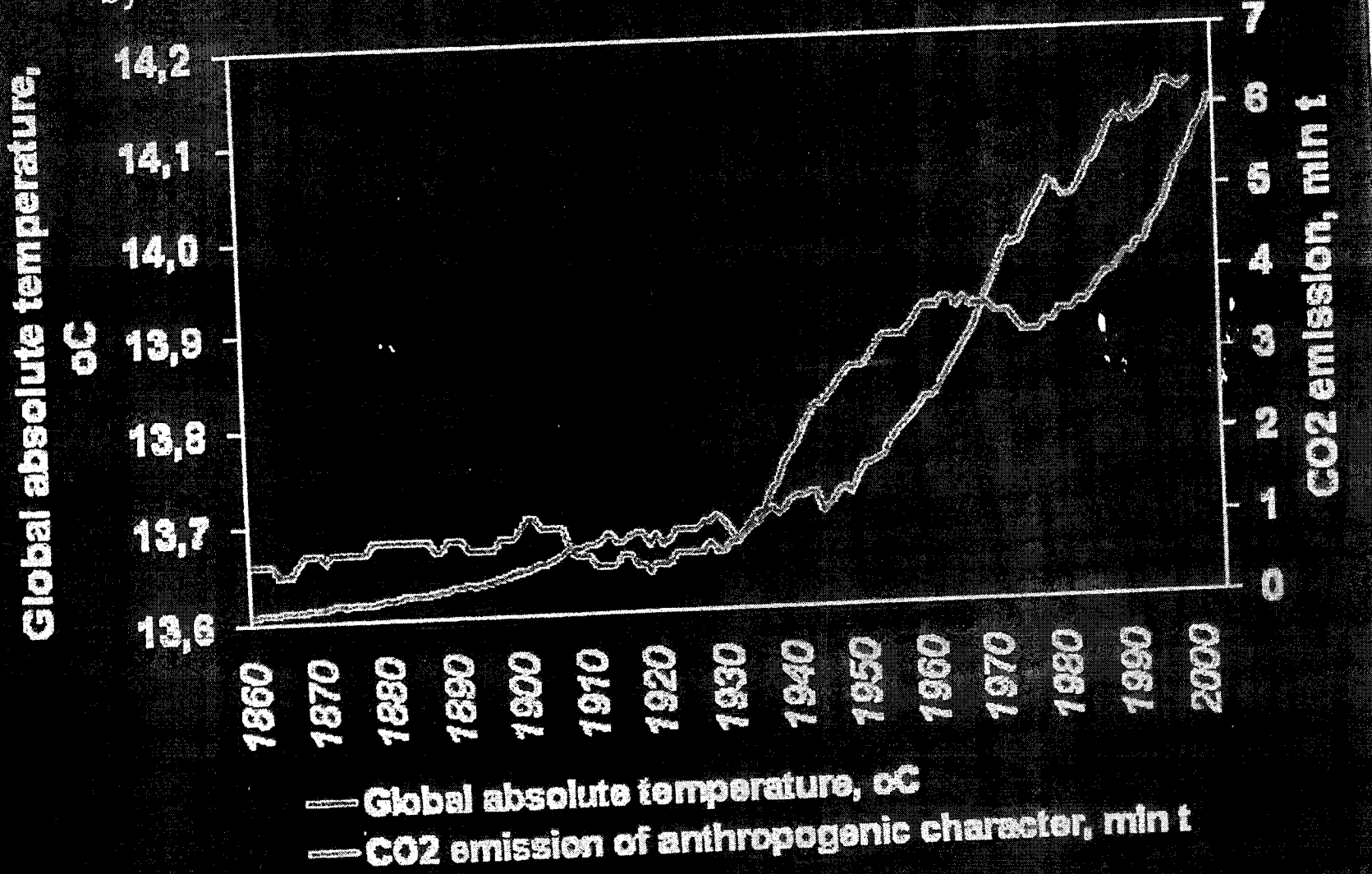
The variation in temperature can not be explained by the variation in CO_2 concentration



Source: Carbon Dioxide Information Analysis Center, 2003.

The Kyoto protocol is based on flawed science.

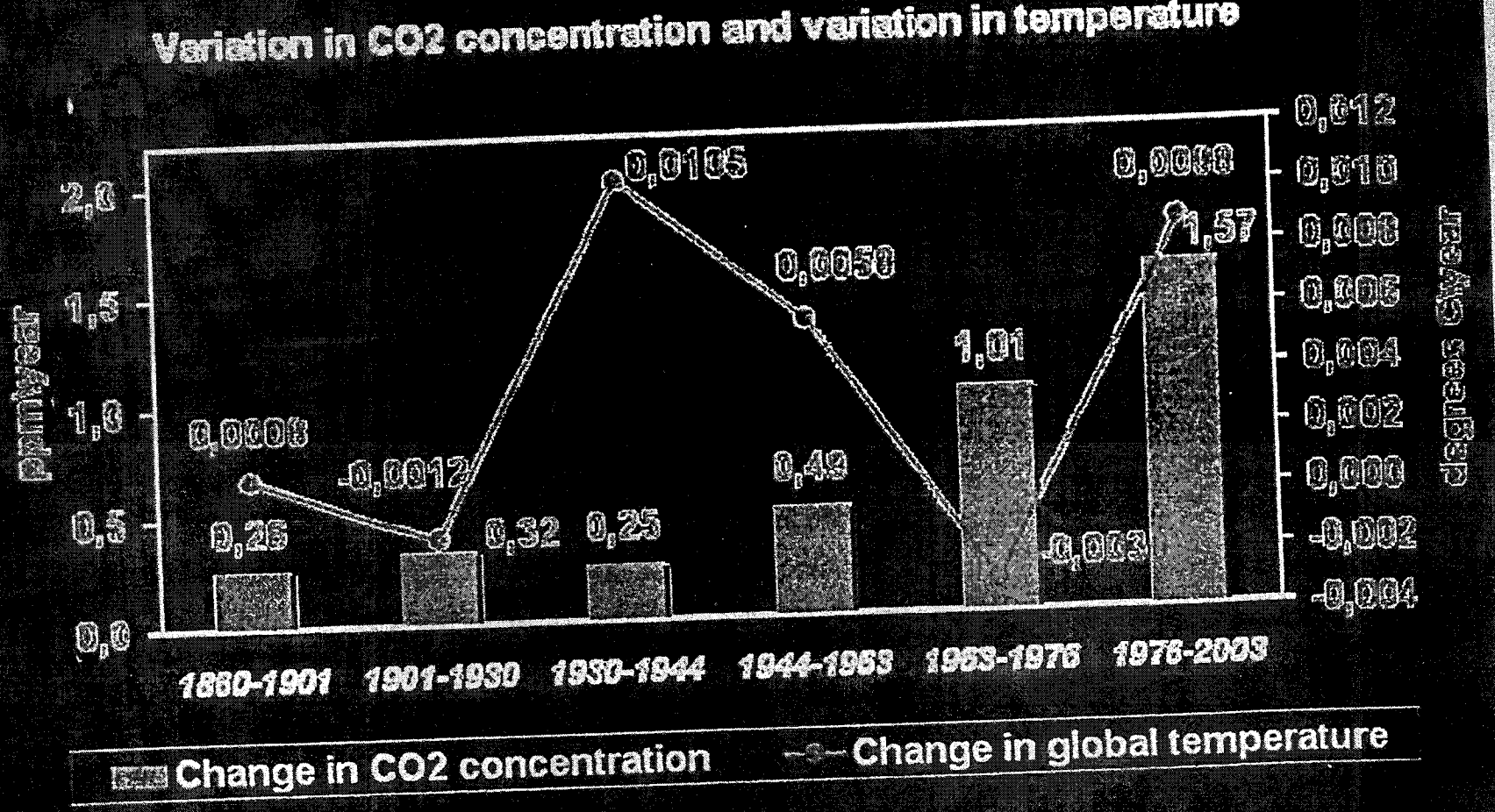
The variation in temperature can not be explained by variation in CO_2 emissions of anthropogenic character



Source: Carbon Dioxide Information Analysis Center, 2003.

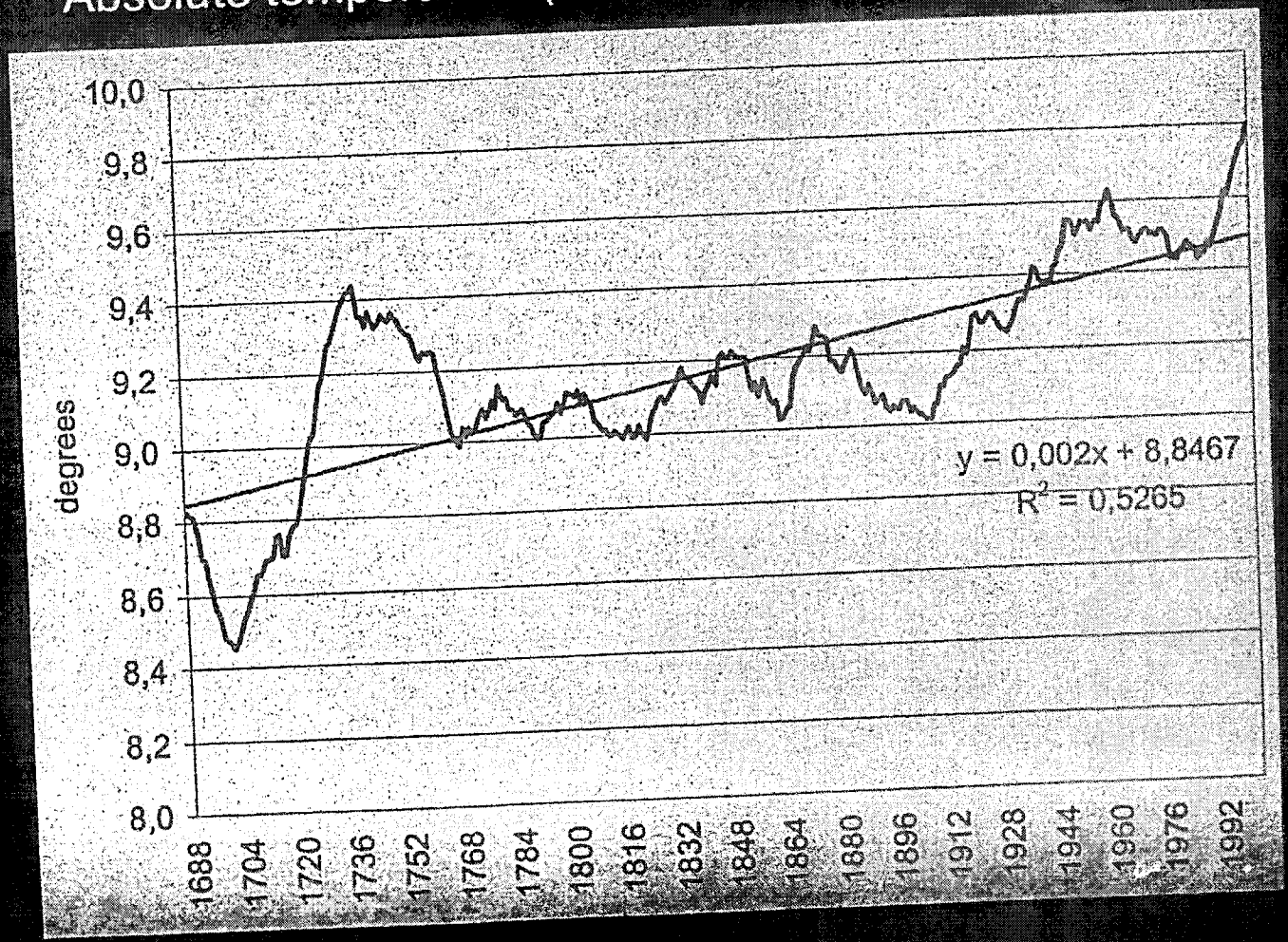
The Kyoto Protocol is based on flawed science.

The variation in temperature is positively correlated with variation in CO_2 concentration only from 1976-2003. This is the ONLY such sub-period out of 6 sub-periods between 1860 and 2003



The very concept of "Global Warming" critically depends on the time horizon chosen. It appears reasonable for short-term periods.

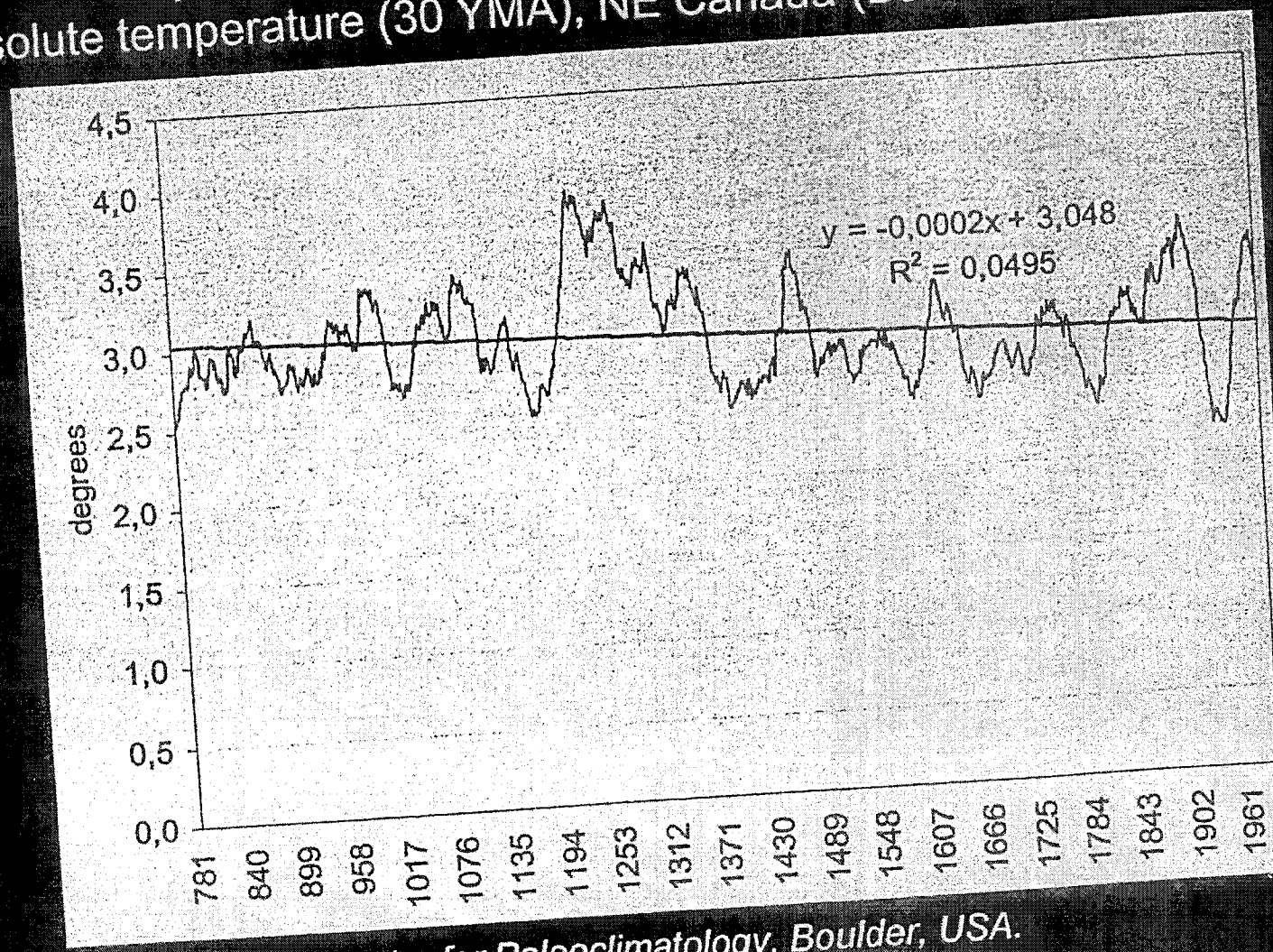
Absolute temperature (30 YMA), England, 1659-2002



Source: www.met-office.gov.uk.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

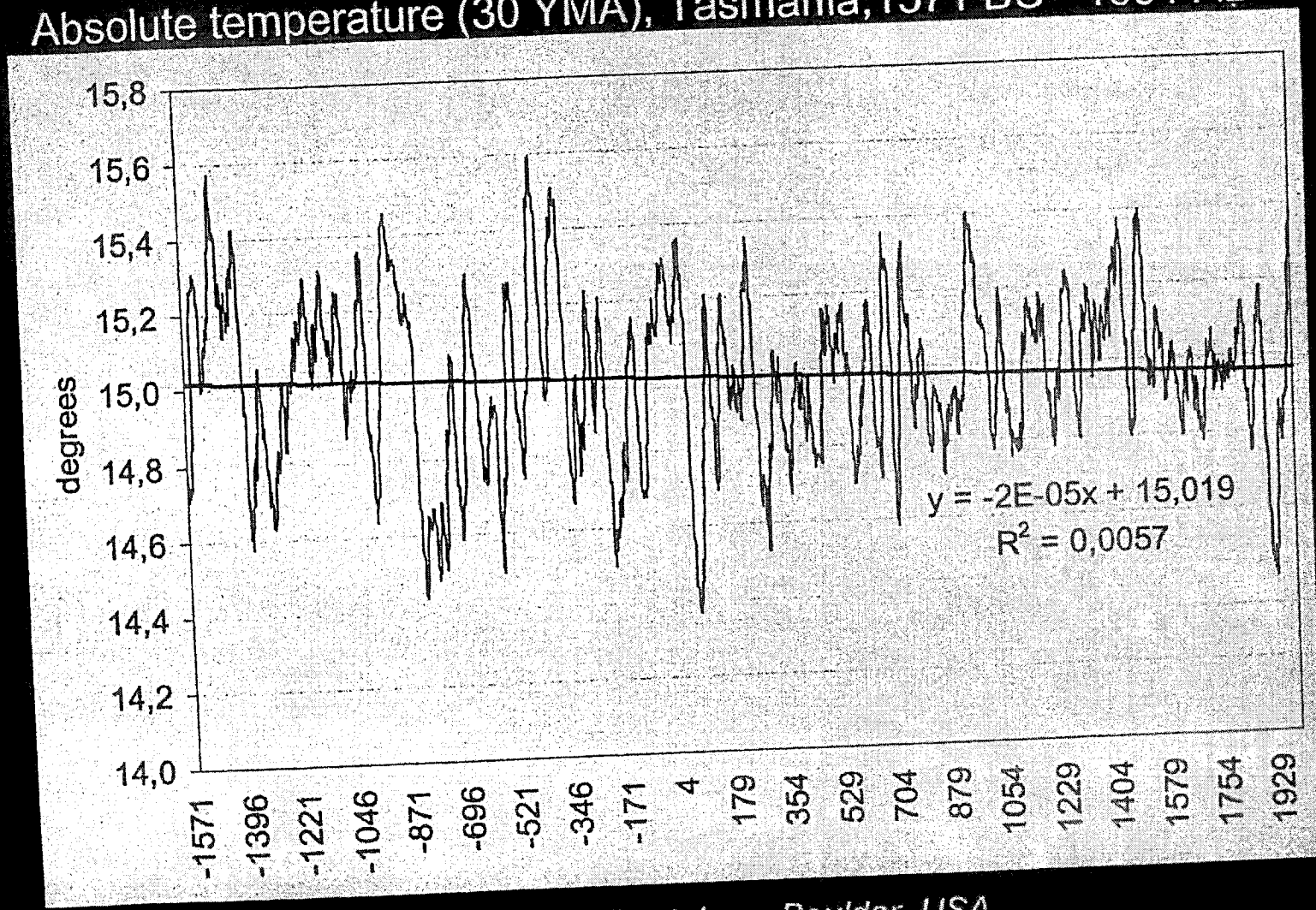
Absolute temperature (30 YMA), NE Canada (Baffin Island), 752-1992



Source: World Data Center for Paleoclimatology, Boulder, USA.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

Absolute temperature (30 YMA), Tasmania, 1571 BC - 1991 AD

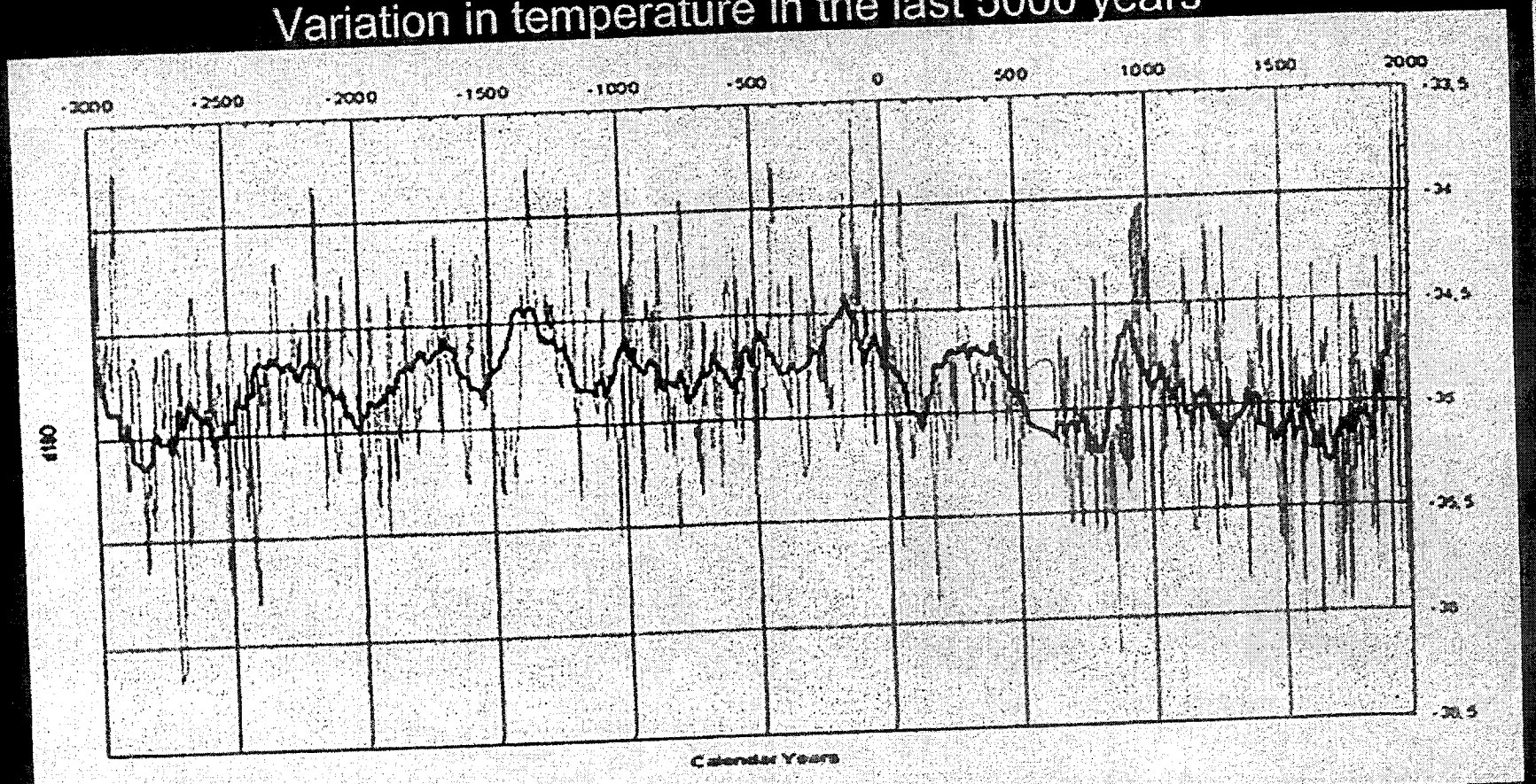


Source: World Data Center for Paleoclimatology, Boulder, USA.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

The current "Global Warming" is not unique and is not strongest in the history of civilization.

Variation in temperature in the last 5000 years

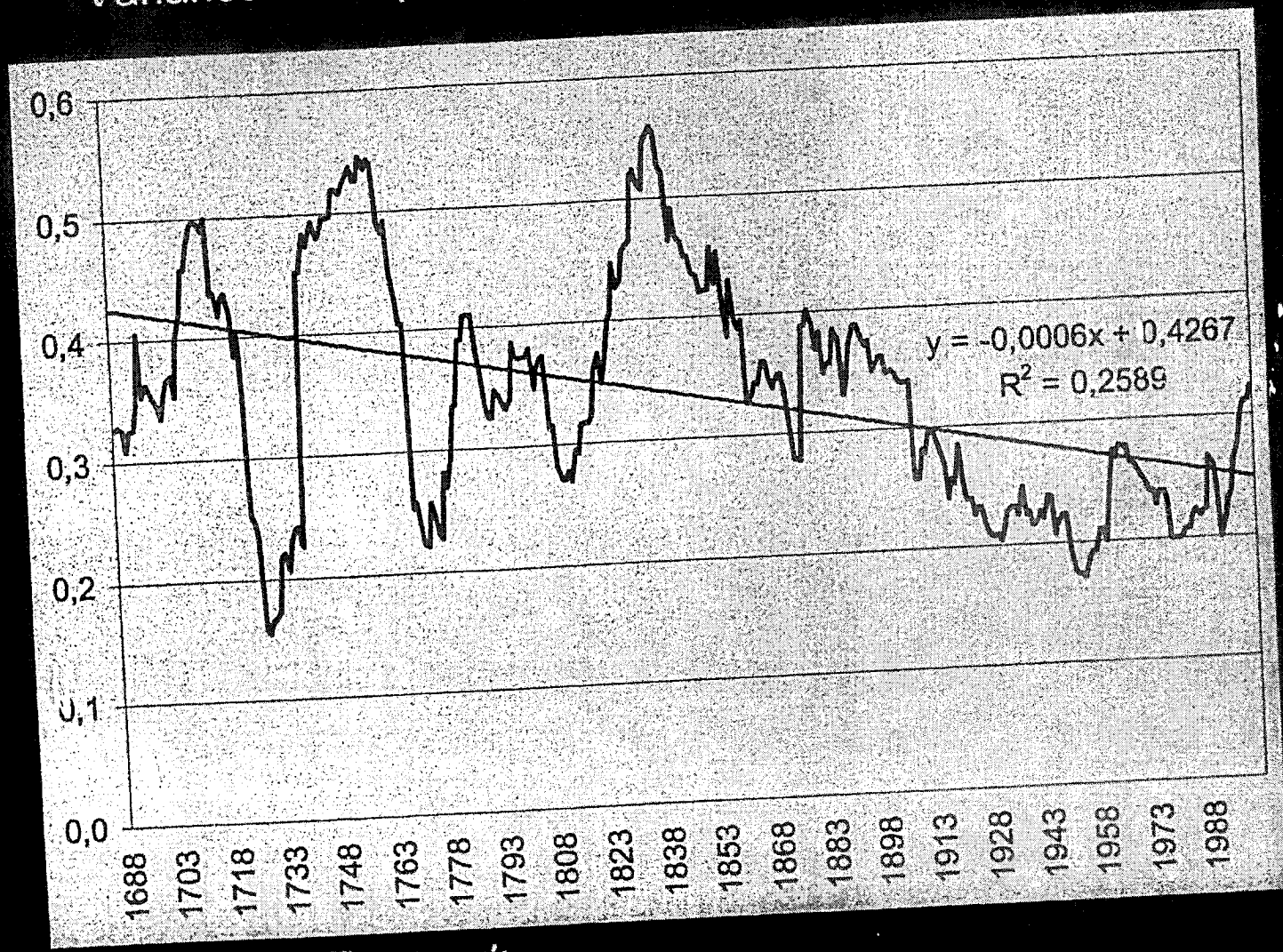


Distribution of Oxygen $\delta^{18}O$ in the upper part of the kern from drill GISP2 (last 5000 years)

Source: Grootes, P.M., Stuiver, M., White, J.W.C., Johnsen, S.J., Jouzel J., Comparison of oxygen isotope records from the GISP and GRIP Greenland ice cores. Nature 366, 1993, pp.552-554.

The asserted increase in the frequency of extraordinary climatic events appears unproven.

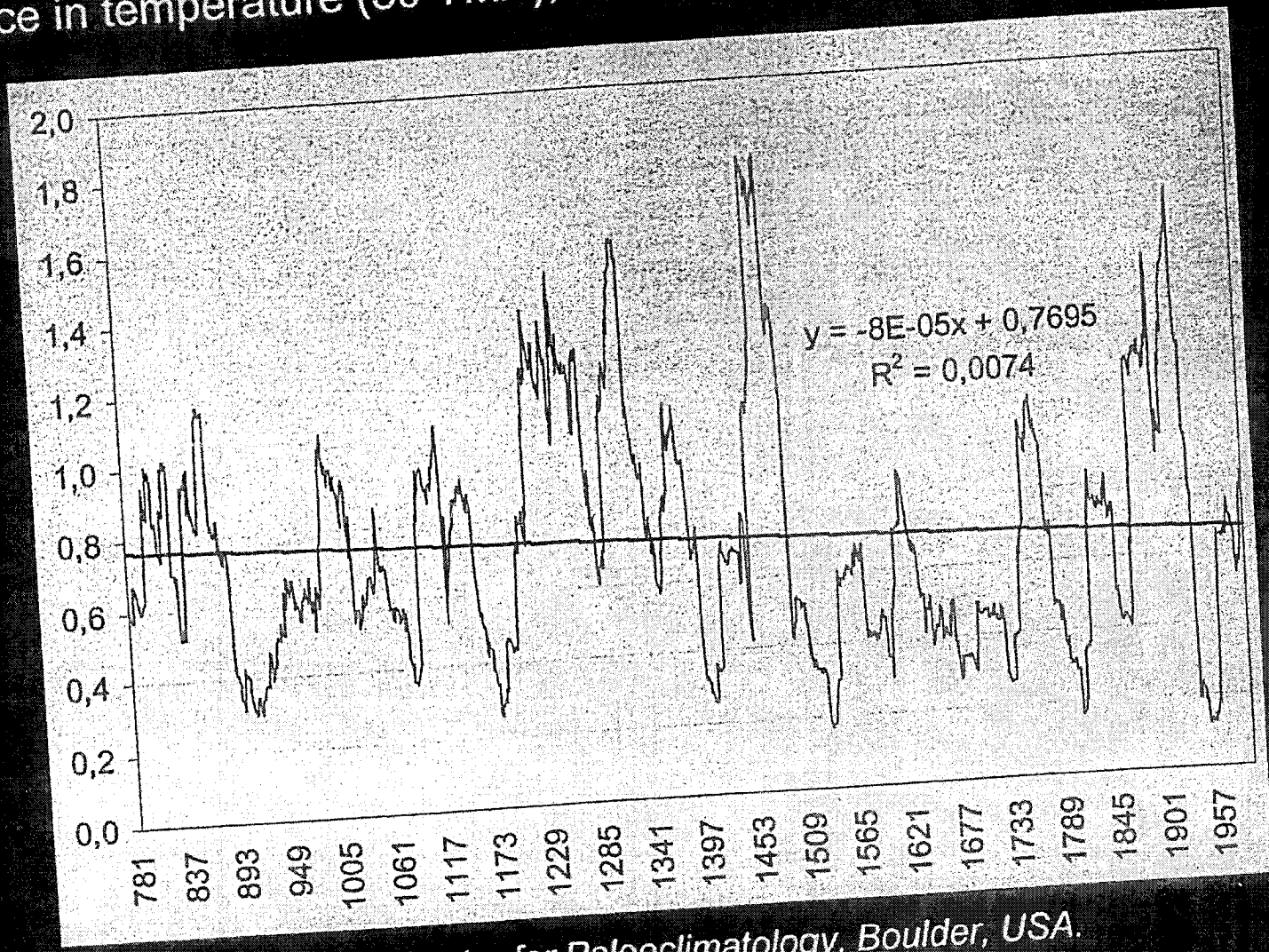
Variance in temperature (30 YMA), England, 1659-2002



Source: www.met-office.gov.uk.

The asserted increase in the frequency of extraordinary climatic events appears unproven.

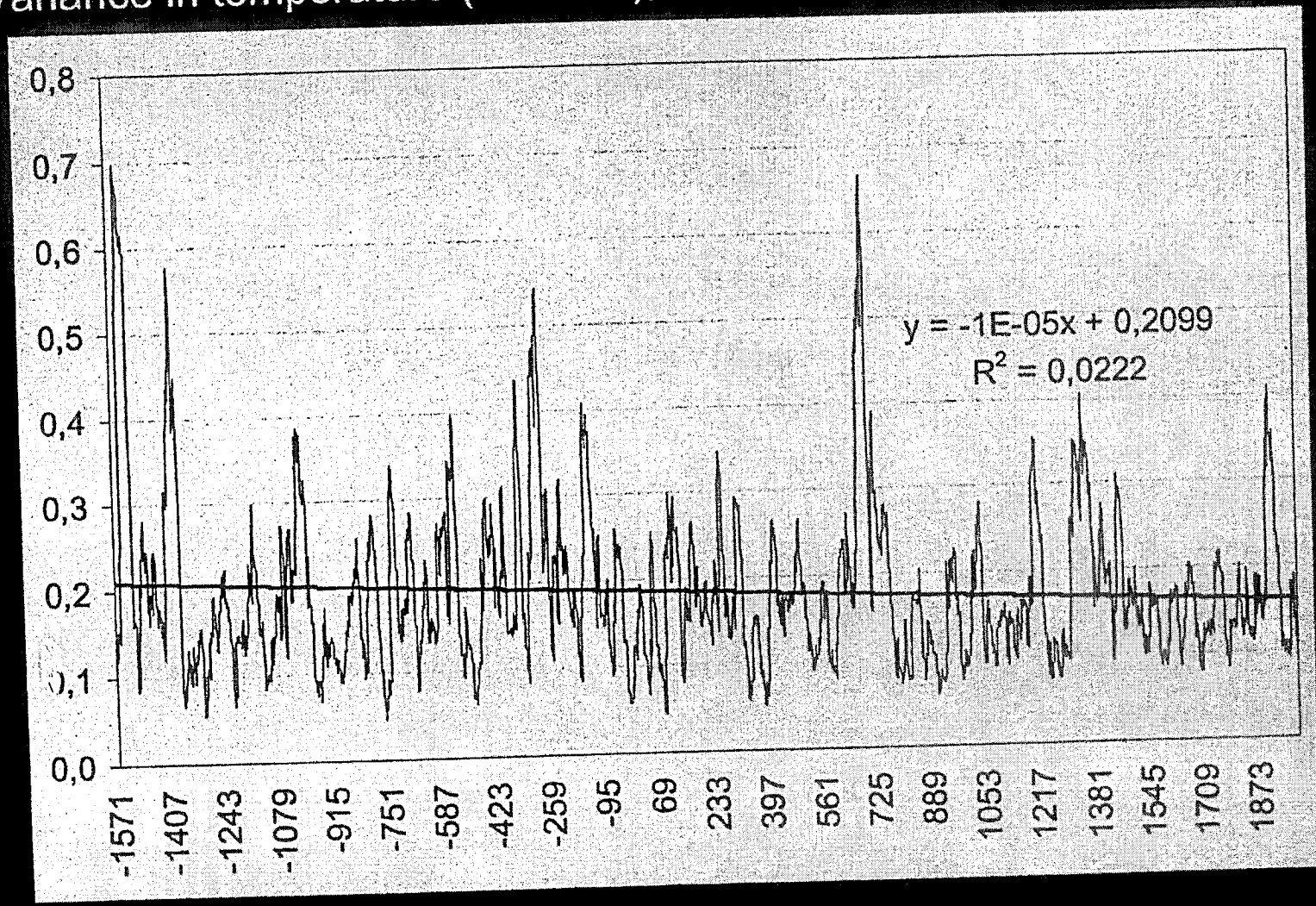
Variance in temperature (30 YMA), NE Canada (Baffin Island), 752-1992



Source: World Data Center for Paleoclimatology, Boulder, USA.

The asserted increase in the frequency of extraordinary climatic events appears unproven.

Variance in temperature (30 YMA), Tasmania, 1751 BC – 1991 AD



Source: World Data Center for Paleoclimatology, Boulder, USA.

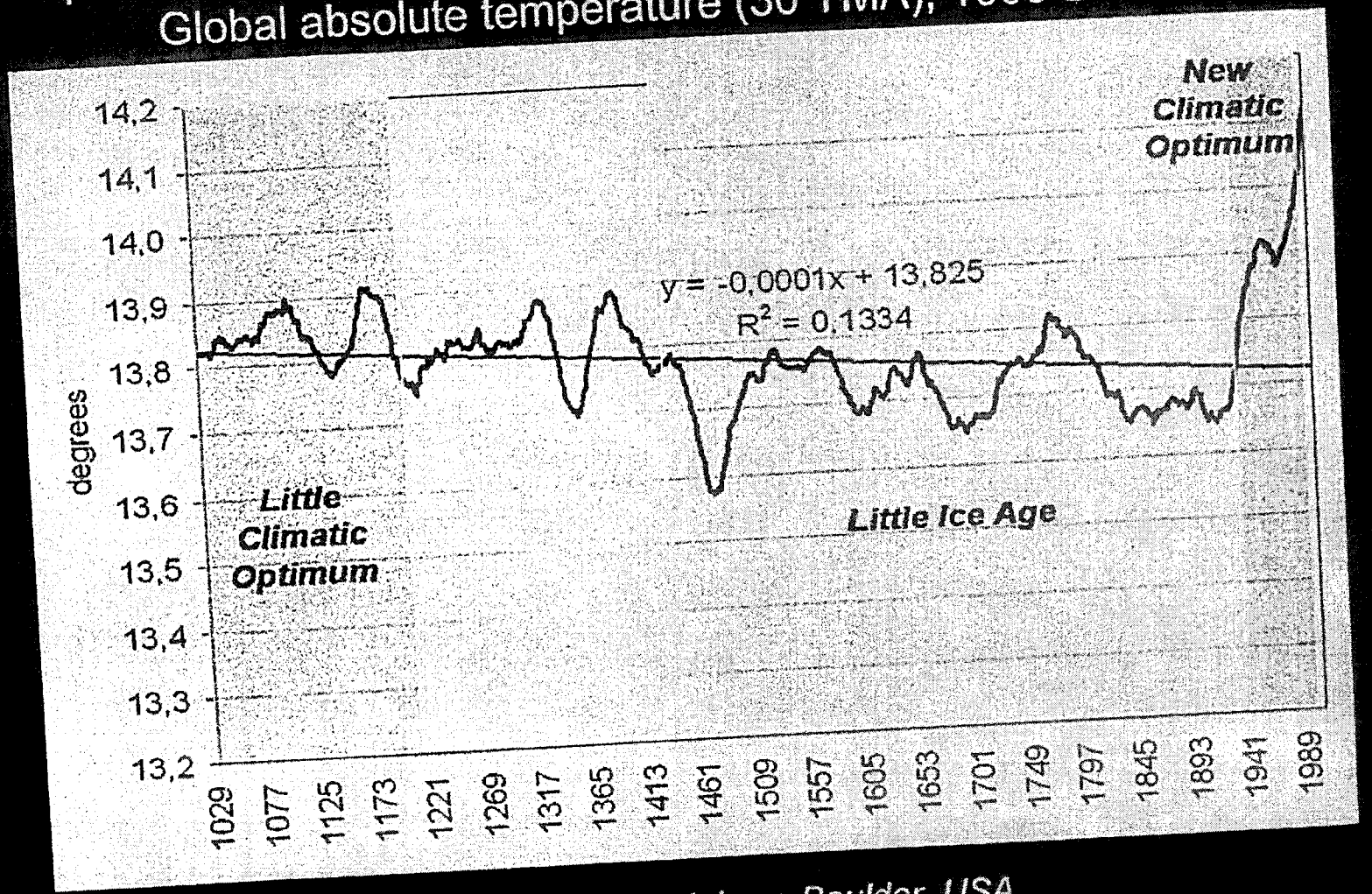
Asserted increase in the speed
of the current temperature change appears unproven.
It is not unique and is not strongest in the last 1000 years.

Change in the global temperature over 30 preceding years

Mother Nature's Weapon of Mass Destruction is actually Global Cooling, not Global Warming.

In the history of civilization climatic optimums are associated more with prosperity and progress, ice ages – with hardships and catastrophes.

Global absolute temperature (30 YMA), 1000-2003



Source: World Data Center for Paleoclimatology, Boulder, USA.

U.S. Department of Energy's 1605(b) Draft General Guidelines

Update

February 2004

President's February 14th, 2002 Directive

1. Established U.S Goal to reduce GHG intensity by 18% by 2012.
2. Directed Improvements to DOE's GHG Voluntary Emissions Registry.
   - The Registry was established Section 1605(b) of the Energy Policy Act of 1992 and currently about 220 reporters provide data on emissions and emissions reductions.
3. Sought recommendations on protecting real reductions against future climate policy and on giving transferable credits.
4. Challenged businesses to take action (Climate VISION, Climate Leaders).

Actions to Date

- Issued a public Notice of Inquiry, May 2002.
- Led extensive interagency staff level and policy level consultations to draft General Guidelines, which were published November 26, 2003.
- Established website to distribute information and receive comments.
- Held **seven** public workshops (DOE hosted 5, USDA hosted 2).
- Interagency groups developing Technical Guidelines for reductions and inventories.
- EIA developing reporting forms and instructions.
- Met and continue to meet with numerous stakeholder groups.

Timeline

- General Guidelines in public review until February 17, 2004.
- Review comments, revise General Guidelines - with Deputy level input – February to March, 2004.
- Draft Technical Guidelines (3 parts: Core Reporting Requirements; Calculating GHG Reductions;GHG Inventories) – January to April, 2004.
- Issue revised General Guidelines and Technical Guidelines for combined review in late Spring/early Summer, 2004.
- EIA initiates OMB process and public comment period for revised forms and instructions, Summer – Fall, 2004.
- Initiate revised program in early 2005.

Key Features of Proposed Revisions

1. **Create a more credible registry.** DOE is creating an improved registry for emissions and reductions that can support trading and future policy.

2. **Emphasize entity-wide inventories and reductions.** Entities may *register* reductions if they provide entity-wide emissions data and can demonstrate they achieved entity-wide emission reductions after 2002.

3. **Encourage small entity participation.** Those without significant emissions may register reductions without filing full entity-wide reports, under special circumstances.

4. **Encourage reporting even if not *registering* reductions.** Entities may elect to report emissions and reductions without having to provide an entity-wide inventory and account for entity-wide emissions.

5. **Enhance corporate responsibility GHG report.** Companies are encouraged to report at the highest level but may report at a subsidiary or affiliate level. High-level official should certify reports. Independent verification is encouraged, but not required.

January 2004 Workshop

- January 12, 2004, Washington, D.C.
- 180 attendees representing wide range of stakeholder groups, include power generation, manufacturers, renewables, waste management, forestry, environmental groups,.
- DOE, USDA, EPA, CEQ participated: EIA, State attended.
- Reviewed entity definition, program structure, inventories, reductions, and certification issues.
- Overall response was quite positive in terms of breath and depth of issues covered.

January 2004 Workshop: Stakeholder Issues

1. **Entity Boundaries.** Many want more restrictive definition of "entity" to avoid sub-entity reporting. Others want DOE to maintain or enhance flexibility in the definition of entities.

2. **International Emissions and Reductions.** Many want to report and register international emissions and reductions. For some, this means emissions and reductions from all non U.S. operations; for others it mean registering overseas "projects" as offsets to U.S. emissions

3. **Reductions Prior to 2002.** Many support registering reductions achieved prior to 2002 as long as they meet the revised criteria. For many, the proviso is that revised criteria must be more project-friendly.

4. **Treatment of Projects.** Many want to register reductions generated by "projects" in lieu of corporate reductions (and/or corporate inventories). Project reductions raise threshold and calculation issues.

5. **"Credits".** Several participants objected to the lack of any reference to transferable credits; some want "registered reductions" to be directly linked to "transferable credits"; others support lack of reference to transferable credits. Most wanted decision to be explicitly stated and explained.

Objectives for Revising 1605(b)

- Strive for accuracy, transparency, consistency, completeness,
- Balance rigor with practicality; stringency with flexibility.
- Recognize entities that contribute to the President's goal of reducing the emissions intensity of the U.S. economy;
- Encourage reporters – particularly those with large emissions – to provide a more accurate, consistent, and complete record of emissions and emission reductions.
- Create a central program for recording achievements associated with voluntary emission reduction programs, such as Climate Leaders and Climate VISION.

From: Parrish, Jobi A.
Sent: Thursday, February 12, 2004 9:23 AM
To: Cooney, Phil; Rothenberg, Jason; Hannegan, Bryan J.; Perino, Dana M.
Cc: Conde, Roberta L.
Subject: 1:15 Today Debrief on NRC CCSP report--follow up to vm I left earlier
1:15 today

Dr. Kathie Olsen will debrief from her meeting on the NRC CCSP report

Office of Science and Technology Policy
1801 Pennsylvania Avenue NW
Sixth Floor
Front Conference Room

Thanks,
Jobi

Jobi Parrish
Office of Science & Technology Policy
202-456-6063
FAX 202-456-6021
jparrish@ostp.eop.gov

003341

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IMPLEMENTING CLIMATE AND GLOBAL CHANGE RESEARCH

A REVIEW OF THE FINAL U.S. CLIMATE CHANGE SCIENCE PROGRAM STRATEGIC PLAN

ADVANCE COPY
NOT FOR PUBLIC RELEASE BEFORE

Wednesday, February 18, 2004
11:00 a.m. EST

PLEASE CITE AS A REPORT OF THE
NATIONAL RESEARCH COUNCIL

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

IMPLEMENTING CLIMATE AND GLOBAL CHANGE RESEARCH

A REVIEW OF THE FINAL U.S. CLIMATE CHANGE SCIENCE PROGRAM STRATEGIC PLAN

Committee to Review the U.S. Climate Change Science Program Strategic Plan
Division on Earth and Life Studies
Division of Behavioral and Social Sciences and Education
Division on Engineering and Physical Sciences

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

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NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This study was supported by Contract No. NASW-01008 between the National Academy of Sciences and NASA/USGCRP. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the organizations or agencies that provided support for the project.

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Advisers to the Nation on Science, Engineering, and Medicine

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COMMITTEE TO REVIEW THE U.S. CLIMATE CHANGE SCIENCE PROGRAM STRATEGIC PLAN

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LINDA A. CAPUANO, San Jose, California
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MARY A. GADE, Sonnenschein, Nath, and Rosenthal, Chicago, Illinois
KATHARINE L. JACOBS, University of Arizona, Tucson
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ROBERT A. WELLER, Woods Hole Oceanographic Institution, Massachusetts
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BYRON MASON, Senior Project Assistant, Division on Earth and Life Studies
ELIZABETH GALINIS, Senior Project Assistant, Board on Atmospheric Sciences and Climate

Preface

In September 2002, Assistant Secretary of Commerce for Oceans and Atmosphere James R. Mahoney asked the National Academies to undertake a fast-track review of the U.S. Climate Change Science Program's (CCSP's) draft strategic plan for climate and global change studies and the final strategic plan after it had been revised. In response the 17-member Committee to Review the U.S. Climate Change Science Program Strategic Plan was formed (see Appendix B for committee biographies). The committee was given a two-phase statement of task (see Appendix A for full statement of task). The committee's first report, which reviewed the November 11, 2002, draft strategic plan, was issued in February 2003 and addressed Phase I of the committee's task. This report, which provides an overall assessment of the revised strategic plan and CCSP's strategic planning process, addresses Phase II of the committee's task (see Box P-1).

Chapter 1 of this report summarizes the committee's overall assessment of the revised strategic plan. Chapters 2 and 3 examine in more detail how those aspects of the draft plan that were identified in the committee's first report as particularly challenging have evolved in the revised plan. The scientific scope of the plan and decision support activities that need further development during implementation are addressed in Chapter 2. The major management challenges in implementing the plan are addressed in Chapter 3. The committee responds to the five questions in the Phase II statement of task (see Box P-1) and provides recommendations for future planning efforts in Chapter 4.

The committee held two meetings since the release of the revised strategic plan to gather information and prepare this report. The first meeting was held on August 25-27, 2003, in Washington, D.C. At this meeting Ghassem Asrar, Associate Administrator for Earth Science at the National Aeronautics and Space Administration, and Richard Moss, executive director of the U.S. Global Change Research Program, presented an overview of the changes to the strategic plan and how the CCSP addressed the committee's major recommendations. Lead authors of selected chapters of the plan also discussed the changes that were made to their chapters. We thank Ghassem Asrar and Richard Moss along with the following individuals who also participated in this meeting: David Allen, CCSP Office; Susan Avery, National Oceanic Atmospheric Administration (NOAA) and CCSP Office; Louis Brown, National Science Foundation (NSF); Margarita Conkright, NOAA and CCSP Office; David Conover, Climate Change Technology Program; Jay Fein, NSF; Janet Gamble, U.S. Environmental Protection Agency (USEPA); Susan Herrod Julius, USEPA; Chester Koblinsky, NASA and CCSP Office; Kathryn Parker, USEPA; Toral Patel-Weynand, Department of State; Steve Shafer, U.S. Department of Agriculture; and Caitlin Simpson, NOAA. The committee held a second meeting in Irvine, California, in October 2003, during which the committee received an update from James Mahoney and Richard Moss on the status of plan implementation, and prepared this report. We extend our gratitude to James Mahoney and Richard Moss for their support, insights, and openness throughout the study process.

The committee and staff have worked diligently to make this report as useful as possible to the CCSP. We wish the CCSP leadership well as it takes on the challenging task of implementing this ambitious strategic plan. In the opinion of many of the committee members the issues addressed by the CCSP are among the most crucial of those facing humankind in the twenty-first century.

Thomas E. Graedel, Chair

BOX P-1 Statement of Task for Phase II

In the second phase, the committee will provide an overall assessment of the revised (final) plan, with an emphasis on how the plan has evolved in response to NRC and other community input. The committee also will address the following questions related to the processes used to solicit and consider input from the scientific and stakeholder communities throughout the strategic planning process:

- Were the mechanisms for input from the scientific and stakeholder communities throughout the program's strategic planning process adequate?
- Did the format of the workshop promote the open exchange of ideas and suggestions for improvement?
- Was the process used to make decisions on potential changes to the draft plan clearly communicated to workshop participants and others who submitted comments during the public comment period?
- Was this process consistent with generally accepted practices for considering community input during public comment periods?
- What specific improvements should be reflected in future planning efforts for the program?

The results of phase II will be provided in a report to be delivered to the program within 6 months after the revised (final) plan is published.

Acknowledgments

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

Mark Abbott, Oregon State University, Corvallis
James Anderson, Harvard University, Cambridge, Massachusetts
D. James Baker, The Academy of Natural Sciences, Philadelphia, Pennsylvania
Antonio Busalacchi, University of Maryland, College Park
William Easterling, The Pennsylvania State University, University Park
Gregory Greenwood, California Resources Agency, Sacramento
Charles F. Kennel, Scripps Institution of Oceanography, La Jolla, California
Pamela Matson, Stanford University, Stanford, California
Susanne C. Moser, National Center for Atmospheric Research, Boulder, Colorado
Edward A. Parson, Harvard University, Cambridge, Massachusetts
Edward S. Sarachik, University of Washington, Seattle
Christine S. Sloane, General Motors Corporation, Warren, Michigan
Susan Solomon, NOAA Aeronomy Laboratory, Boulder, Colorado
B.L. Turner, II, Clark University, Worcester, Massachusetts
David Warrilow, Department for Environment, Food and Rural Affairs, London, United Kingdom
Robert M. White, Washington Advisory Group, Washington, D.C.
Eric Wood, Princeton University, Princeton, New Jersey

Although the reviewers listed above have provided constructive comments and suggestions, they were not asked to endorse the report's conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Robert A. Frosch (Harvard University). Appointed by the National Research Council, he was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Contents

- much improved
- many objectives vaguely worded
- budget not capable of supporting
- management structure complex/untested
- political concerns & worry

Executive Summary

The U.S. Climate Change Science Program (CCSP) was established in February 2002 to coordinate climate and global change research conducted in the United States. Drawing on information from the U.S. Global Change Research Program of the previous decade, as well as from other sources, the CCSP developed a 10-year strategic plan to guide its activities. The CCSP requested that the National Academies review both a discussion draft of this strategic plan, released in November 2002, and a revised version, released in July 2003 (see Appendix A for statement of task). The revised strategic plan is reviewed in this report.

The *Strategic Plan for the U.S. Climate Change Science Program* articulates a guiding vision, is appropriately ambitious, and is broad in scope. It encompasses activities related to areas of long-standing importance, together with new or enhanced cross-disciplinary efforts. It appropriately plans for close integration with the complementary Climate Change Technology Program. The CCSP has responded constructively to the National Academies review and other community input in revising the strategic plan. In fact, the approaches taken by the CCSP to receive and respond to comments from a large and broad group of scientists and stakeholders, including a two-stage independent review of the plan, set a high standard for government research programs. As a result, the revised strategic plan is much improved over its November 2002 draft, and now includes the elements of a strategic management framework that could permit it to effectively guide research on climate and associated global changes over the next decades. Advancing science on all fronts identified by the program will be of vital importance to the nation.

Recommendation: The CCSP should implement the activities described in the strategic plan with urgency.

The revised strategic plan identifies a much broader scope of activities than has historically been supported under the auspices of the Global Change Research Program. To succeed, such an expansion in scope will require a concomitant expansion in funding. A fully informed assessment of whether adequate funding is available for the proposed program was not possible because the CCSP did not provide the committee with prospective budget information and because many of the objectives in the plan are too vaguely worded to determine what will constitute success. However, the present CCSP budget does not appear to be capable of supporting all of the activities in the strategic plan. While well-established program elements have a track record of funding, the newer or expanded areas in the strategic plan lack clear budget lines and agency homes, and are therefore likely to be under supported. The major expansion in climate modeling and the observing system that the plan calls for will also require an increase in funding above current levels. There is no evidence in the plan or elsewhere of a commitment to provide the necessary funds for these newer or expanded program elements. Whatever the budget allocations, the CCSP and participating agencies need to start making budget decisions and setting priorities to allow the program to meet the ambitious overarching goals of the plan.

Recommendation: The CCSP and its parent committees should (1) develop a clear budgetary process linking tasks to agency and program budgets; (2) secure the financial resources, for the present and the future, that will ensure the overall success of the plan; and (3) consider new approaches to funding that will enable new initiatives and the shifting of resources to respond to the nation's evolving needs.

Significant hurdles face the CCSP and participating agencies as they implement the plan. First, meeting all program goals will require advances in previously underemphasized but societally relevant elements of the program. Second, a clearer strategic approach is needed to achieve the necessary expansion of observation systems and modeling capabilities. Third, the management structure proposed by the CCSP is very complex, will require significant interagency cooperation, and is essentially untested. Fourth, given the political sensitivities associated with climate and associated global change, special measures may be needed to ensure the scientific independence and credibility of the program and its products. Finally, the CCSP needs to evaluate the available capacity within the community to implement the plan, and address any capacity gaps that are revealed. The recommendations that follow identify ways to ensure effective implementation of the strategic plan.

ENSURING A BALANCED AND SOCIETALLY RELEVANT PROGRAM

The revised strategic plan addresses much of the critical science relevant to climate and associated global change in a strategic framework that places the research it proposes in the context of national needs. It includes five overarching goals (see Box ES-1) that are consistent with the vision, roughly balanced among the areas of emphasis for the program, and of appropriate scope needed to address climate and associated global change. The fourth and fifth goals, in particular, will be crucial in ensuring the societal relevance of the program, as they focus on understanding impacts on ecosystems and human systems as well as supporting decisions related to prevention and response options. The committee applauds this emphasis, but finds it will require significant new efforts in areas that are not presently well supported by the CCSP. **The CCSP should accelerate efforts in previously underemphasized program elements, including ecosystems, the water cycle, human dimensions, economics, impacts, adaptation, and mitigation, by rapidly strengthening the science plans and institutional support for these areas.**

The plan's attention to research and decision support related to the regional and international aspects of climate and associated global change is particularly welcome. As these elements are implemented, the program will need to do a better job of identifying stakeholders and the types of decisions they need to make. The CCSP should provide the scientific knowledge and analyses needed to support national and international policy decisions, including those aimed at mitigating climate change, as well as local, state, and regional decisions. Correcting the plan's continuing systematic weakness with regard to economic analyses will be critical, because such analysis is crucial for evaluating impacts and weighing possible response options. The purpose of the plan's proposed synthesis and assessment products also must be clarified, because it is unclear whether they either will meet the 1990 Global Change Research Act requirement for impact assessments or will satisfy the program's need to evaluate progress toward program goals or other management objectives. **The CCSP should further develop its decision support activities, making sure to meet the needs of local, regional, national, and international decision makers. The synthesis and assessment products should be chosen to explicitly address the range of needs for decision makers and program management, as well as the broad scope specified in the Global Change Research Act.**

OBSERVATIONS AND MODELING

The plan appropriately calls for major upgrades in global observing capabilities and for significant advances in climate modeling. It falls short, however, in providing a strategy for implementing, sustaining, and evolving an observing system necessary to answer the crucial questions pertaining to climate and associated global changes that will be asked of it over this century. Such a strategy for observations should be well coordinated with related international efforts for maximum effectiveness. A strategy is also needed for meeting the stated modeling goals, particularly for delivering a wide range of products, including long-term climate projections, seasonal to interannual climate predictions, regional climate models, and projections of societal and ecosystem impacts. **The CCSP should develop more comprehensive strategies for implementing and sustaining a global Earth observing system and for meeting climate modeling goals.**

BOX ES-1 Overarching CCSP Goals in the Revised Strategic Plan

CCSP Goal 1: Improve knowledge of the Earth's past and present climate and environment, including its natural variability, and improve understanding of the causes of observed variability and change.

CCSP Goal 2: Improve quantification of the forces bringing about changes in the Earth's climate and related systems.

CCSP Goal 3: Reduce uncertainty in projections of how the Earth's climate and related systems may change in the future.

CCSP Goal 4: Understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes.

CCSP Goal 5: Explore the uses and identify the limits of evolving knowledge to manage risks and opportunity related to climate variability and change

- addressed critical science
- weak on economic analysis of response options
- not clear what synthesis activities supposed to achieve
- no observation system strategy

EFFECTIVELY MANAGING THE PROGRAM

The new management structure described in the strategic plan is designed to integrate the activities of 13 federal agencies, oversee progress toward implementing the strategic plan, and integrate research, technology development, and decision support activities. This structure engages high-level officials who could ensure that the program has the necessary resources and could monitor progress toward program goals. The management structure also provides an explicit linkage between climate change science and climate change technology, an important, heretofore under addressed component of the program. As the CCSP matures, continual attention should be paid to clarifying strategic plan priorities derived from the plan vision, mission, and goals; applying priorities and criteria in the program selection and budgeting process of the participating agencies; and defining measurements (metrics) that can indicate success in achieving goals. **The CCSP should establish and institutionalize effective management processes that create accountability for meeting program goals.**

The complex management structure proposed by the CCSP is essentially untested, however, and thus needs to remain flexible and open to adjustments as program leaders learn from experience. As the strategic plan is implemented, the CCSP leadership should adopt an adaptive management approach for the program as a whole by carefully monitoring its progress and periodically revisiting and adjusting the plan, its timelines, and its deliverables to address any shortcomings. Future strategic planning efforts should build upon the successes of this first one, particularly by maintaining the level of transparency and opportunities for scientist and stakeholder input in the process. **The CCSP should plan for the generation of an updated strategic plan every three to five years.**

MAINTAINING THE SCIENTIFIC CREDIBILITY OF THE PROGRAM

Involving high-level political leaders in CCSP management helps to provide the program with the resources that it requires, but also allows the possibility that the program's priorities or scientific results could be influenced by political considerations. Either the reality or perception of such influences could serve to discredit the program unless independent evaluations of the program and its products are conducted on a regular basis. **The CCSP should establish a mechanism for independent oversight of the program as a whole in order to maintain its long-term scientific credibility.** This committee still believes (as in its first report) that establishing a standing advisory body charged with independent oversight of the entire program will be more effective than using a number of ad hoc external advisory mechanisms. Maintaining scientific credibility is especially important for the synthesis and assessment products designed to summarize and evaluate the implications of the program's cumulative knowledge for scientific research and policy formation. **The CCSP should ensure the credibility of synthesis and assessment products by producing them with independent oversight and review from the wider scientific and stakeholder communities throughout the process.**

ADDRESSING CAPACITY NEEDS

The CCSP likely faces shortages in the human and institutional capacity needed to implement the strategic plan, especially in new and expanded program areas. Within the agencies, the capability and inclination to provide decision support—as opposed to basic scientific results—may be limited. In particular, preparing and reviewing the synthesis and assessment products may place high demands on the scientific community. **The CCSP should carefully assess the needs in capacity implied by the strategic plan and address any gaps by coordinating ongoing capacity building efforts at participating agencies and initiating new programs as needed.** Given the expanded attention to decision support, communication with stakeholders, and interagency coordination, the committee sees a much larger role and responsibility being placed on the CCSP Office. **The CCSP Office should be appropriately resourced to reflect its expanded roles.**

The nation and the global community will be better prepared to address the challenges of climate and associated global changes if the CCSP's vision and overarching goals are achieved. In this effort, the CCSP represents a transition from the science-based Global Change Research Program of the past decade to a program that employs science in the service of societal objectives. While many opportunities exist to improve the plan, as discussed in this report, the major challenge ahead is for vigorous implementation.

- Complex mgmt structure untested
- needs standing NAS review
- CCSP Office should be expanded

1

Overall Assessment of the Strategic Plan

The U.S. Climate Change Science Program (CCSP) was established in February 2002 to coordinate climate and global change research conducted as part of the U.S. Global Change Research Program (GCRP) and Climate Change Research Initiative (CCRI). The interagency CCSP retains the responsibility for compliance with the requirements of the Global Change Research Act of 1990, including its provisions for annual reporting of findings and short-term plans, scientific reviews by the National Academies, periodic publication of a 10-year strategic plan for the program, and assessments of climate change impacts. At the same time, the U.S. Climate Change Technology Program (CCTP) was created to coordinate and develop interagency research efforts focused on developing new technologies related to climate change and its mitigation. An important initial undertaking of the CCSP was development of a 10-year strategic plan for global change research. The discussion draft of the plan, *Strategic Plan for the U.S. Climate Change Science Program* (CCSP, 2002), was released on the CCSP website (<http://www.climatescience.gov>) on November 11, 2002. Over 1,000 scientists, agency representatives, and other stakeholders discussed the plan at a major planning workshop in Washington, D.C., on December 3-5, 2002. The CCSP also requested that the National Academies review both the discussion draft of the strategic plan and a revised version (see Appendix A for statement of task). In response, the National Academies formed the Committee to Review the U.S. CCSP Strategic Plan, which released its first report reviewing the draft plan in February 2003 (NRC, 2003b). The CCSP responded to the committee's and other comments in a revised strategic plan released on July 24, 2003 (CCSP, 2003). This second NRC report represents the results of the committee's review of the revised strategic plan.

The committee finds that the CCSP has responded constructively to the NRC review and other community input in revising the strategic plan. The revised strategic plan is much improved over its November 2002 draft, and includes the elements of a strategic management framework for effectively guiding research on climate and associated global changes over the next decades. The plan articulates a guiding vision, is appropriately ambitious, and is broad in scope. It encompasses activities related to areas of longstanding importance as well as new or enhanced cross disciplinary efforts. Advancing science on all fronts identified by the program will be of vital importance to the nation.

Recommendation: The CCSP should implement the activities described in the strategic plan with urgency.

ELEMENTS OF A STRATEGIC PLAN

The revised strategic plan explicitly includes most essential elements of a strategic plan, representing a substantial improvement. In particular, it now contains several of the strategic elements identified in this committee's review of the draft plan (see Box 1-1), such as a guiding vision, executable goals, clear timetables, and a management plan, as well as a statement of the program's mission and core approaches (see Box 1-2). The vision and goals are consistent with statements by President George W. Bush,[1] indicating that the program is responsive to the national needs that he articulated, and to the NRC report on climate change science requested by the Administration in 2001[2] (NRC, 2001). Further, the committee finds that the CCSP vision and goals are well matched to this program. The mission and core approaches enhance the strategic plan, because they clearly state the main types of program activities necessary to meet the vision and goals.

[1] For example, "America and the world share this common goal: we must foster economic growth in ways that protect our environment. We must encourage growth that will provide a better life for citizens, while protecting the land, the water, and the air that sustain life. We must also act in a serious and responsible way, given the scientific uncertainties. While these uncertainties remain, we can begin now to address the human factors that contribute to climate change." (George W. Bush, February 14, 2002).

[2] "Initial CCSP priorities have developed in response to a report requested by the Administration by a committee of the National Academies' National Research Council. The NRC report, *Climate Change Science: An Analysis of Some Key Questions*, characterized areas of uncertainty in scientific knowledge concerning climate change, and identified research areas that will advance the understanding of climate change." (CCSP, 2003, p. 8).

BOX 1-1

Planning Climate and Global Change Research **(NRC, 2003b) Recommendation**
The revised strategic plan should articulate a clear, concise vision statement for the program in the context of national needs. The vision should be specific, ambitious, and apply to the entire CCSP. The plan should translate this vision into a set of tangible goals, apply an explicit process to establish priorities, and include an effective management plan.

Revisions to the CCSP Strategic Plan
The vision, goals, core approaches, prioritization, and management plan for the program are articulated in the revised strategic plan (See Box 1-2). A new Chapter 2 (Integrating Climate and Global Change Research) has been added, providing an overview of how the goals constitute a comprehensive, program-wide framework for coordinating interdisciplinary research activities and observations to focus on key climate and associated global change issues (CCSP, 2003, pp. 11-28). The revised plan states how priorities were chosen and lists "criteria for prioritization" (see Box 1-2), but does not clearly explain how the program will apply priorities in the budget process to support newer or expanded research areas, especially if the program funding remains level.

The five overarching goals are consistent with the vision (see Box 1-2), are generally balanced among the areas of emphasis for the program, and encompass the scope necessary to address climate and associated global change. The research needs related to ecosystems, human dimensions, impacts, and adaptation have appropriately been brought forward in the plan as the fourth overarching goal. Also, the application of scientific information to "policymaking and adaptive management" can potentially support the decisions highlighted in the fifth goal. The committee notes that objective measures remain to be established, however, for evaluating the program's performance against its five overarching goals.

The alignment of research activities with program goals has been improved compared with the draft plan in that "examples of key research activities" are highlighted for each goal in Chapter 2. However, the plan does not thoroughly map the five goals to research and other program activities or identify sufficient activities to meet the fourth and fifth overarching goals. For example:

- Research on impacts and adaptation described in Chapters 8 and 9 needs to be more strongly linked to research on climate and land-use change in Chapters 4 and 6, respectively.
- Research on impacts and adaptation also needs to be better linked with near-term syntheses and work with stakeholders described in Chapter 11, "Decision Support Resources Development."
- The discussion of the CCSP modeling strategy in Chapter 10 identifies as priorities the development of model outputs to inform decision makers and impacts research, but does not describe actions to facilitate this usage.
- The discussion of observing and monitoring in Chapter 12 devotes only a single paragraph to climate-related social, economic, and health data.

In general, these new and expanded areas of emphasis, which will be vital for accomplishing CCSP Goals 4 and 5, are less developed than the areas addressed by CCSP Goals 1, 2, and 3, and therefore, need to be accelerated. In a more thoroughly integrated plan, the goals of the program would dictate which individual research projects would be supported and how they would be sequenced. During implementation, these linkages need to be made so that program gaps can be identified and progress toward program goals can be assessed.

It is also important that the CCSP have an explicit and defensible process for prioritization and decision making. The revised strategic plan describes how initial priorities were chosen, based in part on the 2001 NRC report *Climate Change Science: An Analysis of Some Key Questions*, and identifies several "Criteria for Prioritization" (see Box 1-2). The CCSP and participating agencies will need to make budget decisions and set priorities based on the contribution of research activities to accomplishment of the overarching CCSP goals. An explicit approach to priority setting is required, but is not explained in the CCSP. One reason that an explicit approach is essential is that the revised strategic plan expands the scope of the program beyond that of the GCRP, while providing no new resources. The prioritization approach should make sure to support emerging research areas that fit the program objectives even with little established track record of previous performance.

The revised strategic plan identifies timelines of 0–2 year, 2–4 year, and greater than 4 years for many deliverables (see Table 1-1). This approach is an important and essential component of the strategic plan. However, many of the milestones, products, and payoffs are too vaguely worded (e.g., many call for "greater understanding," "improved descriptions," or "updated trends") to ascertain what will constitute success. For

BOX 1-2 CCSP Guiding Vision, Mission, Goals, Core Approaches, and Criteria for Prioritization (CCSP, 2003, pp. 2-8).

CCSP Vision
A nation and the global community empowered with the science-based knowledge to manage the risks and opportunities of change in the climate and related environmental systems.

CCSP Mission
Facilitate the creation and application of knowledge of the Earth's global environment through research, observations, decision support, and communication.

CCSP Goals
CCSP Goal 1: Improve knowledge of the Earth's past and present climate and environment, including its natural variability, and improve understanding of the causes of observed variability and change.

CCSP Goal 2: Improve quantification of the forces bringing about changes in the Earth's climate and related systems.

CCSP Goal 3: Reduce uncertainty in projections of how the Earth's climate and related systems may change in the future.

CCSP Goal 4: Understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes.

CCSP Goal 5: Explore the uses and identify the limits of evolving knowledge to manage risks and opportunity related to climate variability and change.

CCSP Core Approaches
1. Scientific Research: Plan, sponsor, and conduct research on changes in climate and related systems.
2. Observations: Enhance observations and data management systems to generate a comprehensive set of variables needed for climate-related research.
3. Decision Support: Develop improved science-based resources to aid decision making.
4. Communications: Communicate results to domestic and international scientific and stakeholder communities, stressing openness and transparency.

CCSP Criteria for Prioritization
1. Scientific or technical quality;
2. Relevance to reducing uncertainties and improving decision support tools in priority areas;
3. Track record of consistently good past performance and identified metrics for evaluation of future progress;
4. Cost and value.

example, does a progress report constitute a milestone of success on one of these topics? Does a 0–2 year timeline indicate that work is already underway, and that an update or a revision to an existing model will be regarded as satisfactory realization of the milestone? The committee finds that many of the 0–2 and 2–4 year deliverables are too short to attain any significant progress on scientific goals for which work is not already underway. Clear definition of deliverables is particularly important for research that addresses challenging unanswered questions or involves major advances in capabilities, such as the development of an integrated observing system or upgraded climate models; it may take longer than 4 years to make significant progress in these areas. Moving into the implementation phase, the program should specify the milestones and products more clearly, while ensuring that associated timelines are realistic.

CLARITY AND INTEGRATION OF THE PLAN

This committee identified a lack of clarity about the relationship between the Global Change Research Program (GCRP) and the Climate Change Research Initiative

(CCRI) as one weakness of the draft report (see Box 1-3). The integration of GCRP and CCRI activities has been clarified in the revised plan, portraying the CCSP as a single integrated program combining longer-term research efforts with shorter-term, targeted decision support and research foci. This change in the document adds clarity to the organization of the program.

More generally, in the revised strategic plan, the critical linkages across program elements are more precisely delineated; facilitated in large part by the new Chapter 2, "Integrating Climate and Global Change Research." The revised plan has a more comprehensive and well-organized treatment of the CCSP's strategies for climate modeling (CCSP Chapter 10) and for observing and monitoring (CCSP Chapter 12); these are critical crosscutting activities of the CCSP. As the CCSP moves forward, the program managers should ensure that implementation of these research elements is well coordinated with other parts of the program.

TABLE 1-1 Number of Deliverables from Each Research Element in the CCSP Strategic Plan

Research Element	< 2 years	2–4 years	> 4 years
Atmospheric composition	0	11	5
Climate variability and change	3	27	5
Water cycle	5	19	14
Land use/Land cover change	13	12	17
Carbon cycle	3	17	22
Ecosystem	2	10	7
Human contributions and responses	3	12	4
TOTAL	29	108	74

BOX 1-3

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should: (1) present clear goals for the CCRI and ensure that its activities are consistent with these goals; (2) maintain CCRI's strong emphasis on support for near-term decisions as an ongoing component of the program; and (3) include an explicit mechanism to link GCRP and CCRI activities.

Revisions to the CCSP Strategic Plan
The revisions to the plan clarified the relationship between the CCRI and the GCRP. The revised plan makes it clearer that the CCSP is a single program, in which the longer-term GCRP activities and the near-term higher-priority CCRI activities share a common vision and set of goals. The revised plan includes a strengthened chapter on Decision Support Resources Development, which is clearly designed to be ongoing component of the program, not just a near-term activity.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The CCSP should strengthen the treatment and integration of crosscutting research areas in all substantive chapters. The revised strategic plan should address the interactions and synergies of climate change with other associated global changes.

Revisions to the CCSP Strategic Plan
Chapter 2 of the revised plan (Integrating Climate and Global Change Research) outlines "Critical Dependencies" among the program elements described in Chapters 3-9, with examples of how research and observations in one element will provide results needed by other elements (CCSP, 2003, pp. 23-25). Crosscutting linkages, interdependencies, and collaborative efforts across elements are also identified in Chapters 3-9. The revised plan includes improved chapters on observations and monitoring, data management, and climate modeling, three crosscutting program activities. The revised plan has two new questions that address the interactions and synergies of climate change with land-use and land-cover change (CCSP, 2003, pp. 68-69) and with ecosystems (CCSP, 2003, pp. 84-86).

MOVING FORWARD

Climate and associated global changes are now recognized as among the most important challenges facing humankind in the twenty-first century. The challenges transcend national boundaries, as well as normal decision making timeframes. Recognizing these verities, 187 nations, including the United States, generated and subsequently ratified the United Nations Framework Convention on Climate Change.[3] The framework's relevance to the present strategic plan is expressed clearly: "All parties shall promote and cooperate in scientific, technological, technical, socio-economic, and other research, systematic observation, and development of data archives related to the climate system and intended to further the understanding and reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude, and timing of climate change, and the economic and social consequences of various response strategies." The CCSP constitutes the United States' commitment to this portion of the Framework challenge. The revised *Strategic Plan for the Climate Change Science Program* is thus of vital importance for the coming decade and beyond. If the CCSP's vision and overarching goals for addressing climate and associated global change are achieved, the nation and the global community will be better prepared to manage the impacts of climate and environmental changes during the twenty-first century, and to make informed decisions about options to forestall or mitigate some of these changes.

In the remainder of this report, key aspects of the strategic plan needing improvement are identified. The committee does not advocate that the CCSP undertake another major revision to the strategic plan, because the plan provides a wholly adequate framework for the CCSP and a major revision would divert resources from the activities described in the plan. In this context, the committee has focused on assisting the CCSP in implementing the revised plan and in managing the program. Chapter 2 discusses scientific scoping and decision support efforts that need further development in the implementation phase. The major management challenges in implementing the plan are addressed in Chapter 3. Issues associated with this and future planning efforts are discussed in Chapter 4.

[3] The United Nations Framework Convention on Climate Change treaty was signed in 1992 and entered into force in 1994. More information on the treaty is available at <http://unfccc.int>.

2

Science Focus and Scope

The *Strategic Plan for the U.S. Climate Change Science Program* (CCSP, 2003) is farsighted in calling attention to several areas that had previously been underemphasized in the U.S. Global Change Research Program, specifically, human dimensions, ecosystems, the water cycle, impacts, adaptation, and mitigation. The plan's attention to research and decision support related to the regional and international aspects of climate and associated global changes is particularly welcome. The plan's explicit linkage of climate change science and climate change technology is an important, heretofore under addressed component. This chapter highlights those parts of the plan where additional attention is needed to refine the objectives and ensure effective implementation.

ENSURING A BALANCED PROGRAM

In defining Goals 4 and 5, the CCSP proposes a dramatic enhancement of research and understanding of the sensitivity and adaptability of human systems and natural and managed ecosystems, and proposes the development of greater knowledge in management of the resulting risks and opportunities. Accomplishing these goals will require effective and well-resourced research programs addressing impacts, adaptation, and mitigation strategies. These issues are covered in the plan's chapters on ecosystems, human contributions and responses to environmental change, and the water cycle (Chapters 8, 9, and 5, respectively), three aspects of the plan which have improved over the draft (see Box 2-1). Predictions and assessments at the regional scale, as yet imperfectly addressed, are particularly important for these topics. Although at least one product addresses mitigation strategies (CCSP, 2003, p. 82), the plan's overarching goals emphasize adaptation rather than mitigation.

The science programs presented in Chapters 8, 9, and 5 are at a lesser state of readiness than those found in other chapters of the plan. All three call for significant new research in areas that are not presently well supported by the CCSP (NRC, 2003b). As in the draft plan, chapters on ecosystems and human dimensions, although improved, continue to lack sufficient focus and scientific depth, perhaps reflecting insufficient input from relevant scientists and stakeholders before or early in the planning process. Targeted workshops or working groups should be put in place to rapidly and significantly strengthen these science plans. In terms of the CCSP, each of the three topic areas (ecosystems, human dimensions, and the water cycle) has functions embedded in several agencies, and lacks clear leadership, coordination across agencies, and effective advocates in annual CCSP budget processes.

The committee is concerned that implementation of previously underemphasized research programs, such as those on ecosystems, human dimensions, and the water cycle, will lag behind the rest of the plan because they entail a scientific scope much broader than the one presently supported by CCSP agency staff and budgets. Such an outcome would greatly undermine the CCSP's ability to make progress against Goals 4 and 5 and therefore limit its overall success. These program elements should be rapidly strengthened with adequate institutional support, improved science plans, targets, and timelines. The balanced scientific approach that will result is essential to CCSP's overall success.

Recommendation: The CCSP should accelerate efforts in previously underemphasized program elements including ecosystems, the water cycle, human dimensions, economics, impacts, adaptation, and mitigation, by rapidly strengthening the science plans and institutional support for these areas.

SYNTHESIS AND ASSESSMENT PRODUCTS

An essential component of any research program is the periodic synthesis of cumulative knowledge and the evaluation of the implications of that knowledge for scientific research and policy formation. In the context of the CCSP, such syntheses and assessments can serve at least five functions.

1. They can define current scientific understanding and uncertainties, informing future research directions. The primary audiences for these state-of-science reports are the CCSP leadership team and the scientific community.

2. They can inform policy decisions related to climate and associated global changes.

3. They can inform operational management decisions at spatial and societal scales influenced by climate and associated global changes, such as the integrated management of a watershed or the operation of societal response mechanisms, such as health alerts and water restrictions.

4. They can be used to evaluate progress toward program goals and other management objectives. The primary audiences for these progress evaluations are the CCSP leadership team and the Interagency Working Group on Climate Change Science and Technology.

5. They can be used to inform international assessments, such as the IPCC Fourth Assessment Report.

An additional benefit of conducting assessments is that they can serve to build and sustain constituencies, educate stakeholders, and build capacity in affected communities, while ensuring that communication channels between the scientific and decision-making communities remain effective avenues for decision support.

The strategic plan explicitly describes considerable synthesis and assessment activity. The revised plan calls for 21 synthesis and assessment products to be produced in either a 0–2 year or a 2–4 year timeframe. The CCSP classified the products as follows (CCSP, 2003, p. 115): nine of these synthesis and assessment products are intended to serve as state-of-the-science reports, five are intended to inform policy decisions, and seven are intended to inform operational management decisions. There are no obvious products devoted to evaluating progress toward program goals, which thereby handicaps the long-term management of the CCSP.

The strategic plan (CCSP, 2003, p. 11) also states that its synthesis and assessment products are intended to fulfill the requirements for synthesis and assessment contained in Section 106 of the 1990 Global Change Research Act (see Appendix C), which specifies that:

> On a periodic basis (not less frequently than every 4 years) the Council through the Committee, shall prepare and submit to the President and the Congress an assessment which:
>
> 1. Integrates, evaluates, and interprets the findings of the Program and discusses the scientific uncertainties associated with such findings;
> 2. Analyzes the effects of global change on the environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity;
> 3. Analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years.

All 21 of the synthesis and assessment products in the strategic plan represent efforts to "integrate, evaluate, and interpret" the findings of the program, and therefore appear to fall under the first assessment component of the Global Change Research Act. The committee could not determine that the proposed products also meet the second and third requirements of the Act because the descriptions in the plan are vague in the context of the Global Change Research Act. Even so, it appears that only seven of the synthesis and assessment products are related to the effects of global change. And, some areas specified in the Act, such as

BOX 2-1

Planning Climate and Global Change Research **(NRC, 2003b) Recommendation**
The revised plan should strengthen its approach to the human, economic, and ecological dimensions of climate and associated global changes to ensure it supports the research necessary to project and monitor societal and ecosystem impacts, to design adaptation and mitigation strategies, and to understand the costs and benefits of climate change and related response options.

Revisions to the CCSP Strategic Plan
The revised plan identifies "the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes" as its fourth overarching goal, appropriately calling attention to these research areas. The plan's chapters on human contributions and responses to environmental change (Chapter 9) and ecosystems (Chapter 8) are improved over the draft. Integrated assessment analyses discussed in Chapter 11 (Decision Support Resources Development) include impacts modeling of the environment as well as socio-economic systems. Other research activities relevant to economics are only weakly addressed in the plan. Although at least one product addresses mitigation strategies (CCSP, 2003, p. 82), the plan's overarching goals emphasize adaptation rather than mitigation.

analyzing the effects on energy production and use, human health and welfare, and human social systems, are only peripherally addressed by this portfolio of products. Not a single synthesis or assessment product explicitly addresses the nation's water supply. Some of the very broadly worded products, such as "scenario-based analysis of the climatological, environmental, resource, technological, and economic implications of different atmospheric concentrations of greenhouse gases," "risks of abrupt changes in global climate," and "uses and limitations of observations, data, forecasts, and other projections in decision support for selected sectors and regions" could cover these areas. The synthesis and assessment products should be more clearly defined, including statements of intended uses and audience for each product.

The plan also does not make clear how the key questions and research activities identified in each research component of the plan relate to the topics chosen for synthesis and assessment products. In addition, because the list of synthesis and assessment products were generated during the brief revision process, the scientific and stakeholder communities did not have much input in deciding which of these products would be included in the plan. As a result, the list of products appears somewhat ad hoc rather than a coherent portfolio of priority synthesis and assessment products.

Recommendation: The synthesis and assessment products should be chosen to explicitly address the range of needs for decision makers and program management, as well as the broad scope specified in the Global Change Research Act.

CCSP synthesis and assessment products must be credible in order to be useful. The program is developing detailed guidelines for the preparation of the synthesis and assessment products, but the committee was unable to review these guidelines because they were not finalized when this report was completed. The strategic plan (CCSP, 2003, pp. 111-112) indicates that all of the decision support activities in the plan will adhere to the following guidelines:

- Analyses structured around specific questions;
- Early and continuing involvement of stakeholders;
- Explicit treatment of uncertainties;
- Transparent public review of analysis questions, methods, and draft results; and
- Evaluation of ongoing CCSP analyses and building on the lessons learned.

The committee believes that these approaches could contribute to the credibility of the synthesis and assessment products and also help address the gaps identified above. It is especially important that CCSP synthesis and assessment products be independently prepared, or evaluated, by the science community. This will provide a level of credibility that reports produced exclusively within the government sometimes fail to achieve. The only previous centralized assessment effort by the CCSP agencies, the U.S. National Assessment on the Potential Consequences of Climate Variability and Change (NAST, 2001), followed these credibility assurance guidelines. The National Assessment's Overview and Foundation reports are important contributions to understanding the possible consequences of climate variability and change. The processes of stakeholder engagement and transparent review of the National Assessment reports were exemplary (see Box 2-2).

Recommendation: The CCSP should ensure the credibility of synthesis and assessment products by producing them with independent oversight and review from the wider scientific and stakeholder communities throughout the process.

BOX 2-2

Planning Climate and Global Change Research **(NRC, 2003b) Recommendation**
The revised strategic plan should build upon the lessons learned in applied climate studies and stakeholder interaction from prior environmental and climate assessment activities.

Revisions to the CCSP Strategic Plan
This recommendation has been embodied in the principal guidelines for the CCSP decision support approach: "Evaluate ongoing CCSP analyses and build on the lessons learned" (CCSP, 2003, p. 112). The decision support management strategy also states that the CCSP Office will be responsible for "evaluating, reporting, and communicating results from the decision support activities" (CCSP, 2003, p. 122). The revised plan still generally overlooks the insights into the assessment process and the networks of researchers and stakeholders that were developed during the U.S. National Assessment.

Another concern regarding the synthesis and assessment products is the magnitude of human resources, both within the scientific community and for CCSP staff, needed to coordinate and prepare them. The CCSP has not yet evaluated the feasibility of producing 21 of these products in the next 2 – 4 years without unduly impairing the progress of its research. Many of these products are significant scientific assessments and will require input and review by numerous scientists, as was learned during the U.S. National Assessment process of the late 1990s. In addition, the synthesis and assessment products will be generated over the same timeframe as the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4). The AR4 lead authors (including U.S. scientists) will be writing and revising AR4 chapters during 2005 and 2006, with final government review in early 2007. There is considerable overlap of the CCSP synthesis and assessment products and the AR4 chapters in terms of content. It is therefore important for the CCSP to actively coordinate the timeframe and content of the synthesis and assessment products with the IPCC AR4. For example, a set of peer-reviewed, authoritative CCSP products that appear by mid-2005 would likely contribute substantially to AR4. On the other hand, if the CCSP products are simply progress reports produced without involvement of the scientific community and with no independent review they will add little value to the IPCC process. Effective coordination with the IPCC could avoid possible conflicts with the international climate assessment, improve efficient use of resources, and could raise the image and impact of U.S. climate change science.

Recommendation: The CCSP should ensure that the synthesis and assessment products are produced without unduly affecting the ability to conduct research and in coordination with the IPCC assessment.

DECISION SUPPORT

The CCSP has appropriately made decision support an integral component of the strategic plan. Chapter 11, "Decision Support Resources Development," emphasizes development of methods, tools, and processes for effective decision support. Effective implementation of the proposed decision support activities is vital to fulfilling the CCSP's vision of providing the regional, national, and global communities with capabilities for managing the risks and opportunities of changes in climate and related environmental systems. This chapter has much more depth and specificity than did the comparable chapter in the draft strategic plan (see Box 2-3).

Managing risks and opportunities requires stakeholder support on a range of scales and across multiple sectors, which in turn implies an understanding of the decision context for stakeholders. The revised plan identifies three categories of decision makers by decision type (se Box 2-3). As the decision support elements of the program are implemented, the CCSP will need to do a better job of identifying stakeholders and the types of decisions they need to make. This will improve the matching of decision types with the tools and methods most appropriate to that type of decision.

The strategic plan stresses the value of open communication between scientific and stakeholder communities, mentioning "frequent use of 'draft for comment' methods" (CCSP, 2003, p. 7) and "advisory mechanisms . . . including workshops, committees, or NRC activities" (CCSP, 2003, p. 122). The committee lauds this aspect of the plan. However, the program needs to specify more clearly where stakeholder input will enter the process. The current plan should more effectively build upon a growing capability within the U.S. climate global change community to interact with potential users of climate and global change science, as was demonstrated in the U.S. National Assessment of the Potential Consequences of Climate Variability and Change (NAST, 2001). The revised plan generally overlooks the insights and relationships that were developed by the National Assessment. For example, the experience developed in assembling and maintaining networks of university researchers and stakeholders in different regions of the country is extraordinarily valuable, as are the networks themselves. These relationships should be supported if the CCSP is going to maintain strong stakeholder involvement. The plan also does not include areas of research relevant to regional-scale assessments identified as a result of the National Assessment. The committee reiterates the recommendation from its first report that the CCSP should "build upon the lessons learned in applied climate studies and stakeholder interaction from prior environmental and climate assessment activities." This deficiency needs to be remedied quickly so that the program's decision support activities reflect what the scientific community now knows, what it can accomplish, and what users would like to know.

Effective implementation of the plan's goals requires focused research to develop decision support resources and methods, as noted in this committee's review of the draft strategic plan.[1] The revised plan provides several good illustrations of information and resources that will assist in decision support, but it does not present a strong research plan to bolster the development of assessments, adaptive management, and interactions with stakeholders. The

[1] "The draft plan fails to adequately distinguish between research to develop new decision support tools and understanding on the one hand, and operational decision support activities, on the other. It then does not successfully identify state-of-the-art undertakings in both" (NRC, 2003b, p. 5).

BOX 2-3

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should better describe how decision support capabilities will be developed and how these efforts will link with and inform the program's research to improve understanding of climate and associated global changes.

Revisions to the CCSP Strategic Plan
The revised plan includes a much improved treatment of decision support in Chapter 11 (Decision Support Resources Development), which lays out a framework for the types of decision support activities to be undertaken by the program and how these will help identify decision information needs to guide the evolution of the CCSP science agenda. The decision support activities proposed are threefold: (1) prepare scientific syntheses and assessments; (2) develop resources to support adaptive management and planning; and (3) "develop and evaluate methods (scenario evaluations, integrated analyses, alternative analytical approaches) to support climate change policymaking and demonstrate these methods with case studies" (CCSP, 2003, p. 111). CCSP's decision support research should also draw on other well-developed research methods, best practices, and basic insights from the social and behavioral sciences.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should identify which categories of decision makers the CCSP serves and describe how the program will improve two-way communication with them.

Revisions to the CCSP Strategic Plan
Three categories of decision making have been identified by decision type in Chapter 11 of the revised plan: (1) public discussion and planning; (2) "operational adaptive management decisions by managers of natural resources and build infrastructure;" and (3) support for policy formulation (CCSP, 2003, p. 113). Stakeholder interaction is one of the principal guidelines for the decision support approach. This interaction has been identified for problem identification and framing; review of analysis questions, methods, and draft results; codevelopment of decision support tools with interdisciplinary teams; and feedback from experiences with CCSP decision support projects and analyses (CCSP, 2003, p. 122). The chapter on communications (Chapter 14) in the revised plan better recognizes the importance of interactive communications, though few details are provided on how the program will improve this type of communication (CCSP, 2003, pp. 152-153).

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The CCSP should encourage participation of those agencies whose research or operational responsibilities would strengthen the ability of the program to deliver products that serve national needs.

Revisions to the CCSP Strategic Plan
In Chapter 11 of the revised plan, Objective 2.2, focuses on the need to "promote the transition of resources from research to operations for sustained use" (CCSP, 2003, pp. 116-117). The revised plan's chapter on program management mentions the need to ensure that mission agencies have access to "observations, methods, and information developed through CCSP" (CCSP, 2003, p. 172). No clear mechanism for engaging mission-oriented agencies is described in either chapter.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should identify what sources and magnitudes of reductions in key climate change uncertainties are especially needed and where an improved characterization of uncertainty would benefit decision making, and should use this information to guide the research program.

Revisions to the CCSP Strategic Plan
The revised strategic plan does not clearly identify key climate change uncertainties of relevance to decision making, though some information can be inferred from the overarching program goals and the selection of synthesis and assessment products. The document does not explicitly link program priorities for research to specific policymaker needs.

decision support research activities in the plan emphasize integrated assessment modeling and scenario development. CCSP's decision support research should also draw on other well-developed research methods, best practices, and basic insights from the social and behavioral sciences. Employing these approaches will improve the synthesis and validation of information, the communication of uncertainty, understanding stakeholder needs and constraints, and the economics of decision making. These efforts would include learning how to better explain uncertainty by defining and communicating its source, its current magnitude, and the potential for that magnitude to increase in some areas, as well as the potential for it to be reduced. The plan retains a pervasive weakness with regard to economic analyses and economic modeling, although such approaches could yield powerful results for evaluating impacts and weighing possible response options. In addition, regional products and communication systems are important aspects of climate and associated global change that are not yet completely addressed in the strategic plan.

The effective use of the "decision support toolbox" to be developed and tested within the plan is fully dependent upon the transfer of these tools from the research and developmental domain to the decision-making domain. The plan recognizes the need to "promote the transition of research to operations" (CCSP, 2003, p. 116). In the implementation phase the CCSP should specify the agencies or programs responsible for this transition, and describe the involvement of additional mission-oriented agencies that are not currently participants in the program. As discussed in this committee's first report, mission-oriented agencies—such as the Federal Emergency Management Agency, water resources and land management agencies within Department of the Interior and the Army Corps of Engineers, and the extension and farm program agencies within U.S. Department of Agriculture—could be instrumental in making CCSP research results operational (see Box 2-3). The CCSP should work to support public-private-academic partnerships that could facilitate the transfer of research results to operational applications, borrowing where appropriate from the successful model used in the provision of weather services (NRC, 2003a).

The CCSP should move forward aggressively in creating an effective decision support component of the program. To address the inherent challenges in this endeavor, the CCSP should adopt the approach and procedures outlined in *Understanding Risk: Informing Decisions in a Democratic Society* (NRC, 1996). It should organize a variety of deliberation activities (e.g., workshops, focus groups, working panels, citizen advisory groups) and involve a broad range of stakeholders, including those from government, industry, academia, users of decision support tools, and representatives of the public. The goals of these deliberation activities would be (1) to expand the range of decision support options being developed by the program; (2) to match decision support approaches to the decisions, decision makers, and user needs; and (3) to capitalize on the practical knowledge of practitioners, managers, and laypersons.

Recommendation: The CCSP should further develop its decision support activities, making sure to meet the needs of local, regional, national, and international decision makers.

OBSERVATIONS AND MODELS

Two priority components of the CCSP are enhanced observations and modeling that are relevant to climate and associated global changes. The plan calls for significant advances in the capability of climate models to simulate future climate conditions and their associated regional impacts, and for major upgrades in the global Earth observing system. Both of these challenges have a degree of difficulty that will require systematic, sustained investments for a minimum of a decade if their full contributions to climate research and applications are to be realized. As discussed below, the CCSP needs to develop more comprehensive strategies for prioritizing and sequencing these investments to meet the stated goals.

Observations

The strategic plan recognizes the benefits of a robust and comprehensive observing system to monitor changes in climate, to support modeling efforts, and to expand understanding of the climate system (CCSP, 2003, p.237). For example, the revised plan has an increased emphasis on the role of paleoclimate observations in providing information about the long-term context of climate change. Unfortunately, a comprehensive climate observing system is not yet in place and the CCSP will have to make a substantial commitment to support, coordinate, and better manage its observational activities if it is to attain such a system (see Box 2-4). The program will have to address the facts that no one agency now has the lead in climate observations, some parts of the existing observing system are in decline, and observational capabilities are only just being developed in some areas. For example, the quality and coverage of surface-based atmospheric monitoring systems have actually declined over the past decade (IPCC, 2001a), and the establishment of the climate observing system in the ocean has just begun and needs significantly greater support to be implemented and sustained. Chapter 12, "Observing and Monitoring," identifies many goals for climate observing that have been previously articulated by the community and a preliminary strategy for developing

such a system. The chapter falls short, however, in providing a comprehensive strategy for implementing and sustaining such a system.

Improving observational capabilities is a major challenge that requires the science community to rethink how to evolve a focused Earth observing system. Additional short-term investments called for in the plan (CCSP, 2003, p. 141) can serve as an initial increment toward achieving the system that will be required in the next several decades. Establishing and sustaining a truly robust and comprehensive observation system, however, will require a significant expansion in activities, and therefore a longer-term increase in funding above current levels. For example, many components of the existing observing system rely on expendable platforms, such as atmospheric radiosondes and profiling floats deployed in the ocean, and replacement costs will be ongoing; the cost of these expendables, as well as associated labor costs, has played a role in recent decisions to reduce surface-based observing capabilities. Attaining climate quality observations will require infrastructure, such as calibration facilities, to support and document instrumental accuracy, as well as investments to replace or update obsolete hardware. Other investments will be needed to establish new observing capabilities in regions critical for climate change analysis, such as the Southern Ocean and polar regions, and to meet the needs for improved assessments and predictions.

A number of other aspects of the program's climate observations strategy need improvement as well. First, the plan should explicitly build upon the National Polar-orbiting Operational Environmental Satellite System (NPOESS), which will become the primary space-based climate observing system for the United States in a few years. The CCSP should make sure that NPOESS is an important part of its observations and monitoring strategy. Second, the program should emphasize the periodic reanalysis of satellite observations to improve not only the current climate data records but also past climate data records. Third, the program should pay more attention to the use of surface-based and *in situ* observations of aerosols, clouds, and surface fluxes in validating satellite observations and in providing a robust baseline. Lastly, the program needs to better integrate itself with the international context for climate observations, as for example, coordinated by the international Global Climate Observing System (GCOS) and now receiving new attention as a result of the Earth Observing Summit hosted by the United States in the summer of 2003.

In addition to improving climate observations, the CCSP faces challenges in strengthening monitoring of societal and ecosystem impacts. For example, the plan's chapter on "Human Contributions and Responses to Environmental Change" does not discuss observational needs and only a few examples are listed as part of the chapter on "Observing and Monitoring the Climate System" in Appendix 12.2 of the revised plan. Indeed, the integration of biogeochemical, ecosystem, demographic, land-use, and water-use observations will be critical for decision support and human impacts data, and is already integrated into IPCC assessments (e.g., IPCC, 2001b). The CCSP should carefully consider the detailed nature of its

BOX 2-4

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should better describe a strategic program for achieving an integrated observing system for detecting and understanding climate variability and change and associated global changes on scales from regional to global.

Revisions to the CCSP Strategic Plan
The revised plan's treatment of climate system observing and monitoring is much improved over the draft plan in that it devotes all of Chapter 12 to describing the CCSP's goals for climate system observing and monitoring. The plan still falls short in providing a comprehensive strategy for implementing and sustaining a global climate observing system. This is a major challenge and will require the program to develop an approach to sequencing investments over many years.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The global and long-term historical context of climate change and variability should receive greater emphasis in the revised strategic plan.

Revisions to the CCSP Strategic Plan
The revised plan has increased the emphasis on the global and long-term context of climate variability and change in the chapter on this topic. In particular, the plan includes more attention to global modes of variability other than the El Nino Southern Oscillation (CCSP, 2003, pp. 44-47) and to analyses of the paleoclimate record (CCSP, 2003, pp. 47-48).

commitment to establish and sustain a global Earth observing system. Indeed, the program should take the lead in identifying, securing, and coordinating the investments necessary to establish, maintain, and evolve the observing system that will be required to answer the crucial questions pertaining to climate and associated global change that will be asked of it over this century.

Recommendation: The CCSP should develop a more comprehensive strategy for implementing and sustaining a global climate observing system.

Modeling

Improving climate models is widely recognized as a major national and international priority. The strategic plan appropriately calls for greatly improved climate models both for "synthesizing observations, theory, and experimental results to investigate how the Earth system works and how it is affected by human activities" (CCSP, 2003, p. 101) and for "sustained and timely delivery of predictive model products that are required for assessments and other decision support needs" (CCSP, 2003, p. 101).

BOX 2-5

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should more fully describe how models and knowledge that support regional decision making and place-based science will be developed.

Revisions to the CCSP Strategic Plan
The revised plan more fully describes regional climate modeling activities as well as some other activities to support regional decision making. In Chapter 10 (Modeling Strategy), Objective 1.6 focuses on CCSP efforts to "accelerate the development of science-based predictive models to provide regional and fine-scale climate and climate impacts information relevant to scientific research and decision support applications" (CCSP, 2003, pp. 105-106). Further efforts are needed to ensure that these models are developed with stakeholder involvement and that they integrate simulations of societal and ecosystem impacts. The discussion in Chapter 11 (Decisions Support Resource Development) of adaptively managing natural and human systems affected by climate change (CCSP, 2003, pp. 114-117) also identifies many regional-scale decisions and the activities CCSP will pursue to help inform these decisions.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The discussion of applied climate modeling should be revised to better describe how model projections will be incorporated into the broader suite of decision support activities and to better address the key challenges to attaining the applied climate modeling goals set forward in the plan.

Revisions to the CCSP Strategic Plan
The revised plan includes a new chapter articulating the program's modeling strategy. Applied climate modeling activities are described in Goal 3 of this chapter, "Coordinate and accelerate climate modeling activities and provide relevant decision support information on a timely basis" (CCSP, 2003, pp. 108-110). Integrated assessment modeling is also discussed as one of the tools the program will develop for decision support (CCSP, 2003, pp. 117-120).

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should provide details about how the CCSP will acquire the computing resources necessary to achieve its goals

Revisions to the CCSP Strategic Plan
The revised plan's Chapter 10 (Modeling Strategy) states that the CCSP will "provide the computing, data storage and retrieval, and software engineering resources required to support a world-class U.S. climate modeling activity" (CCSP, 2003, p. 106). Priorities under this objective include: "support researchers in developing more comprehensive coupled models," "provide researchers at the major modeling centers with access to steadily growing computational resources that increase by a factor of four each year," coordinate with the Office of Science and Technology Policy's High-End Computing Revitalization Task Force, support development of software, and develop and maintain tailored information technology infrastructure. Based on available budgets for acquiring new computers and the expected rate of improvement in computing technology over the next five years, the increase in computing capabilities is unlikely.

The revised plan includes a new chapter (Chapter 10) in which climate models are discussed, a substantial improvement over the scattered treatment of models in the draft plan. However, to achieve the climate model goals, the CCSP should develop a strategy for sequencing investments to address long-term research challenges. The CCSP should revisit its promise to increase computational resources by a factor of four each year for five years (see Box 2-5). Based on available budgets for acquiring new computers and the expected rate of improvement in computing technology over the next five years, this increase in computing capabilities is unlikely.

For the most part, Chapter 10 presents a strategy for producing climate change projections through two modeling centers, but fails to present a national strategy for the seasonal to interannual climate predictions so important to many stakeholders. The operational demands, requirements, and mandate for the National Center for Environmental Prediction (NCEP) are relegated to a middle-level status and little attention is given to obtaining and providing the computational resources needed for multiscale climate prediction. Without a fundamental change in approach to fully support seasonal to interannual climate prediction, the United States will be unsuccessful in the delivery of climate services.

The continued development and application of regional climate models will also be essential to the delivery of climate services. An improved understanding of climate change and its impacts at the regional scale will require an enhanced regional climate modeling capability. The last few years have brought significant improvements in these capabilities, improvements that are not fully recognized in the strategic plan. Even so, there are many unresolved issues about regional climate models. In implementation, the CCSP should support the development and application of regional climate models to a greater extent than described in the revised plan (see Box 2-5). The CCSP should also support development of a research and applications infrastructure that enables stakeholder involvement to ensure valuable societal use of information produced by these models. This research and stakeholder community, along with the necessary infrastructure, is still in the formative stage. In the future, CCSP should launch new efforts to develop modeling approaches for projecting societal and ecosystem impacts and for designing and evaluating response options.

Recommendation: The CCSP should develop a more comprehensive strategy for meeting climate modeling goals.

LINKAGES BETWEEN CCSP AND CCTP

The committee's review of the draft strategic plan recommended that the CCSP "assess the scientific implications of technologies under consideration by the CCTP and develop realistic emissions scenarios for climate and associated global changes with these technologies in mind" (see Box 2-6). The CCSP, in cooperation with the CCTP, has made commendable efforts to address this recommendation. In particular, joint activities of the CCSP and the CCTP to develop improved scenarios of greenhouse gas emissions are described in the revised plan. Comments by CCSP and CCTP representatives at the committee's August 2003 meeting indicated that efforts are already yielding benefits in coordinating the two programs.

The committee is concerned, however, that efforts to coordinate CCSP and CCTP activities are not identified beyond these scenario development activities. One area that has been overlooked is the evaluation of social and environmental impacts of potential new technologies, such as land-use requirements for developing bioenergy or the necessity to divert massive economic resources to develop the infrastructure to support a hydrogen economy. Another area for coordination involves research on the extent to which mitigation or adaptation strategies developed under

BOX 2-6

Planning Climate and Global Change Research **(NRC, 2003b) Recommendation**
The CCSP should assess the scientific implications of technologies under consideration by the CCTP and develop realistic scenarios for climate change with these technologies in mind. The program management chapter of the revised CCSP strategic plan should clearly describe mechanisms for coordinating and linking its activities with the technology development activities of the CCTP.

Revisions to the CCSP Strategic Plan
The cabinet-based management structure described in the revised plan's chapter on program management provides executive direction under which CCSP and CCTP activities will be coordinated. Planning and implementation for activities relevant to both programs will be coordinated through interagency working groups (CCSP, 2003, pp. 172-174). The plan identifies only a few specific areas where the CCSP and CCTP will coordinate, focusing primarily on the development of scenarios (CCSP, 2003, pp. 119-120).

the CCTP might produce climate or other environmental impacts, such as those that may be associated with large-scale sequestration of carbon dioxide in geological or oceanic reservoirs. The CCSP strategic plan does include research to evaluate "environmental effects of mitigation options that involve reduction or prevention of greenhouse gas emissions" (CCSP, 2003, p. 82), which should in turn be coordinated with CCTP activities. Of particular concern is the poorly defined role of economic analyses in the coordination between CCSP and CCTP. Although the need for economic analyses is identified in Chapter 9, "Human Contributions and Responses to Environmental Change," the plan does not explain how these efforts would be coordinated with CCTP technology development or with economic analyses that might be conducted under the CCTP. The milestones, products, and payoffs relevant to research in economics are limited in scope, indicating that the program is not positioned to address these research needs.

Though these coordination issues may be resolved as the CCTP completes its strategic planning and as both programs mature, there remains a risk that critical research areas may be overlooked at the interface of the two programs, particularly as the science and general understanding develop in parallel. The CCSP and CCTP should establish a systematic mechanism for identifying research areas that require coordination between their two programs, and develop administrative and financial approaches, as well as external review, for supporting research activities that fall at their interface.

3

Implementing and Managing the Program

The revised strategic plan is a more complete and articulate presentation of the federal government's scientific plan for the U.S. Climate Change Science Program (CCSP). The plan addresses much of the critical science in a strategic framework that places the research it proposes in the context of national needs. The committee is concerned, however, about some aspects of how the CCSP and participating agencies propose to implement the plan. In some cases, the plan does not recognize inherent challenges on the pathway to implementation. In other cases, the plan puts forward ambitious goals that exceed currently available resources, without presenting a strategy for prioritization that addresses barriers to achieving the stated research agenda. The management structure proposed by the CCSP is complex, will require significant interagency cooperation, and is essentially untested. In this chapter, such factors that may hinder implementation of the plan are addressed.

MATURING PROGRAM MANAGEMENT

The new management structure described in the strategic plan is designed to coordinate the activities of 13 federal agencies, oversee implementation of the strategic plan, and integrate research, technology development, and decision support activities. Chapter 16, "Program Management and Review," provides a broad description of the roles and responsibilities of the thirteen participating agencies, briefly describes the complex budgeting and appropriations process, references management mechanisms to ensure that data needs are coordinated across disciplines and research areas, and explains five management mechanisms in detail.

Despite these improvements to the program management chapter of the plan, the plan still lacks a process by which higher levels of management will ensure that program goals are met. As the program matures, continual attention should be paid to refining strategic plan priorities; applying priorities and criteria in the program selection and budgeting process of the participating agencies; and defining measurements (metrics) that can indicate success in achieving goals. These management processes should be institutionalized to ensure a lasting research enterprise. At the same time, the management structure needs to remain flexible and open to adjustments as program leaders learn from experience.

Institutionalizing Accountability at All Leadership Levels

The management structure for the CCSP (see Figure 3-1) engages high-level officials who could ensure that the program has the necessary resources and could monitor progress toward program goals. It involves a CCSP interagency governing body, chaired by the CCSP director; an Interagency Working Group on Climate Change Science and Technology to supervise the CCSP and the complementary Climate Change Technology Program (CCTP); and above that, a cabinet-level Committee on Climate Change Science and Technology Integration to link both programs into the White House Office of Science and Technology Policy. The Interagency Working Group and the CCSP Program Office will need to work closely together to ensure effective plan execution. Ultimately, successful implementation of the CCSP will depend on whether these high-level management groups can influence individual agency programs and budgets.

Involving high-level political leaders in CCSP management helps to provide the program with resources that it requires, but also allows the possibility that the program's priorities of scientific results could be influenced by political considerations. Either the reality or perception of such influences could discredit the program unless independent evaluations of the program and its products are conducted on a regular basis. In its first report, this committee recommended that the CCSP establish a standing advisory body charged with independent oversight of the entire program. The CCSP considered this recommendation (see Box 3-1), but decided that it would provide independent program oversight through "a number of external advisory mechanisms, including periodic overall program reviews by the NRC or other groups, rather than a single body" (CCSP, 2003, p. 175). The committee still

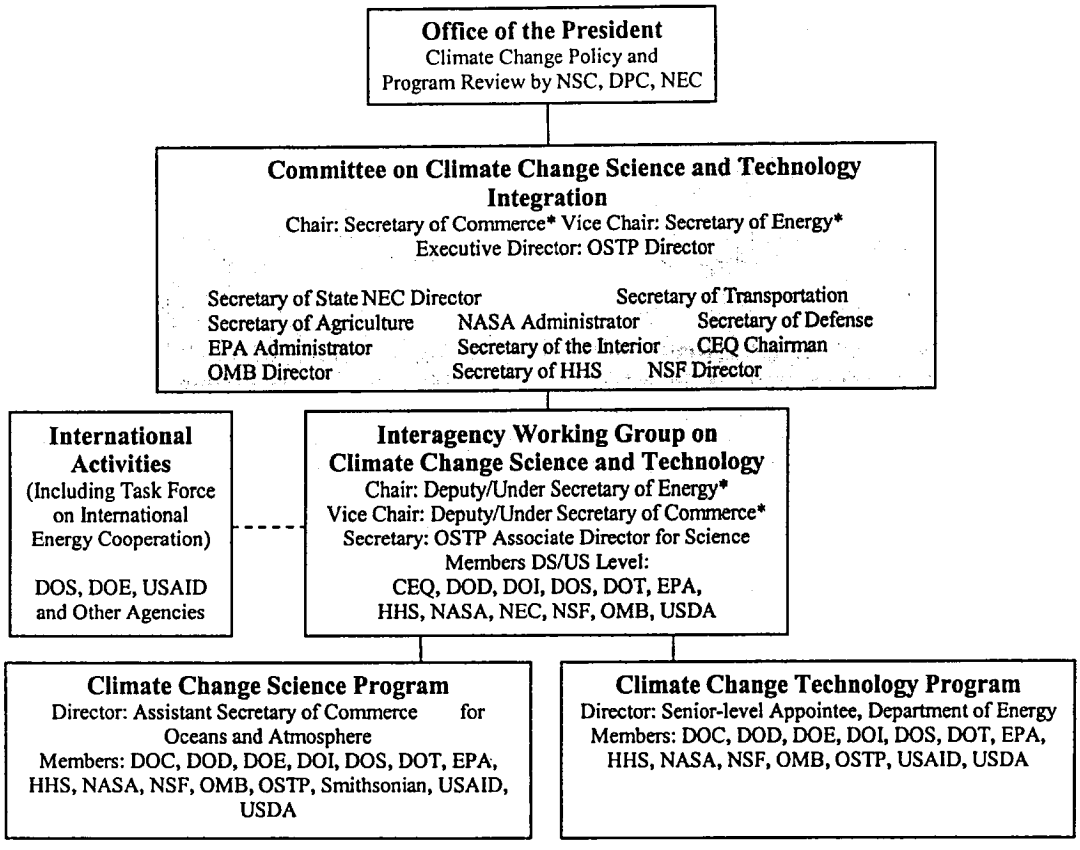

FIGURE 3-1 Climate Science and Technology Management Structure. SOURCE: CCSP. Available online at <http://www.climatescience.gov>.

BOX 3-1

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The CCSP should establish a standing advisory body charged with independent oversight of the entire program.

Revisions to the CCSP Strategic Plan
The revised strategic plan includes a section in Chapter 16 (Program Management and Review) on "External Interactions for Guidance, Evaluation, and Feedback" (CCSP, 2003, p. 175). In this section, the plan states that the CCSP considered this recommendation to establish a standing advisory body, but chose not to implement it at this time. The plan states: "CCSP believes that essential program oversight is better provided by the use of a number of external advisory mechanisms, including periodic overall program reviews by the NRC or other groups, rather than a single body. Additional mechanisms to seek external scientific input, such as workshops, steering committees, *ad hoc* working groups, and review boards, will be employed as needed. CCSP will continue to consider creation of a permanent overall advisory group as program implementation proceeds." The committee still believes that an independent, standing advisory body for the entire program would be the most effective way to maintain the long-term scientific credibility of the program.

believes that an independent, standing advisory body for the entire program would be the most effective way to maintain the long-term scientific credibility of the program. Such a group should include highly respected scientists and other stakeholders spanning the broad range of topics addressed by the program. This group would supplement advisory groups already established for many CCSP program areas. Whatever mechanism is chosen, the committee believes that independent program oversight will be essential to maintaining the long-term credibility of the CCSP.

Recommendation: The CCSP should establish a mechanism for independent oversight of the program as a whole in order to maintain its long-term scientific credibility.

Nearly all of the structural accountability for achieving the CCSP's goals appears to reside in practice at the program element level. All the strategic plan's chapters have clearly identified lead authors and contributors, providing an important accountability and openness for this document. This accountability has substantially strengthened the scientific and programmatic content of the plan, and sends a message that the U.S. scientific community is prepared to take on these research challenges provided the resources are available. The committee notes a more tenuous level of accountability for implementing activities to meet the goals of newer initiatives and program elements. Of greatest concern is the enormous gulf between the ambitious goals identified in the chapters on decision support and human dimensions and the likely level of implementation ascertained from comments by agency representatives.

The strategic plan states that the responsibility for ensuring that the program's five overarching goals are met falls to the interagency governing body that manages the CCSP (see Box 3-2). However, the plan is not specific about the mechanisms it will employ to ensure that the overarching CCSP goals are met. Because the goals do not provide any real target for accomplishment, it is difficult to ascertain what will be considered success. The description of accountability at levels above the CCSP is even less clear. The cabinet-level committee and the Interagency Working Group should regularly solicit independent plan evaluation to measure progress toward the program's goals and help ensure that overarching program goals are met by taking steps to clearly link strategic plan priorities and activities to the vision, mission, and goals of the plan.

To address concerns about program management and accountability, the committee recommends that the CCSP clearly codify accountability at all levels of the program. In particular, the program needs to more clearly identify what each level of leadership is accountable for, and put processes in place to ensure that the plan's five overarching goals are met. Having these responsibilities clearly laid out could help ensure that presently under supported activities move forward and that priority areas are properly addressed. The responsibilities of the cabinet-level

BOX 3-2

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should describe the management processes to be used to foster agency cooperation toward common CCSP goals. The revised plan also should clearly describe the responsibilities of the CCSP leadership.

Revisions to the CCSP Strategic Plan
Chapter 16 of the revised plan includes a much improved discussion of program management and review. The chapter describes the cabinet-based management structure, program criteria, principal areas of focus for CCSP agencies, and responsibilities of the CCSP Office. It is clearly stated in the revised plan that the CCSP interagency governing body, chaired by the CCSP director, is responsible for coordination of program activities.

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should more clearly outline agency responsibilities for implementing the research.

Revisions to the CCSP Strategic Plan
Box 16-1 of the revised plan describes the principal areas of focus for each CCSP participating agency in general terms (CCSP, 2003, pp. 170-172). Specific objectives in Chapters 3-13 are not associated with a responsible agency, making it difficult to link CCSP goals and objectives to programs supported at the individual agencies.

committee and the Interagency Working Group should include reviewing the CCSP's and CCTP's overarching goals, ensuring that they meet the nation's needs and are complementary, and making sure that the goals are accomplished. Special attention is needed to identify who is responsible for addressing the CCSP-CCTP interface and identifying gap areas of research. Given that addressing climate change will be a challenge for decades, implementation of the strategic plan will take place over a succession of administrations; consequently, the program should carefully document its management processes.

Recommendation: The CCSP should establish and institutionalize effective management processes that create accountability for meeting program goals.

Adaptive Management of the Program

As the strategic plan is implemented, the CCSP leadership should adopt an adaptive management approach for the program as a whole by carefully monitoring its progress and periodically revisiting and adjusting the plan, its timelines, and its deliverables to address any shortcomings. This activity will require independent plan evaluation to measure progress against plan goals, assessment of stakeholder input and feedback, and a review of the degree to which the individual program elements are integrated to form a larger and more useful overall perspective. One possible unintentional result of failure to revisit the plan could be that the 21 proposed synthesis and assessment products would become the default substitutes for program selection criteria, budgetary decision criteria, and strategic plan evaluation. Such an unproductive outcome should be avoided.

The complex management structure proposed by the CCSP is essentially untested. Coordination among more than a dozen agencies will be a formidable challenge. The strategic plan is a research framework that requires considerable buy-in by the agencies. The plan itself has no real mandate for command-and-control functions and hence the success of the program will require a management approach that enhances coordination, and is collaborative and adaptive. This is the charge of the Interagency Working Group and the CCSP Office.

An important core function of the CCSP Office will be using the strategic plan in making decisions concerning research investments, priorities, and direction. Because the program and its strategic plan is expected to evolve over time, explicit mechanisms are needed to continuously engage the agencies, the research community, and stakeholders in order to gauge progress and incorporate new developments and priorities into the program. This can be accomplished in many ways, some of which are discussed in the context of decision support in Chapter 2 of this report. Whatever mechanism is chosen, constant attention to the overarching goals and a matching of the results and deliverables against these goals will be crucial. In the early years of the CCSP, the use of specific identified products to evaluate progress against these goals will need to be explicit and routine. At the same time, the program should have a mechanism for making revisions to the goals and outcomes when it is important. Any such process should be grounded in science and transparently involve the science community.

The committee recognizes that the challenges for understanding and responding to climate and associated global change have both near-term and long-term management issues. There is a need to make progress early, but there is also a need for mechanisms that ensure continuity over time. It is unlikely that all the scientific questions and policy-relevant problems will be resolved in the near term, and hence the management of this program needs to be based on modalities that transcend different administrations and conditions. This will require institutionalizing a mature management process that can adapt and grow as priorities shift. The program should recognize explicitly those longer-term problems that will not be resolved in the near term, develop a mechanism for making the necessary investments today to enable longer-term payoffs, and create adaptive management mechanisms that transcend individual administrations, events, or conditions.

INTERNATIONAL LINKAGES

The plan's description of international linkages in Chapter 15 is improved (see Box 3-3), providing an impressive list of U.S. involvement in international climate and associated global change research programs. The chapters on modeling and observations, as well as the final section of many other chapters, explicitly recognize that expanded international cooperation is required and list some specific programs. But the plan is still weak in identifying explicit opportunities where international cooperation can enhance or leverage CCSP research, thus increasing the efficiency and effectiveness of the program. Many of the research programs in the strategic plan will benefit from strong links to the international community of climate and associated global change scientists; indeed, many of the programs *require* such linkage. To enhance the strategic aspect of the CCSP, opportunities to build on bilateral, regional, and international programs that meet U.S. information needs both in science and decision support should be identified and reinforced. Among the key reasons to work more diligently on the international programs is that efficiency of resource use can be improved.

BOX 3-3

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should clearly describe how the CCSP will contribute to and benefit from international research collaborations and assessments.

Revisions to the CCSP Strategic Plan
Chapter 15 (International Research and Cooperation) of the revised plan provides an impressive list of U.S. involvement in international climate change research programs. The chapter describes international frameworks established to coordinate global change research, international assessment activities, bilateral discussions the United States has had with other countries, international efforts to build observing systems and shared data management, and capacity building in developing countries. Linkages with the international community are also identified within many of the program chapters. The plan could be more specific about how the CCSP will contribute to the international efforts and could provide more detail about how the United States would benefit from this involvement.

Two important sets of international linkages should be strengthened within the program. The first is the need for international capacity building through collaborations with developing countries such as those pursued through the International Geosphere Biosphere Programme (IGBP), International Human Dimensions Program (IHDP), World Meteorological Organization (WMO), Inter-American Institute for Global Change Research (IAI), Asia-Pacific Network for Global Change Research (APN), and a variety of bilateral programs. These collaborations can be very beneficial to U.S. climate change research in that they build understanding of regions that play key roles in the global climate system, such as the Amazon or the Asian monsoon region, and contribute to attempts to establish a global observing system. The plan includes some discussion of capacity building in developing countries (CCSP, 2003, p. 167). However, compared to the level of detail provided about domestic research initiatives, the plan fails to develop plans or identify resources for such programs.

Second, the CCSP should develop a more detailed recognition, review, and plan for collaboration with scientists in regions such as Europe, Japan, Australia, and China. The plan briefly describes bilateral discussions that the United States has had with several other nations (CCSP, 2003, p. 160-161). In some cases these international partners are funding science that greatly enhances or overlaps with U.S. activities. The International Group of Funding Agencies (IGFA) provides a venue for coordination of international research funding. Climate modeling in the United Kingdom, Germany, and Japan provides important comparative and competitive opportunities for the proposed two-center U.S. modeling initiative. European Union and national research programs are focusing considerable resources on questions of climate impacts, adaptation, mitigation, outreach to stakeholders, and assessments that can provide research implementation and funding models for the new U.S. programs. Some of these programs (e.g., the U.K. Climate Impacts Programme) focus on interaction with stakeholders and decision support and provide important lessons that could allow a faster startup for new U.S. initiatives.

RESOURCES TO IMPLEMENT THE PLAN

Feasibility Analysis

In clearly stating five overarching goals for the CCSP, the revised strategic plan is a significant improvement over its draft. However, the strategic plan does not provide enough information to allow the committee or the community at large to make a fully informed judgment as to whether there are sufficient financial and other resources to meet the program goals. This lack of information on resource needs coupled with an abundance of vaguely worded objectives, as discussed in Chapter 1 of this report, makes it difficult to assess the likelihood that the CCSP will succeed at reaching its overarching goals. In short, it appears that the CCSP has not carefully conducted a feasibility analysis of the activities proposed in the strategic plan.

The strategic plan would have been more convincing if the reader were able to draw a line from budgetary inputs through an implementing agency to final or even interim products. For example, the most clearly identified deliverables in the revised plan are the 21 synthesis and assessment products. As noted elsewhere in this report, the connection between each of these synthesis products and the overarching program goals is not clearly made. Moreover, it is not clear what these products are envisioned to encompass. At one extreme, they may simply represent summaries of the current state of knowledge about the selected topics. Although it would be feasible to produce such summaries quickly and at relatively low cost, this would represent at best a minimal step toward reaching the plan's overarching goals. On the other extreme, if these synthesis products are intended to provide the scientific

basis for achieving these higher-level goals, then the plan is unrealistically optimistic in what can be accomplished at current funding levels in two to four years. The true aim likely lies somewhere between these extremes, but without further clarification it is not possible to say whether the objectives are likely to be achieved.

Recognizing the difficulties of government officials commenting on future budgets, some indication of the financial and other resources that will be required to carry out the program is nonetheless needed. The CCSP has indicated that these details would be worked out as implementation of the plan moves forward, but no process by which this would occur has been proposed. It is absolutely critical to the success of the plan that such a process be formalized and initiated as soon as possible and that it involve scientists and stakeholders from outside the federal government in both the design and oversight of research programs. The committee believes that significant progress toward the plan's higher-level goals is possible at reasonable levels of funding and over a reasonable period of time. However, to ensure that progress is made, it is necessary to develop specific research programs, conduct careful feasibility analysis, and provide adequate funding, institutional, and other support required to achieve the stated objectives.

Ensuring Adequate Financial Resources

The revised strategic plan identifies a much broader scope of activities than has historically been supported under the auspices of the Global Change Research Program (GCRP). To succeed, such an expansion in scope will require a concomitant expansion in funding. A fully informed assessment of whether adequate funding is available for the proposed program was not possible because the CCSP did not provide the committee with prospective budget information and because many of the objectives in the plan are too vaguely worded to determine what will constitute success. However, the present budget for the CCSP does not appear to be capable of supporting all of the activities identified in the strategic plan. Whereas well-established program elements have a track record of funding, newer or expanded areas in the strategic plan lack clear budget lines and agency homes. The major expansion in climate modeling and climate observations that the plan calls for will also require an increase in funding above current levels. There is no evidence in the plan or elsewhere of a commitment to provide the necessary funds for these newer or expanded program elements. Whatever the budget allocations, the CCSP and participating agencies will need to start making budget decisions and setting priorities to allow the program to meet the ambitious overarching goals of the plan.

The CCSP needs strong leadership and effective management approaches to address problems in the distribution of current funding and to develop new funding as needed. The committee recognizes the major challenges associated with deciding how to allocate new resources and shift existing resources across 13 agencies and congressional jurisdictions. There are at least four management approaches to funding that could be used to address these challenges. One approach would be to designate a single agency to manage or coordinate the program. Such an approach would avoid some of the difficulties in coordinating programs and budget across so many agencies and congressional jurisdictions. However, this approach could weaken strong research programs that are currently managed by other agencies if these programs felt "disenfranchised" by the lead agency. A second approach would to provide the CCSP Office itself with a significant amount of funding to be used to support new and crosscutting initiatives and other program priorities. This would create a strong incentive for agency programs to coordinate with each other on these initiatives while leveraging existing programs within individual agencies. A potential downside to this approach would be that it could lead to significant reductions in funding in existing programs unless accompanied by major increases in funding for the CCSP as a whole. A third approach would be to require the CCSP agencies to prepare and submit a joint budget to the Office of Management and Budget (OMB), as was done in the early years of GCRP, and to empower OMB to recommend changes in funding allocations across the agencies. This approach would create incentives for agencies to cooperate in preparing a joint budget. If not implemented carefully, however, it could put OMB, rather than the CCSP leadership and others who are more knowledgeable about climate change science and technology issues, in a position of making decisions on programmatic priorities. A fourth approach would be to have the interagency CCSP make recommendations about funding and program allocations to the Interagency Working Group on Climate Change Science and Technology, which is the process described in the strategic plan. An advantage of this approach is that it allows those most knowledgeable about the program to make funding decisions. The division of authority among 13 agencies is likely to make it difficult to agree on changes in funding allocation and prioritization, as has been observed throughout the history of the GCRP (NRC, 2001).

Recommendation: The CCSP and its parent committees should (1) develop a clear budgetary process linking tasks to agency and program budgets; (2) secure the financial resources, for the present and the future, that will ensure the overall success of the plan; and (3) consider new approaches to funding that will enable new initiatives and shifting of resources to respond to the nation's evolving needs.

Capacity Building

In reviewing the draft strategic plan, the committee recommended that the revised strategic plan "explicitly address the major requirements in building capacity in human resources that are implied in the plan" (see Box 3-4). The revised plan mentions capacity building in the context of the modeling strategy, decision support, and international research and cooperation, but does not discuss capacity needs spanning the entire program. The CCSP likely faces shortages in the human and institutional capacity needed to implement the strategic plan, especially in new and expanded program areas. Of particular concern is the need for a program to train the next generation of "adaptation specialists" that can work in sectors most impacted by climate, such as energy, water management, agriculture, fisheries, and ecosystems management. To meet the nation's needs for innovative solutions to challenging social problems associated with climate change, the CCSP should devise ways to support economists, sociologists, anthropologists, statisticians, lawyers, policy advisors, communications specialists, and other social science specialists in climate and adaptation programs.

Within the agencies, the capability and inclination to provide decision support—as opposed to basic scientific results—may be limited. Given the expanded attention to decision support, communication with stakeholders, and interagency coordination, the committee sees a much larger role and responsibility being placed on the CCSP Office. However, that office may not have the human resources necessary to meet the strategic plan objectives. As the provision of decision support is a central goal of the overall plan, failure in this area would represent a serious failure of the overall program.

Recommendation: The CCSP should carefully assess the needs in capacity implied by the strategic plan and address any gaps by coordinating ongoing capacity building efforts at participating agencies and initiating new programs as needed. The CCSP Office should be appropriately resourced to reflect its expanded roles.

BOX 3-4

***Planning Climate and Global Change Research* (NRC, 2003b) Recommendation**
The revised strategic plan should explicitly address the major requirements in building capacity in human resources that are implied in the plan.

Revisions to the CCSP Strategic Plan
Capacity building is mentioned in three chapters of the revised plan: Chapter 10 (Modeling Strategy) states that the CCSP will "establish graduate, post-doctoral, and visiting scientist programs to cross-train new environmental scientists for multidisciplinary climate and climate impacts modeling research and applications" (CCSP, 2003, p. 107); Chapter 11 (Decision Support Resources Development) states that "the analyses and development of other decisions support resources are intended to support the decision-making process and to be capacity-building activities" (CCSP, 2003, p. 112); and Chapter 15 (International Research and Cooperation) includes a section on CCSP efforts to "build scientific capacity in the developing world" (CCSP, 2003. p. 167). The plan does not present a discussion of human resources and institutional capacity needs spanning the entire program. Of particular concern is the capacity needed to achieve goals in new or expanded areas of the program.

4

Strategic Planning

EVALUATION OF THE PLANNING PROCESS

The draft plan was developed largely by the Climate Chang Science Program (CCSP) Office and the participating agencies without involvement of the external community. As a consequence, and as pointed out in this committee's first report, the draft plan was of mixed scientific quality, with the result that those chapters drawing upon preexisting expert working groups and science initiatives (e.g., atmospheric composition and the carbon cycle) were better developed and more consistent with the community consensus about priorities than other chapters in the plan (NRC, 2003b).

Once developed, however, a number of steps were taken to solicit input on the draft strategic plan. The CCSP organized a Planning Workshop in December 2002, which was open to all interested parties. The effort it took to organize such a large workshop for the discussion of the draft report was notable and widely appreciated. Comments on the draft plan were solicited from numerous scientists and stakeholders, at the workshop, by e-mail, and by other means. These approaches succeeded in communicating the thoughts and ideas of hundreds of people; well over 1,000 people attended the workshop and some 900 pages of written comments were received. In addition, the CCSP requested and received a detailed report from this committee. Overall, the mechanisms for gathering and organizing input relevant to the draft plan were commendable. In the view of the committee, the approaches taken by CCSP to receive and respond to comments from a very large and very broad group of scientists and stakeholders sets a high standard for all government research programs related to the development and use of science and engineering information.

The workshop was structured to elicit a wide variety of ideas and suggestions for improvement. The agenda included keynote addresses by many top Administration and international officials, breakout sessions focused on individual chapters or crosscutting issues, and plenary session summaries of the breakout sessions. In each breakout session, an overview presentation was made by an agency employee, two to four invitees then presented a critique of the designated section of the plan, and finally the session was opened to comments from the audience. The workshop attendees were able to engage openly in discussions, to express ideas, and to offer suggestions for improvement. A message of transparency and openness was constantly communicated to all participants. The format of plenary sessions, breakout groups, and breakout group summaries was generally effective in facilitating the exchange of ideas at such a large gathering.

There are opportunities for improvements in future workshops of this type. First, in several sessions, the balance between presentation and discussion should have been modified to permit more of the latter. The constrained schedule for the conference meant that the printed document dominated the agenda, leaving insufficient time to discuss questions about the underlying assumptions and gaps in the program's intellectual underpinning. Second, particular efforts should be made to attract stakeholders and scientists from programs now targeted for enhancement, such as decision support. Participation in the workshop was dominated by agency employees and scientists supported by federal funding, with significantly smaller attendance by scientists from previously underemphasized program elements, the private sector, state and local natural resource and land-use decision makers, and the environmental community.

It was clear that the comments elicited were welcomed and would receive consideration. The process used to make decisions regarding the comments was not well communicated. The committee recognizes the difficulty associated with specifying exactly how comments would be evaluated, as such activities inevitably involve extensive discussions among the plan drafters and managers. At the same time, more transparency would have been desirable regarding how comments would be weighed, how conflicting comments would be resolved and how the program would respond to suggestions not to be implemented. For the most part, the CCSP's revisions to the strategic plan are quite responsive to comments expressed at the workshop, in written input, and by this committee. One notable exception is the fact that the revised plan does

not acknowledge the substantive and procedural contributions of the U.S. National Assessment of the Potential Consequences of Climate Variability and Change (NAST, 2001), a major focus of the Global Change Research Program (GCRP) in the late 1990s. Many participants at the December workshop criticized how the draft strategic plan treated the National Assessment, as did this committee in its first report (NRC, 2003b). The revised plan does not reflect an attempt to address these concerns, and no rationale for this decision has been provided.

As the program moves forward from planning to implementation, regular opportunities should be provided for interested parties to comment on the specific details of the program. The overall plan, and its individual components, will benefit from review boards, steering committees, and other structures that can provide external expert advice to the program's managers. In fact, at the committee's August 2003 meeting, several chapter authors indicated that they are planning workshops with research and stakeholder communities to further revise their portions of the strategic plan and to develop implementation plans. The committee commends the program managers for seeking input from expert communities in this manner. These smaller expert workshops would have been of even more value if they had taken place before the strategic plan was prepared and before the large planning workshop. Increasing the involvement of the decision support community and various stakeholders is an important way to improve future planning. This involvement should be given a high priority in the near term, starting with areas where there is already a receptive decision-making group, such as water resource managers.

THE NEXT GENERATION OF STRATEGIC PLANNING

The current strategic planning effort of the CCSP has been impressive. It has identified goals and objectives for the program, proposed an ambitious series of products that will shed light on issues perceived to be important for national decision makers, and stimulated a great amount of cooperation among the many participating agencies. But, as the CCSP itself has pointed out, planning and implementing such an ambitious program is itself something of an experiment. It is an experiment not only in managing activities among a diverse group of agencies but also in trying to produce near-term results and analyses helpful to decision makers while simultaneously assuring that the long-term nature of the climate change issue continues to receive sufficient attention. Even with the substantial history of the GCRP behind it, continued planning and management of the CCSP remains a work in progress.

While many of the activities that are envisioned in the current strategic plan will succeed, some will fail, and others will achieve their goals more slowly than anticipated. Some agencies will perceive their involvement in the CCSP to have advanced their missions; others will not. The science will proceed quickly in some areas and frustratingly slowly in others. It is critical that the program management and the agencies use these experiences in an adaptive way to adjust their own management practices as they identify the next series of tasks in a dynamic scientific, budgetary, and political environment. Embracing adaptive management for the program as a whole will require ongoing and rigorous evaluation and redirection. As discussed in Chapter 2 of this report, to identify which program elements are succeeding and which are lagging, the CCSP will need to conduct rigorous independent program reviews.

The committee believes that one way to ensure that adaptive learning occurs will be for the CCSP to conduct future strategic planning exercises, perhaps in collaboration with relevant international programs. The CCSP should update the strategic plan every three to five years. The updated strategic plan need not be as extensive as the current plan; it could instead focus largely on those areas of the science and the program for which adjustments are needed, and should spell out what those adjustments are intended to be. It will be critical that the updated plan be developed in cooperation with scientific and stakeholder communities, and that the updated plan identify the management responsibility and accountability for all the elements of the program, including its crosscutting functional components, such as communications and data management.

Recommendation: The CCSP should plan for the generation of an updated strategic plan every three to five years.

The process of producing the updated plan should reflect the learning that has accompanied the current CCSP strategic plan. Any strategic plan is a balance between the top-down goals of the organization and its bottom-up capabilities to deliver information and products. The current plan reflects this tension in the often poor linkage between the products and milestones identified in the individual science chapters and the five goals for the overall CCSP. The updated plan should resolve persisting linkage problems. This can be done effectively only by engaging the scientific community responsible for generating measurements and knowledge in each of the program's areas. This engagement should happen early and often, to provide timely feedback to the CCSP.

Involving the potential users of climate science (broadly defined) early in the updated strategic planning

effort will be equally important. Many of the activities proposed in the current plan could be used to structure such engagement, and their success will be critical to the overall success of the CCSP. Engaging users in an open and transparent way will strengthen the credibility of the plan. The CCSP should hold open workshops to review users' needs as a precursor to the development of an updated strategic plan.

Another improvement to the planning process should be a greater interaction with the global audience than has been achieved to date. This interaction should be rooted in both the science and decision support activities of the CCSP. By engaging the scientific and user communities in critical countries, the CCSP could be more effective in addressing its scientific objectives and in investing resources.

The CCSP should document and publish its process for strategic planning and implementation. The CCSP intends to become a learning organization, and one of the characteristics of such organizations is their documentation of what they have learned. Because documentation typically leads to institutionalization, the CCSP will be able to learn effectively from the current process of planning and implementation, and will be able to demonstrate the progress that the nation can reasonably expect in the future.

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Appendixes

Appendix A

Statement of Task

An *ad hoc* committee will conduct an independent review of the U.S. Climate Change Science Program's strategic plan for global change and climate change studies, giving attention also to the program's strategic planning process. This review will be carried out in two phases.

Phase I

In the first phase, the committee will review the discussion draft of the plan. The review will address the following questions about the draft plan as a whole:

- Is the plan responsive to the nation's needs for information on climate change and global change, their potential implications, and comparisons of the potential effects of different response options?
- Are the goals clear and appropriate?
- Is there an appropriate balance (1) between short-term (2-5 years) and longer-term goals, (2) among substantive research areas, and (3) between research and non-research activities, such as observations, modeling, and communicating results?
- Are mechanisms for coordinating and integrating issues that involve multiple disciplines and multiple agencies adequately described?
- Does the plan adequately describe the roles of the public, private sector, academia, state/local governments, and international communities, and linkages among these communities?
- Does the written document describing the program effectively communicate with both stakeholders and the scientific community? Is the question format for driving the research program effective?

The review also will address the following questions for each of the plan's major topical areas:

- Does the plan reflect current scientific and technical understanding?
- Are the specific objectives clear and appropriate?
- Are expected results and deliverables (and their timelines) realistic given the available resources?

In its review, the committee will consider the scientific and stakeholder community comments at the U.S. Climate Change Science Program's workshop and other comments received by the program during the public comment period. If time permits, the committee also will comment on any significant process issues related to the workshop that could affect how the program revises the draft plan.

The results of phase I will be provided in a report to be delivered no later than February 28, 2003.

Phase II

In the second phase, the committee will provide an overall assessment of the revised (final) plan, with an emphasis on how the plan has evolved in response to NRC and other community input. The committee also will address the following questions related to the processes used to solicit and consider input from the scientific and stakeholder communities throughout the strategic planning process:

- Were the mechanisms for input from the scientific and stakeholder communities throughout the program's strategic planning process adequate?
- Did the format of the workshop promote the open exchange of ideas and suggestions for improvement?
- Was the process used to make decisions on potential changes to the draft plan clearly communicated to workshop participants and others who submitted comments during the public comment period?
- Was this process consistent with generally accepted practices for considering community input during public comment periods?
- What specific improvements should be reflected in future planning efforts for the program?

The results of phase II will be provided in a report to be delivered to the program within 6 months after the revised (final) plan is published.

Appendix B

Committee and Staff Biographies

Dr. Thomas E. Graedel (*Chair*) is a professor of industrial ecology at Yale University. He earned his Ph.D. in astrophysics in 1969 from the University of Michigan. His research interests include chemistry and physics of atmospheric gases and aerosols; effects of atmospheric contaminants on materials and electrical and mechanical equipment; and environmentally responsible industrial product and process design. His most recent research focuses on studies of the stocks and flows of materials in the industrialized society, especially in very large cities and in environmentally sensitive regions. This work explores aspects of resource availability, potential environmental impacts, opportunities for recycling and reuse, and resources policy initiatives. Dr. Graedel is a member of the NRC Committee on Material Flows Accounting of Natural Resources, Products, and Residuals and is a member of the National Academy of Engineering.

Dr. Linda Capuano recently retired as the vice president of strategic marketing and business development for Honeywell Engines & Systems, a $5 billion aerospace business that provides propulsion engines, auxiliary power units, environmental control systems, engine controls and accessories, as well as electrical power. She was responsible for strategic planning, e-business, and mergers and acquisitions. Joining AlliedSignal in 1995, Dr. Capuano was the general manager of commercial air transport auxiliary power unit products. Previously, she was the vice president of operations and business development and part of the founding team of Conductus, a telecommunications superconductive electronics business in Sunnyvale, California. Dr. Capuano has also held product management positions in magnetic memory recording at IBM. She served on the Department of Energy Task Force on Alternative Futures for the DOE National Laboratories and chair of the National Research Council's Board on Assessment of NIST Programs. Dr. Capuano holds a B.S. in chemistry from State University of New York at Stony Brook, a B.S. in chemical engineering and an M.S. in chemistry from the University of Colorado, and an M.S. in engineering management and Ph.D. in materials science from Stanford University.

Dr. Elizabeth Chornesky is a freelance analyst and research associate at the University of California, Santa Cruz. For more than a decade, she has worked on integrating science into policies and practices related to the conservation of biological diversity and management of biological resources. Previously, as the director of stewardship and then director of conservation research at The Nature Conservancy, Dr. Chornesky oversaw the organization's multi-million dollar research programs and led teams of extension scientists specializing in ecological management, monitoring, and restoration. Prior to that, she was a project director and analyst at the U.S. Congress Office of Technology Assessment, working on national assessments related to invasive species and pesticide alternatives. Her early career was as a research scientist in marine ecology and systematics at the Smithsonian Institution and Lehigh University. Dr. Chornesky has consulted for the National Commission on Science for Sustainable Forestry, the Union of Concerned Scientists, and the Wallace Institute for Alternative Agriculture. She also serves on several national committees, most recently a visioning initiative of the Ecological Society of America's Governing Board and the NRC Committee on Opportunities in Agriculture. Dr. Chornesky holds a B.A. from Cornell University and a Ph.D. from the University of Texas at Austin.

Ms. Mary A. Gade is a partner in the environmental practice group in the law firm of Sonnenschein Nath & Rosenthal in Chicago, Illinois, where her work includes litigation, regulatory affairs, and compliance counseling. Before joining the firm, Ms. Gade was the director of the Illinois Environmental Protection Agency from 1991 to 1999. She supervised a staff of approximately 1,400 that enforced the environmental laws and regulations of the state, conducted hazardous waste cleanups, responded to environmental emergencies, maintained environmental laboratories, provided financial assistance to local governments for pollution control facilities, and encouraged and supported pollution prevention programs. She received her law degree in 1977 from Washington University School of Law in St. Louis, Missouri, and her undergraduate degree in environmental studies and Italian from the University of Wisconsin-Madison. She has been a fellow of the National Academy of Public Administration since 1996.

Ms. Katharine L. Jacobs is a member of the faculty of the University of Arizona, Water Resources Research Center and associate staff scientist with the Institute for the Study of the Planet Earth. She previously worked on rural water resources issues and developed a drought plan for the state at the Arizona Department of Water Resources (ADWR). She was the director of the Tucson Active Management Area (AMA) of the ADWR from 1988 through 2001. In 2001-2002 she worked on a special project at the National Oceanic and Atmospheric Administration focused on the interface between scientific information, policy and decision making. Ms. Jacobs earned her M.L.A. in environmental planning from the University of California, Berkeley. Her expertise is in groundwater management and developing practical, appropriate solutions to difficult public policy issues. She has been involved in all aspects of implementation of the 1980 Groundwater Management Act, including establishing water rights and permits; developing mandatory conservation requirements for municipal, agricultural, and industrial water users; developing plans for artificial recharge, and writing the Assured Water Supply Rules that require new subdivisions in AMAs to prove a 100 year supply of water. She served on the Synthesis Team for the U.S. National Assessment of the Consequences of Climate Variability and Change and two other National Research Council panels, Valuing Groundwater (1994) and Endangered Species on the Platte River (2003).

Dr. Anthony C. Janetos is a senior research fellow at the H. John Heinz III Center for Science, Economics, and the Environment. Dr. Janetos earned his Ph.D. in biology from Princeton University. In 1999 he joined the World Resources Institute as senior vice president and chief of programs. Previously he served as senior scientist for the Land-Cover and Land-Use Change Program in NASA's Office of Earth Science, and was program scientist for the *Landsat* 7 mission. He has many years of experience in managing scientific research programs on a variety of ecological and environmental topics, including air pollution effects on forests, climate change impacts, land-use change, ecosystem modeling, and the global carbon cycle. He was a cochair of the U.S. National Assessment of the Potential Consequences of Climate Variability and Change, and was an author of the IPCC Special Report on Land-Use Change and Forestry and the Global Biodiversity Assessment. Dr. Janetos recently served on the NRC Committee on Review of Scientific Research Programs at the Smithsonian Institution.

Dr. Charles D. Kolstad is the Donald Bren Distinguished Professor of Environmental Economics and Policy at the University of California, Santa Barbara, where he is jointly appointed in the Department of Economics and the Bren School of Environmental Science and Management. For the decade prior to joining UCSB in 1993 he was on the faculty of the University of Illinois, Urbana-Champaign. He has been a visiting professor at Massachusetts Institute of Technology, Stanford, the Catholic University of Leuven (Belgium) and the New Economic School (Moscow). He received his Ph.D. from Stanford University (1982), his M.A. from the University of Rochester and his B.S. from Bates College. His research interests have been in the area of regulation, particularly environmental regulation. Recently he has also done work on environmental valuation theory in the role of information in environmental decision making and regulation, and the role of uncertainty and learning in controlling the precursors of climate change. His past work in energy markets has focused on coal and electricity markets, including the effect of air pollution regulation on these markets. Dr. Kolstad has served on several NRC committees, including the Committee on Building a Long-Term Environmental Quality Research and Development Program in the U.S. Department of Energy and the Board on Energy and Environmental Systems.

Dr. Diana M. Liverman joined the University of Oxford as the director of the Environmental Change Institute and professor of environmental science in the School of Geography and Environment in October 2003. Dr. Liverman previously served as the director of the Center for Latin American Studies, professor of geography and regional development, and a member of the Executive Committee of the Institute for the Study of Planet Earth (ISPE) at the University of Arizona. Dr. Liverman's research examines the social causes and consequences of environmental change, especially in Latin America. She is currently working on the impacts of climate variability and change on agriculture and water resources, and on the anthropogenic causes of changes in land use and land cover, both with a regional focus on Mexico. She also studies environmental policy relating to the U.S.-Mexico border, the functioning of transnational research institutions, such as the Inter-American Institute for Global Change Research, and she is associated with UA-ISPE's Climate Assessment for the Southwest. Dr. Liverman received her Ph.D. from University of California, Los Angeles.

Dr. Jerry D. Mahlman is a senior research fellow at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. He was the director of the Geophysical Fluid Dynamics Laboratory at the National Oceanic and Atmospheric Administration in Princeton, New Jersey, for 16 years before his retirement in 2000. He was also a professor of atmospheric and oceanic sciences at Princeton University for 28 years. Much of Dr. Mahlman's research career has been directed toward understanding the behavior of the stratosphere and troposphere. This has involved extensive mathematical modeling and diagnosis of the interactive chemical, radiative, dynamical, and transport aspects of the atmosphere, as well as their

implications for climate and chemical change. Over the past decade he has played a central role in the interpretation of climate change to policy makers and affected communities. Dr. Mahlman has served on numerous committees and boards, including the NASA Advisory Council and the Board on Sustainable Development of the National Research Council. In 1994 he received the prestigious Carl-Gustaf Rossby Research Medal from the American Meteorological Society and the Presidential Distinguished Rank Award, the highest honor awarded to a federal employee. He received his Ph.D. from Colorado State University.

Dr. Diane McKnight is professor of civil, environmental and architectural engineering at the University of Colorado. Her research focuses on interactions between hydrologic, chemical, and biological processes in controlling the dynamics in aquatic ecosystems. This research is carried out through field-scale experiments, modeling, and laboratory characterization of natural substrates. In addition, Dr. McKnight conducts research focusing on interactions between freshwater biota, trace metals, and natural organic material in diverse freshwater environments, including lakes and streams in the Colorado Rocky Mountains and in the McMurdo dry valleys in Antarctica. She also develops interactions with state and local groups involved in mine drainage and watershed issues in the Rocky Mountains. Dr. McKnight is a member of the NRC's Water Science and Technology Board and is a former member of the Polar Research Board. She received her Ph.D. in environmental engineering from the Massachusetts Institute of Technology.

Dr. Michael J. Prather is professor and Kavli Chair in the Earth System Science Department at the University of California, Irvine. He received his Ph.D. in astronomy from Yale University. His research interests include the simulation of the physical, chemical, and biological processes that determine atmospheric composition and the development of detailed numerical models of photochemistry and atmospheric radiation, and global chemical transport models that describe ozone and other trace gases. Dr. Prather has played a significant role in the IPCC second and third assessments and special report on aviation, and in the World Meteorological Organization's Ozone Assessments (1985-1994). He is a fellow of the American Geophysical Union and a foreign member of the Norwegian Academy of Science and Letters, and has served on several NRC committees, including the Panel on Climate Variability on Decade-to-Century Time Scales.

Dr. Eugene Rosa is professor of sociology and the Edward R. Meyer Distinguished Professor of Natural Resource and Environmental Policy in the Thomas S. Foley Institute for Public Policy and Public Service at Washington State University. Dr. Rosa also serves on the Advisory Board of the CIVICS (Consultative Institutions: Values and Information in a Changing Society) Network of the European Union. Dr. Rosa's research program has focused on environmental topics, particularly energy, technology, and risk issues, with attention to both theoretical and policy concerns. He has investigated the relationship between levels of energy consumption and societal well-being, public opinion about energy problems and policies, factors affecting the adoption of solar technologies and conservation practices, and public attitudes toward and acceptance of nuclear power and nuclear policies. Most recently his research is focused on two complementary topics: technological risk and global environmental change. His principal research activities associated with global change are devoted to specifying the anthropogenic causes of carbon dioxide loads and of ecological footprints, to the historical relationships between greenhouse gases and societal well-being, to the history of social thought on climate, and to testing theories of environmental impact. Dr. Rosa received his Ph.D. in social science from the Maxwell Graduate School of Syracuse University and completed postdoctoral work at Stanford University.

Dr. William H. Schlesinger is the James B. Duke Professor of Biogeochemistry and dean of the Nicholas School of the Environment and Earth Sciences at Duke University. After completing his A.B. at Dartmouth (1972) and Ph.D. at Cornell (1976), he joined the faculty at Duke in 1980. He is the author or coauthor of over 150 scientific papers and the widely adopted textbook *Biogeochemistry: An Analysis of Global Change* (Academic Press, 2nd ed., 1997). He was elected a member of the American Academy of Arts and Sciences in 1995. Currently Dr. Schlesinger focuses his research on global change ecology. He is the co-principal investigator for the Free Air Carbon Dioxide Enrichment (FACE) Experiment in the Duke Forest, a project that aims to understand how an entire forest ecosystem (vegetation and soils) will respond to growth in elevated CO_2. He has also worked extensively in desert ecosystems and their response to global change. From 1991 to 2000 he served as principal investigator for the NSF-sponsored program of Long Term Ecological Research (LTER) Network at the Jornada Basin in southern New Mexico. His past work has taken him to diverse habitats, ranging from Okefenokee Swamp in southern Georgia to the Mojave Desert of California. His research has been featured on NOVA, CNN, NPR, and on the pages of *Discover*, *National Geographic*, *New York Times*, and *Scientific American*. Schlesinger has testified before U.S. House and Senate Committees on a variety of environmental issues, including preservation of desert habitats and global climate change. He is a member of the Committee on Research and Exploration for the National Geographic Society. Schlesinger has been elected president of the Ecological Society of America for 2003-2004.

Dr. David L. Skole is a professor of geography and the director of the Center for Global Change and Earth Observations at Michigan State University. He received a Ph.D. in natural resources from the University of New Hampshire His research interests are in the role of land-use and land-cover change and its relation to global change and sustainable development. Much of his work involves remote sensing at continental scales in the tropical and temperate zones, including assessments of the rates and geographic patterns of tropical forest conversion and fragmentation. His research incorporates geographical information and geospatial information technologies in numerical models of natural and managed landscape change and its effect on biodiversity and biogeochemistry. Dr. Skole is past chair of the IGBP-IHDP Core Project on Land Use and Cover Change. He currently serves as chair of the Forest Cover Characteristics and Changes Implementation team of the United Nations Global Terrestrial Observing System program on Global Observations of Land Cover Dynamics, and has served on several advisory committees at federal agencies and the aerospace and geographic information system industries in the United States. Dr. Skole is currently the chair of the U.S. National Science Foundation Advisory Committee on Environmental Research and Education and a member of NASA's *Landsat* 7 science team.

Dr. Andrew R. Solow is an associate scientist and the director of the Marine Policy Center at Woods Hole Oceanographic Institution. His research interests include environmental and ecological statistics, time series analysis, spatial statistics, and applied Bayesian methods. His recent work has focused on population modeling with an emphasis on capturing the population effects of environmental variability. Dr. Solow is a former member of the NRC's Commission on Geosciences, Environment, and Resources and the Committee on Fifty Years of Ocean Discovery at the National Science Foundation. Dr. Solow earned his Ph.D. in geostatistics from Stanford University.

Dr. Robert A. Weller received his Ph.D. in 1978 from the Scripps Institution of Oceanography. He is the director of the Cooperative Institute for Climate and Ocean Research at Woods Hole Oceanographic Institution; he has worked at WHOI since 1979. His research is on atmospheric forcing (wind stress and buoyancy flux), surface waves on the upper ocean, prediction of upper ocean variability, and the ocean's role in climate. He serves as the Secretary of the Navy Chair in Oceanography. He has been on multiple mooring deployment cruises and has practical experience with ocean observation instruments. Dr. Weller is currently serving on the NRC Committee on Utilization of Environmental Satellite Data: A Vision for 2010 and Beyond and the NRC Committee on Implementation of a Seafloor Observatory Network for Oceanographic Research.

Dr. Steve Wittrig is director of the Clean Energy: Facing the Future Program for BP, a program to invest $10 million in Chinese universities to develop and prove clean energy technologies for China and the rest of the world. He worked on the BP/Amoco merger, considering gas-to-liquids strategy and chemical technology strategy and implementation; and on special assignments for Amoco including leading the strategy development team for a program to convert gas to liquids and oxygenates. In prior assignments with Amoco, he managed the engineering and process evaluation group for new product development in chemicals; led a team developing new reactor technology for methane conversion to syngas; and worked with Amoco Oil on coal liquefaction, refinery research, and pollution control. He has a B.S. from the University of Illinois, Urbana, and a Ph.D. in chemical engineering from the California Institute of Technology.

National Research Council Staff

Dr. Amanda Staudt is a program officer with the Board on Atmospheric Sciences and Climate of the National Academies. She received an A.B. in environmental engineering and sciences and a Ph.D. in atmospheric sciences from Harvard University. Her doctorate research involved developing a global three-dimensional chemical transport model to investigate how long-range transport of continental pollutants affects the chemical composition of the remote tropical Pacific troposphere. Since joining the National Academies in 2001, Dr. Staudt has worked on studies addressing weather research needs for surface transportation, climate forcings, air quality management in the United States, research priorities for airborne particulate matter, the *NARSTO Assessment of the Atmospheric Science on Particulate Matter*, carbon monoxide episodes in meteorological and topographical problem areas, and weather forecasting for aviation traffic flow management. She also is the study director for the longstanding Climate Research Committee.

Dr. Gregory H. Symmes serves as associate executive director of the Division on Earth and Life Studies (DELS) of the National Academies, where he is responsible for managing the review of over 70 reports each year and coordinating the National Academies' global change activities, among other management duties. Prior to the formation of DELS in January 2001, he served as associate executive director of the National Academies' Commission on Geosciences, Environment, and Resources. In addition to his division-level management responsibilities, Dr. Symmes has directed National Academies

studies in the following areas of science policy: peer review processes and science and technology needs for the Department of Energy's radioactive waste management efforts; regulation of hardrock mining on federal lands; and competitive research within the U.S. Department of Agriculture. Before joining the NRC in 1995, Dr. Symmes served as a research assistant professor and postdoctoral associate in the Department of Earth and Space Sciences at the State University of New York at Stony Brook. He received his Ph.D. in geology from the Johns Hopkins University and his B.A. summa cum laude in geology from Amherst College.

Appendix C

Global Change Research Act of 1990

Public Law 101-606 [S. 169]; November 16, 1990
104 Stat. 3096-3104

An Act to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions toward international protocols in global change research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Global Change Research Act of 1990".

SECTION 2. DEFINITIONS.

As used in this Act, the term--

1. "Committee" means the Committee on Earth and Environmental Sciences established under section 102;
2. "Council" means the Federal Coordinating Council on Science, Engineering, and Technology;
3. "Global change" means changes in the global environment (including alterations in climate, land productivity, oceans or other water resources, atmospheric chemistry, and ecological systems) that may alter the capacity of the Earth to sustain life;
4. "Global change research" means study, monitoring, assessment, prediction, and information management activities to describe and understand--

   A. The interactive physical, chemical, and biological processes that regulate the total Earth system;
   B. The unique environment that the Earth provides for life;
   C. Changes that are occurring in the Earth system; and
   D. The manner in which such system, environment, and changes are influenced by human actions;

5. "Plan" means the National Global Change Research Plan developed under section 104, or any revision thereof; and
6. "Program" means the United States Global Change Research Program established under section 103.

TITLE I--UNITED STATES GLOBAL CHANGE RESEARCH PROGRAM

SEC. 101. FINDINGS AND PURPOSE.

(a) FINDINGS--The Congress makes the following findings:

1. Industrial, agricultural, and other human activities, coupled with an expanding world population, are contributing to processes of global change that may significantly alter the Earth habitat within a few human generations.
2. Such human-induced changes, in conjunction with natural fluctuations, may lead to significant global warming and thus alter world climate patterns and increase global sea levels. Over the next century, these consequences could adversely affect world agricultural and marine production, coastal habitability, biological diversity, human health, and global economic and social well-being.

3. The release of chlorofluorocarbons and other stratospheric ozone-depleting substances is rapidly reducing the ability of the atmosphere to screen out harmful ultraviolet radiation, which could adversely affect human health and ecological systems.
4. Development of effective policies to abate, mitigate, and cope with global change will rely on greatly improved scientific understanding of global environmental processes and on our ability to distinguish human-induced from natural global change.
5. New developments in interdisciplinary Earth sciences, global observing systems, and computing technology make possible significant advances in the scientific understanding and prediction of these global changes and their effects.
6. Although significant Federal global change research efforts are underway, an effective Federal research program will require efficient interagency coordination, and coordination with the research activities of State, private, and international entities.

(b) PURPOSE--The purpose of this title is to provide for development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.

SEC. 102. COMMITTEE ON EARTH AND ENVIRONMENTAL SCIENCES.

(a) ESTABLISHMENT--The President, through the Council, shall establish a Committee on Earth and Environmental Sciences. The Committee shall carry out Council functions under section 401 of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6651) relating to global change research, for the purpose of increasing the overall effectiveness and productivity of Federal global change research efforts.

(b) MEMBERSHIP--The Committee shall consist of at least one representative from—

1. The National Science Foundation;
2. The National Aeronautics and Space Administration;
3. The National Oceanic and Atmospheric Administration of the Department of Commerce;
4. The Environmental Protection Agency;
5. The Department of Energy;
6. The Department of State;
7. The Department of Defense;
8. The Department of the Interior;
9. The Department of Agriculture;
10. The Department of Transportation;
11. The Office of Management and Budget;
12. The Office of Science and Technology Policy;
13. The Council on Environmental Quality;
14. The National Institute of Environmental Health Sciences of the National Institutes of Health; and
15. Such other agencies and departments of the United States as the President or the Chairman of the Council considers appropriate.

Such representatives shall be high-ranking officials of their agency or department, wherever possible the head of the portion of that agency or department that is most relevant to the purpose of the title described in section 101(b).

(c) CHAIRPERSON--The Chairman of the Council, in consultation with the Committee, biennially shall select one of the Committee members to serve as Chairperson. The Chairperson shall be knowledgeable and experienced with regard to the administration of scientific research programs, and shall be a representative of an agency that contributes substantially, in terms of scientific research capability and budget, to the Program.

(d) SUPPORT PERSONNEL--An Executive Secretary shall be appointed by the Chairperson of the Committee, with the approval of the Committee. The Executive Secretary shall be a permanent employee of one of the agencies or departments represented on the Committee, and shall remain in the employ of such agency or department. The Chairman of the Council shall have the authority to make personnel decisions regarding any employees detailed to the Council for purposes of working on business of the Committee pursuant to section 401 of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6651).

(e) FUNCTIONS RELATIVE TO GLOBAL CHANGE--The Council, through the Committee, shall be responsible for planning and coordinating the Program. In carrying out this responsibility, the Committee shall--

1. Serve as the forum for developing the Plan and for overseeing its implementation;
2. Improve cooperation among Federal agencies and departments with respect to global change research activities;
3. Provide budgetary advice as specified in section 105;
4. Work with academic, State, industry, and other groups conducting global change research, to provide for periodic public and peer review of the Program;
5. Cooperate with the Secretary of State in--

   (A) Providing representation at international meetings and conferences on global change research in which the United States participates; and
   (B) Coordinating the Federal activities of the United States with programs of other nations and with international global change research activities such as the International Geosphere-Biosphere Program.

6. Consult with actual and potential users of the results of the Program to ensure that such results are useful in developing national and international policy responses to global change; and
7. Report at least annually to the President and the Congress, through the Chairman of the Council, on Federal global change research priorities, policies, and programs.

SEC. 103. UNITED STATES GLOBAL CHANGE RESEARCH PROGRAM.

The President shall establish an interagency United States Global Change Research Program to improve understanding of global change. The Program shall be implemented by the Plan developed under section 104.

SEC. 104. NATIONAL GLOBAL CHANGE RESEARCH PLAN.

(a) IN GENERAL--The Chairman of the Council, through the Committee, shall develop a National Global Change Research Plan for implementation of the Program. The Plan shall contain recommendations for national global change research. The Chairman of the Council shall submit the Plan to the Congress within one year after the date of enactment of this title, and a revised Plan shall be submitted at least once every three years thereafter.
(b) CONTENTS OF THE PLAN--The Plan shall--

1. Establish, for the 10-year period beginning in the year the Plan is submitted, the goals and priorities for Federal global change research which most effectively advance scientific understanding of global change and provide usable information on which to base policy decisions relating to global change;
2. Describe specific activities, including research activities, data collection and data analysis requirements, predictive modeling, participation in international research efforts, and information management, required to achieve such goals and priorities;
3. Identify and address, as appropriate, relevant programs and activities of the Federal agencies and departments represented on the Committee that contribute to the Program;
4. Set forth the role of each Federal agency and department in implementing the Plan;
5. Consider and utilize, as appropriate, reports and studies conducted by Federal agencies and departments, the National Research Council, or other entities;
6. Make recommendations for the coordination of the global change research activities of the United States with such activities of other nations and international organizations, including--

   (A) A description of the extent and nature of necessary international cooperation;
   (B) The development by the Committee, in consultation when appropriate with the National Space Council, of proposals for cooperation on major capital projects;
   (C) Bilateral and multilateral proposals for improving worldwide access to scientific data and information; and
   (D) Methods for improving participation in international global change research by developing nations; and

7. Estimate, to the extent practicable, Federal funding for global change research activities to be conducted under the Plan.

(c) RESEARCH ELEMENTS--The Plan shall provide for, but not be limited to, the following research elements:

1. Global measurements, establishing worldwide observations necessary to understand the physical, chemical, and biological processes responsible for changes in the Earth system on all relevant spatial and time scales.
2. Documentation of global change, including the development of mechanisms for recording changes that will actually occur in the Earth system over the coming decades.
3. Studies of earlier changes in the Earth system, using evidence from the geological and fossil record.
4. Predictions, using quantitative models of the Earth system to identify and simulate global environmental processes and trends, and the regional implications of such processes and trends.
5. Focused research initiatives to understand the nature of and interaction among physical, chemical, biological, and social processes related to global change.

(d) INFORMATION MANAGEMENT--The Plan shall provide recommendations for collaboration within the Federal Government and among nations to--

1. Establish, develop, and maintain information bases, including necessary management systems which will promote consistent, efficient, and compatible transfer and use of data;
2. Create globally accessible formats for data collected by various international sources; and
3. Combine and interpret data from various sources to produce information readily usable by policymakers attempting to formulate effective strategies for preventing, mitigating, and adapting to the effects of global change.

(e) NATIONAL RESEARCH COUNCIL EVALUATION--The Chairman of the Council shall enter into an agreement with the National Research Council under which the National Research Council shall--

1. Evaluate the scientific content of the Plan; and
2. Provide information and advice obtained from United States and international sources, and recommended priorities for future global change research.

(f) PUBLIC PARTICIPATION--In developing the Plan, the Committee shall consult with academic, State, industry, and environmental groups and representatives. Not later than 90 days before the Chairman of the Council submits the Plan, or any revision thereof, to the Congress, a summary of the proposed Plan shall be published in the Federal Register for a public comment period of not less than 60 days.

SEC. 105. BUDGET COORDINATION.

(a) COMMITTEE GUIDANCE--The Committee shall each year provide general guidance to each Federal agency or department participating in the Program with respect to the preparation of requests for appropriations for activities related to the Program.

(b) SUBMISSION OF REPORTS WITH AGENCY APPROPRIATIONS REQUESTS--

1. Working in conjunction with the Committee, each Federal agency or department involved in global change research shall include with its annual request for appropriations submitted to the President under section 1108 of title 31, United States Code, a report which--

   (A) Identifies each element of the proposed global change research activities of the agency or department;
   (B) specifies whether each element (i) contributes directly to the Program or (ii) contributes indirectly but in important ways to the Program; and
   (C) states the portion of its request for appropriations allocated to each element of the Program.

2. Each agency or department that submits a report under paragraph (1) shall submit such report simultaneously to the Committee.

(c) CONSIDERATION IN PRESIDENT'S BUDGET.--

1. The President shall, in a timely fashion, provide the Committee with an opportunity to review and comment on the budget estimate of each agency and department involved in global change research in the context of the Plan.
2. The President shall identify in each annual budget submitted to the Congress under section 1105 of title 31, United States Code, those items in each agency's or department's annual budget which are elements of the Program.

SEC. 106. SCIENTIFIC ASSESSMENT.

On a periodic basis (not less frequently than every 4 years), the Council, through the Committee, shall prepare and submit to the President and the Congress an assessment which--

1. integrates, evaluates, and interprets the findings of the Program and discusses the scientific uncertainties associated with such findings;
2. analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and
3. analyzes current trends in global change, both human- induced and natural, and projects major trends for the subsequent 25 to 100 years.

SEC. 107. ANNUAL REPORT.

(a) GENERAL.--Each year at the time of submission to the Congress of the President's budget, the Chairman of the Council shall submit to the Congress a report on the activities conducted by the Committee pursuant to this title, including--

1. a summary of the achievements of the Program during the period covered by the report and of priorities for future global change research;
2. an analysis of the progress made toward achieving the goals of the Plan;
3. expenditures required by each agency or department for carrying out its portion of the Program, including--

   (A) the amounts spent during the fiscal year most recently ended;
   (B) the amounts expected to be spent during the current fiscal year; and
   (C) the amounts requested for the fiscal year for which the budget is being submitted.

(b) RECOMMENDATIONS.--The report required by subsection (b) shall include recommendations by the President concerning--

1. changes in agency or department roles needed to improve implementation of the Plan; and
2. additional legislation which may be required to achieve the purposes of this title.

SEC. 108. RELATION TO OTHER AUTHORITIES.

(a) NATIONAL CLIMATE PROGRAM RESEARCH ACTIVITIES.-- The President, the Chairman of the Council, and the Secretary of Commerce shall ensure that relevant research activities of the National Climate Program, established by the National Climate Program Act (15 U.S.C. 2901 et seq.), are considered in developing national global change research efforts.
(b) AVAILABILITY OF RESEARCH FINDINGS.--The President, the Chairman of the Council, and the heads of the agencies and departments represented on the Committee, shall ensure that the research findings of the Committee, and of Federal agencies and departments, are available to--

1. the Environmental Protection Agency for use in the formulation of a coordinated national policy on global climate change pursuant to section 1103 of the Global Climate Protection Act of 1987 (15 U.S.C. 2901 note); and
2. all Federal agencies and departments for use in the formulation of coordinated national policies for responding to human-induced and natural processes of global change pursuant to other statutory responsibilities and obligations.

(c) EFFECT ON FEDERAL RESPONSE ACTIONS.--Nothing in this title shall be construed, interpreted, or applied to preclude or delay the planning or implementation of any Federal action designed, in whole or in part, to address the threats of stratospheric ozone depletion or global climate change.

TITLE II--INTERNATIONAL COOPERATION IN GLOBAL CHANGE RESEARCH

SEC. 201. SHORT TITLE.

This title may be cited as the "International Cooperation in Global Change Research Act of 1990".

SEC. 202. FINDINGS AND PURPOSES.

(a) FINDINGS--The Congress makes the following findings:

1. Pooling of international resources and scientific capabilities will be essential to a successful international global change program.
2. While international scientific planning is already underway, there is currently no comprehensive intergovernmental mechanism for planning, coordinating, or implementing research to understand global change and to mitigate possible adverse effects.
3. An international global change research program will be important in building future consensus on methods for reducing global environmental degradation.
4. The United States, as a world leader in environmental and Earth sciences, should help provide leadership in developing and implementing an international global change research program.

(b) PURPOSES--The purposes of this title are to--

1. Promote international, intergovernmental cooperation on global change research;
2. involve scientists and policymakers from developing nations in such cooperative global change research programs; and
3. promote international efforts to provide technical and other assistance to developing nations which will facilitate improvements in their domestic standard of living while minimizing damage to the global or regional environment.

SEC. 203. INTERNATIONAL DISCUSSIONS.

(a) GLOBAL CHANGE RESEARCH.--The President should direct the Secretary of State, in cooperation with the Committee, to initiate discussions with other nations leading toward international protocols and other agreements to coordinate global change research activities. Such discussions should include the following issues:

1. Allocation of costs in global change research programs, especially with respect to major capital projects.
2. Coordination of global change research plans with those developed by international organizations such as the International Council on Scientific Unions, the World Meteorological Organization, and the United Nations Environment Program.
3. Establishment of global change research centers and training programs for scientists, especially those from developing nations.
4. Development of innovative methods for management of international global change research, including--

   (A) use of new or existing intergovernmental organizations for the coordination or funding of global change research; and
   (B) creation of a limited foundation for global change research.

5. The prompt establishment of international projects to--

   (A) create globally accessible formats for data collected by various international sources; and
   (B) combine and interpret data from various sources to produce information readily usable by policymakers attempting to formulate effective strategies for preventing, mitigating, and adapting to possible adverse effects of global change.

6. Establishment of international offices to disseminate information useful in identifying, preventing, mitigating, or adapting to the possible effects of global change.

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(b) ENERGY RESEARCH.--The President should direct the Secretary of State (in cooperation with the Secretary of Energy, the Secretary of Commerce, the United States Trade Representative, and other appropriate members of the Committee) to initiate discussions with other nations leading toward an international research protocol for cooperation on the development of energy technologies which have minimally adverse effects on the environment. Such discussions should include, but not be limited to, the following issues:

1. Creation of an international cooperative program to fund research related to energy efficiency, solar and other renewable energy sources, and passively safe and diversion-resistant nuclear reactors.
2. Creation of an international cooperative program to develop low cost energy technologies which are appropriate to the environmental, economic, and social needs of developing nations.
3. Exchange of information concerning environmentally safe energy technologies and practices, including those described in paragraphs (1) and (2).

SEC. 204. GLOBAL CHANGE RESEARCH INFORMATION OFFICE.

Not more than 180 days after the date of enactment of this Act, the President shall, in consultation with the Committee and all relevant Federal agencies, establish an Office of Global Change Research Information. The purpose of the Office shall be to disseminate to foreign governments, businesses, and institutions, as well as the citizens of foreign countries, scientific research information available in the United States which would be useful in preventing, mitigating, or adapting to the effects of global change.

Such information shall include, but need not be limited to, results of scientific research and development on technologies useful for--

1. Reducing energy consumption through conservation and energy efficiency;
2. Promoting the use of solar and renewable energy sources which reduce the amount of greenhouse gases released into the atmosphere;
3. Developing replacements for chlorofluorocarbons, halons, and other ozone-depleting substances which exhibit a significantly reduced potential for depleting stratospheric ozone;
4. Promoting the conservation of forest resources which help reduce the amount of carbon dioxide in the atmosphere;
5. Assisting developing countries in ecological pest management practices and in the proper use of agricultural, and industrial chemicals; and
6. Promoting recycling and source reduction of pollutants in order to reduce the volume of waste which must be disposed of, thus decreasing energy use and greenhouse gas emissions.

TITLE III--GROWTH DECISION AID

SEC. 301. STUDY AND DECISION AID.

(a) The Secretary of Commerce shall conduct a study of the implications and potential consequences of growth and development on urban, suburban, and rural communities. Based upon the findings of the study, the Secretary shall produce a decision aid to assist State and local authorities in planning and managing urban, suburban, and rural growth and development while preserving community character.

(b) The Secretary of Commerce shall consult with other appropriate Federal departments and agencies as necessary in carrying out this section.

The Secretary of Commerce shall submit to the Congress a report containing the decision aid produced under subsection (a) no later than January 30, 1992. The Secretary shall notify appropriate State and local authorities that such decision aid is available on request.

FYI -- NAS Press release on review of CCSP plan.txt
From: Rick Piltz [rpiltz@usgcrp.gov]
Sent: Wednesday, February 18, 2004 12:23 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: FYI -- NAS Press release on review of CCSP plan

>From: "Nicholas Sundt" <nsundt@usgcrp.gov>
>Subject: NAS Press release (18 Feb 2004): Government Climate Change
>Research Plan Provides Guiding Vision ...
>Date: Wed, 18 Feb 2004 11:31:42 -0500
>
> FYI. Press release (see text below) is at:
>
>http://www4.nationalacademies.org/news.nsf/isbn/0309088658?OpenDocument
>Full text is at:
>http://books.nap.edu/catalog/10635.html
>
>Date: Feb. 18, 2004
>Contacts: Bill Kearney, Director of Media Relations Christian Dobbins,
>Media Relations Assistant Office of News and Public Information
>202-334-2138; e-mail <news@nas.edu>
>
>FOR IMMEDIATE RELEASE
>
>Government Climate Change Research Plan Provides Guiding Vision And
>Should Be Implemented, But Needs Additional Funding
>
>WASHINGTON -- The federal government should implement its revised
>strategic plan for climate change research as soon as possible, says a
>new report from the National Academies' National Research Council. The
>committee that wrote the report said the plan is "much improved,"
>broader in scope, and more ambitious than a previously reviewed draft,
>but commitments to fund many of the newly proposed activities are lacking.
>
>"Advancing the science called for in the plan will be of vital
>importance to the nation," said committee chair Thomas E. Graedel,
>professor of industrial ecology, Yale University School of Forestry and
>Environmental Studies, New Haven, Conn. "There are still ways in which
>the plan could be improved, but at this point the main challenge is to implement it
vigorously."
>
>The plan was written by the U.S. Climate Change Science Program (CCSP),
>a group formed two years ago to coordinate climate change research
>among 13 federal agencies. In its revised plan, CCSP tackles a wider
>array of research activities than the federal government pursued in the
>prior decade under the auspices of the U.S. Global Change Research
>Program, according to the committee. In particular, the committee
>welcomed the plan's new emphasis on achieving a better understanding of
>how climate change will affect ecosystems and people, as well as on
>research to support decisions about how to mitigate climate change and
>adapt to its effects. The revised plan's explicit connection between
>research on climate change and the development of technologies to
>address it -- a link that was weak in the draft plan -- was applauded by the
committee as well.
>
>But for the plan's expanded portfolio of research to succeed, it must
>be accompanied by an increase in funding, the committee noted. Although
>it was not given prospective budget information, the committee
>concluded that CCSP's current budget does not appear capable of
>supporting all of the activities outlined in the strategic plan.
>
>While some research in the plan has an established track record of
>funding by particular government agencies, newer and expanded areas,
>such as the study of climate change's effects on ecosystems and humans,

>are likely to be underfunded. A major upgrade in global climate
>observing capabilities and advances in computer models to project
>future changes in climate -- both in the new plan -- will require
>funding above current levels as well. The committee said that CCSP
>should secure sufficient funding for its plan to succeed and establish
>a clear process linking research tasks to agency budgets.
>
>The purpose of the plan's proposed synthesis and assessment reports
>also must be clarified, the committee said. One goal of these reports
>should be to better meet the needs of national and regional
>decision-makers who must confront the effects of climate change, such
>as rising sea levels or more frequent droughts, or who are considering
>policies to reduce emissions of greenhouse gases that contribute to
>global warming. These reports also should provide periodic assessments
>of the effects of climate change, as specified in the 1990 Global
>Change Research Act, and help evaluate progress toward the objectives of the
program.
>
>Another hurdle facing CCSP, according to the committee, is ensuring the
>scientific independence and credibility of its research efforts. The
>presence of high-level political leaders in CCSP management should help
>the program secure resources, but it also may lead to a real or
>perceived political influence that could discredit the program. To
>prevent this, CCSP should seek independent oversight, preferably by a standing
advisory body.
>CCSP reports also should be reviewed by the wider scientific community
>and stakeholders such as government decision-makers, nongovernmental
>organizations, private industry, and other users of climate science.
>The committee noted that CCSP has already set a high standard for
>government research programs by seeking advice not only from the
>Research Council but also from many other outside scientists and stakeholders.
>
>Although the plan was developed for a 10-year time frame, it could
>effectively guide climate change research for decades, provided CCSP
>updates it every three to five years to reflect scientific and
>technical advances and the changing needs of the nation, the committee said.
>
>The Research Council study was sponsored by the U.S. Climate Change
>Science Program. The National Research Council is the principal
>operating arm of the National Academy of Sciences and the National
>Academy of Engineering. It is a private, nonprofit institution that
>provides science and technology advice under a congressional charter. A committee
roster follows.
>
>Copies of Implementing Climate and Global Change Research: A Review of
>the Final U.S. Climate Change Science Program Strategic Plan will be
>available later this winter from the National Academies Press; tel.
>202-334-3313 or
>1-800-624-6242 or on the Internet at http://www.nap.edu. Reporters may
>obtain a pre-publication copy from the Office of News and Public
>Information (contacts listed above).
>
>[This news release and report are available at
>http://national-academies.org]
>
>
>NATIONAL RESEARCH COUNCIL
>Division on Earth and Life Studies
>
>Committee for Review of the U.S. Climate Change Science Program
>Strategic Plan
>
>Thomas E. Graedel1 (chair)

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FW FYI -- NAS Press release on review of CCSP plan.txt
From: Cooney, Phil
Sent: Wednesday, February 18, 2004 12:26 PM
To: Perino, Dana M.; Holbrook, William F.; Boyd, Allison; Hopkins, Robert; Connaughton, James
Subject: FW: FYI -- NAS Press release on review of CCSP plan

-----Original Message-----
From: Rick Piltz [mailto:rpiltz@usgcrp.gov]
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RE FYI-- AP article on NRC review of CCSP plan.txt
From: Cooney, Phil
Sent: Wednesday, February 18, 2004 12:27 PM
To: 'Rick Piltz'
Subject: RE: FYI-- AP article on NRC review of CCSP plan

Thanks, Rick, Phil

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From: Rick Piltz [mailto:rpiltz@usgcrp.gov]
Sent: Wednesday, February 18, 2004 12:23 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: FYI-- AP article on NRC review of CCSP plan

>From: "Nicholas Sundt" <nsundt@usgcrp.gov>
>Subject: ABCNEWS.com Panel Urges Funds to Study Climate Change
>Date: Wed, 18 Feb 2004 11:57:11 -0500
>
> http://abcnews.go.com/wire/US/ap20040218_912.html#
>
>Panel Urges Funds to Study Climate Change
>Bush Plan to Study Climate Change Improves but Lacks Commitment to Fund
>New Research, Panel Says
>
>The Associated Press
>
>WASHINGTON Feb. 18 -- The Bush administration's program to study
>climate change is much improved but lacks a commitment to pay for many
>of the new research proposals, a panel of the National Academy of
>Sciences complained Wednesday. The panel urged that the plan, announced
>last July, be implemented vigorously.
>
>"Advancing the science called for in the plan will be of vital
>importance to the nation," said committee chairman Thomas E. Graedel,
>professor of industrial ecology at Yale University. "There are still
>ways in which the plan could be improved, but at this point the main
>challenge is to implement it vigorously."
>
>The government's 10-year Climate Change Science Program is aimed at
>learning more about natural causes of climate change; to better
>understand how climate changes affect human, wildlife and plant
>communities; and to find more exact ways of calculating the risks of
>global warming.
>
>Assistant Commerce Secretary James Mahoney, who oversees U.S. research
>on climate change, responded that fundamental work in the research
>effort is under way.
>
>The plan calls for a series of 21 reports in specific subject areas,
>such as what can be known from current temperature data, the impact of
>aerosols such as clouds, soot and chemicals and the uses and
>limitations of data in making policy forecasts.
>
>All of these studies are in the detailed planning stage, Mahoney said,
>with the lead agency determined for each one. The reports will be open
>for peer review and public comment, he added.
>
>Graedel noted the program calls for turning these out in the next four
>years, a number of them in next two years. "That is a very rapid pace,
>it will call on the capacity of the (research) community to respond to
>it," he said.
>
>Graedel said he doesn't see a clear line in the plan between the

>reports and a way to follow through to the goals of the program.
>
>The new report, "Implementing Climate and Global Change Research," was
>prepared by the National Research Council, the operating arm of the
>National Academies.
>
>The panel praised the administration's emphasis on understanding how
>climate change will affect ecosystems and people, as well as research
>to help make decisions about how to ease climate change and adapt to
>its effects.
>
>However, the panel said the program's current budget does not appear
>capable of supporting all of the activities outlined in the strategic
>plan.
>
>While some research in the plan has a record of funding by particular
>government agencies, other areas, such as the study of climate change's
>effects on ecosystems and humans, are likely to be underfunded, the
>committee said.
>
>In addition, spending higher than current levels will be needed for the
>proposed upgrade in global climate observing capabilities and advances
>in computer models to project future changes in climate.
>
>Mahoney responded that the plan extends over 10 years and funding isn't
>just a matter of the first year's budget.
>
>Graedel also said an effort needs to be made to be sure the scientific
>credibility of the research is maintained throughout the process,
>suggesting a standing advisory committee to review the work.
>
>Environmentalists complain the administration focuses too much on
>natural causes and reopening scientific issues already well studied.
>
>The first draft of the climate research plan, announced in late 2002,
>drew harsh criticism from the National Academy of Sciences, where
>experts said it didn't set hard priorities or provide a clear vision
>and specific timetable for meeting goals.
>
>Graedel said the administration has been responsive to those criticisms
>and has developed a "wholly adequate" framework to guide climate
>research.
>

>

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From: Rick Piltz [rpiltz@usgcrp.gov]
Sent: Wednesday, February 18, 2004 12:48 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: NYTimes on-line: NRC review of CCSP plan

>From: "Nicholas Sundt" <nsundt@usgcrp.gov>
>Subject: NY Times: Scientific Panel Urges Bush to Finance
>Climate-Change Research
>Date: Wed, 18 Feb 2004 12:40:11 -0500
>
>
> http://www.nytimes.com/2004/02/18/science/18CND-CLIM.html?hpScientific

>Panel Urges Bush to Finance Climate-Change Research By ANDREW C. REVKIN
>
>Published: February 18, 2004
>
>President Bush's plan for clarifying the causes and impacts of climate
>change has been improved over the past year, but can succeed only if
>the research is shielded from political pressures and if budgets grow,
>a panel of experts concluded today.
>
>Administration officials, who requested the outside review of the plan,
>welcomed the panel's findings, but said that no significant budget
>increases were in the offing and that the project would succeed mainly
>through improved organization of research.
>
>"We can't practically expect short-term massive increases in funding -
>it's just not in the cards these days," said Dr. James R. Mahoney, an
>assistant secretary of commerce who directs the administration's
>Climate Change Science Program.
>
>The panel, assembled by the National Research Council of the National
>Academies, the country's leading scientific advisory group, said there
>was an "urgent" need to move from planning an expanded push in federal
>climate research to financing it and moving ahead.
>
>"This is an issue where the science is pretty clearly telling us that
>the longer we wait to consider some of these issues, the more dramatic
>the impacts may turn out to be," said Dr. Thomas E. Graedel, a
>professor of industrial ecology at Yale and chairman of the 17-member panel.
>
>The administration's climate-research plan is available at
>www.climatescience.gov and the critique is at www.nationalacademies.org.
>
>Mr. Bush first announced plans to intensify climate research in June
>2001, shortly after he was criticized by many climate experts for
>abandoning a campaign pledge to limit power plants' emissions of carbon
>dioxide, a gas that many scientists have linked to global warming.
>
>He said more research was needed before he would consider any measures
>beyond voluntary programs to slow growth in emissions.
>
>The first version of the plan, issued in November 2002, was criticized
>by the same panel last February as lacking clear priorities and
>neglecting to take stock of existing studies pointing to risks posed by
>rising global temperatures.
>
>In its review of the revised plan, which was released last July, the
>panel found clearer goals, but saw few signs that sufficient money
>would be allocated for new initiatives, like improving satellite
>observations and computer simulations of the changing atmosphere and oceans.
>

>"There is no evidence in the plan or elsewhere of a commitment to
>provide the necessary funds for these newer or expanded program
>elements," the panel said.
>
>The panel also recommended that the administration insure the
>credibility of government climate research by establishing a standing
>review committee of outside parties - spanning the range of
>perspectives on the contentious issue.
>
>Many environmentalists and political opponents of Mr. Bush, and some
>scientists at government agencies, have expressed strong concern about
>the potential for political interference in climate science.
>
>They have cited a string of instances in which the White House has
>rewritten climate-related documents in ways that amplified
>uncertainties and eliminated references to studies pointing to significant risks.
>
>Just before the final version of the research plan was released last
>summer, for example, senior Commerce Department officials shaping the
>document threatened to resign over last-minute efforts by senior
>administration officials to adjust wording, according to several
>scientists and officials involved in the dispute.
>
>Dr. Mahoney said a firm boundary would be maintained between science
>and policy. "We've got a very clear vision," he said. "Let's get the
>science right and the policy gets debated in its own right."
>
>The review panel said the plan's strongest element was the architecture
>it laid out for organizing the dispersed efforts of 13 agencies to
>focus on a few central goals, including: improving knowledge of past
>and current climate shifts and the influences - both natural and human
>- that shape them and reducing uncertainties in projections of how
>Earth's climate may shift in coming decades.
>
>"Although the plan was developed for a 10-year time frame, it could
>effectively guide climate change research for decades," provided it is
>revised every three to five years to reflect advances in the science,
>the panel said in a printed statement.
>
>One of the biggest weaknesses in the plan, the panel said, was the
>absence of any significant reference to existing research examining the
>potential impacts of climate change around the United States.
>
>Particularly notable, it said, was the omission of any reference to the
>National Assessment on the Potential Consequences of Climate
>Variability and Change, a 2001 report that took years to prepare.
>
>White House officials have been continually pressed by industry
>lobbyists and anti-regulatory groups to expunge references to that
>study, which was mainly undertaken in the Clinton administration.
>
>That assessment provides "important contributions" and the independent
>peer review it went through was "exemplary," the panel said.
>

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February 19, 2004

David G. Victor
Adjunct Senior Fellow

Mr. James L. Connaughton
Council on Environmental Quality
722 Jackson Place, NW
Washington, DC 20503

Dear Jim:

Enclosed is a draft of the Council Policy Initiative (CPI) on global climate change. I hope you will have time to review this draft prior to the meeting next week. Please pay particular attention to whether the draft is a fair representation of the full range of responsible opinion on this issue. Do the speeches make the best case for each of the three major alternatives? Have we identified the most illuminating and appropriate alternatives? Do the speeches work well with the cover memo? What materials, if any, should we include in annexes--such as copies of key documents, agreements, or figures? Should we add a note on sources and places for further reading? We welcome comments of any type, including on the details. Although the format of the CPI is a presidential memo with speeches, our audience is a broad group of interested non-experts. Please let us know if you think the text is not accessible or interesting to that audience. The meeting itself will likely focus on the major issues where group discussion would be most valuable. We will have additional copies on hand, or can photocopy your text, in case you would like to provide detailed editorial comments.

To confirm, the meeting will take place on Thursday, February 26, 2004 from 12:00 to 2:30 pm at the Council on Foreign Relations office in Washington, DC, located at 1779 Massachusetts Avenue, N.W. (Tel: 202-518-3400).

I greatly appreciate your guidance in this effort and I look forward to hearing your thoughts on the enclosed text. Although I assure you that your name will not be mentioned in the report, your comments will certainly be reflected in the final product.

If you would like to discuss the report further either before or after the meeting, do not hesitate to contact me at (650) 724-1712 or David.Victor@stanford.edu. In addition, please contact Margaret Winterkorn-Meikle at (212) 434-9683 or mwinterkorn@cfr.org with questions about the advisory committee meeting or the project in general.

Sincerely,

David Victor

Encl.

cc: Kenneth L. Peel
Philip A. Cooney

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MEMORANDUM TO THE PRESIDENT

(draft 18 February 2004)

From: "National Security Adviser" and "Director of the National Economic Council"

Re: Policy Strategies to Address Global Climate Change

For fifteen years the U.S. government has struggled with developing appropriate policy responses to the hazards of global climate change. Industrial and agricultural activities, such as burning fossil fuels and clearing forests for crops, cause the emission of carbon dioxide (CO_2) and other "greenhouse gases." As these gases accumulate in the atmosphere they trap heat and alter climate, which in turn will probably raise sea levels and cause more extreme weather events such as heat waves, droughts and floods. Although often called "global warming," the expected changes in climate are likely to be more complex than a simple rise in global average temperature. For example, changes in high altitude winds over the Rocky Mountains as well as fluctuations in the Atlantic Gulf Stream—both possible with changing climate—could actually cool parts of northern Europe. Climate is naturally variable and humans are highly adaptive; however, the effects of climate change could unfold more rapidly than the capacity of humanity and ecosystems to adapt.

During the late 1980s this issue rose to prominence in the United States and other advanced industrialized countries. Because the emissions that cause climate change are global in scope, successive administrations have crafted policy through coordination with other countries. The United States alone accounts for one-quarter of world emissions of greenhouse gases, but our ability to act alone is limited. Industry has been wary of costly limits on its emissions unless other firms in the global marketplace are required to make comparable efforts. Already, nearly half of world emissions are from developing countries, and that fraction is rising. Moreover, even as public concern about this issue has waned in recent years here in the United States, our allies (especially in Europe) remain deeply concerned and are increasingly frustrated by what they view as inadequate United States response to the problem at hand.

In 1992 at the "Earth Summit" held in Rio de Janeiro the United States signed the United Nations Framework Convention on Climate Change, which established a broad framework for international cooperation on climate change. 187 nations are now members of that Convention—essentially every nation on Earth but for Iraq, Somalia, Turkey, and few others. Widespread membership and compliance reflects the Convention's exceedingly modest obligations. For the United States and industrialized countries, compliance has required submitting reports on emissions of greenhouse gases and contributing to a special fund that compensates developing countries for the "agreed incremental cost" of their efforts to comply with the Convention's goals. The Convention urges all nations to aspire to reduce their emissions but set no firm targets for timetables. This arrangement reflected the national interests of the key participants. Industrialized nations generally sought to control emissions but could not agree on the particular level of effort nor how to share the burden. Developing nations were

wary of encumbering commitments and thus agreed only to actions that imposed no cost to their economies.

Most governments, including your predecessor's administration, viewed the Convention's commitments to control emissions as woefully inadequate. In 1995 they launched a diplomatic process to strengthen the Convention, culminating in the 1997 Kyoto Protocol. Kyoto set targets for the total quantity of greenhouse gases that industrialized countries would be allowed to emit during a specific "budget period" of 2008-2012. (Kyoto is largely silent about obligations beyond 2012.) The Protocol envisioned allowing countries flexibility in meeting their commitments through a worldwide system of tradable emission credits, modeled on the successful experience with trading air pollution credits in the United States. Firms and governments in the industrialized countries would be allowed to trade portions of their emission budgets. Since greenhouse gases mix globally in the atmosphere this trading system would allow attainment of the environmental objective (less human stress on the climate system) at the lowest economic cost.

Kyoto imposed no targets and timetables for emissions from developing countries. However, a scheme known as the "Clean Development Mechanism (CDM)"—largely the brainchild of Brazil and the United States—would encourage foreign investment in projects that yield lower emissions of greenhouse gases. Investors would calculate the level of emissions that would occur with and without their projects; the CDM would award valuable emission credits for the difference. For example, the World Bank has pooled funding from a coalition of 23 governments and firms to invest in projects such as a small dam in Chile that will produce electricity without causing emissions of CO_2 from the burning of fossil fuels. The investors—23 governments and firms from advanced industrialized countries that face tight emission constraints under the Kyoto Protocol—hope to get emission credits that they can use back at home. Host countries such as Chile seek investment.

The Clinton administration never submitted the Kyoto Protocol to the Senate for its consent, as it surely would have been defeated. Kyoto would have required that the United States reduce its emissions of "greenhouse gases" to 7% below 1990 levels during the years 2008 to 2012. At the close of the 1990s U.S. emissions were already 17% above 1990 levels and rising at 1.3% per year. Reversing that trend before 2008 appeared to be impossible, and thus any plan for U.S. compliance would have required prodigious use of the international emission trading system. However, the targets and timetables set in Kyoto awarded a large surplus of emission credits to Russia. In Kyoto, Russian negotiators refused to accept a cap that was more strict than a simple freeze on their emissions at 1990 levels; by the late 1990s, however, the collapse of the Russian economy, which forced the closing of factories, drove emissions nearly 40% below the earlier level, and emission projections for 2008-2012 suggested that Russia would have surplus emission credits of roughly one billion tons of CO_2. Selling those credits (mainly to U.S. firms) would net Russia perhaps $20 to $50 billion, although these credits were not the result of any active emission control efforts in Russia. In addition to this shell game, critics of Kyoto focused on the lack of any obligation for developing countries to control their emissions.

Early in 2001, you adopted a policy that, in effect, withdrew the United States from the Kyoto process. You argued that the United States could not meet its Kyoto targets at acceptable cost; the international trading system was unworkable; and, it was unfair to force U.S. industry to compete in a world economy without meaningful emission controls on all nations. Over the last three years your administration has developed an alternative approach that is based on voluntary actions by firms, investment in new technology—such as hydrogen-powered fuel cells for vehicles and advanced low-emission coal plants—as well as partnerships with key developing countries to assist their application of advanced technologies. At the same time, most other nations have remained engaged with the Kyoto process, in part your dramatic withdrawal from Kyoto galvanized most other governments to close ranks and profess their support for Kyoto. However, key industrialized nations are now finding that they, too, will find it difficult to meet their Kyoto targets. Many developing countries, which had expected to be the beneficiaries of new technologies and investments unleashed by this trading system, have grown dissatisfied as a robust market has not yet emerged. The CDM is floundering, in part because it is tied in red tape and in part because the large potential surplus of emission credits from Russia and other nations that had hoped to sell to the United States has depressed prices and reduced the incentive to invest in projects in developing countries.

With climate change policy in the United States and abroad at a crossroads, you asked us to convene an inter-agency process to review your options. We find that the issue of climate change is one of the most complex topics on today's policy agenda. It involves most agencies of government, from the federal to the local level. It requires working closely with Congress and with other nations; if a political deal with one key player unravels then many others can come unstuck as well. Controlling emissions will require credible policies that impose costs on society today with benefits that accrue in the distant future—a time scale that crosses generations and is longer than most actions of government. Even as this issue is extraordinarily complex, it has also become highly polarizing. At one extreme, climate change is viewed as a hoax or conspiracy dreamed up by scientists who want to usurp government control of the economy and lubricate a gravy train of research funding. At the other extreme, climate change is seen as a threat so severe that it requires complete and immediate re-organization of the modern industrial economy. The public is deeply confused about the risks and options, offering both the danger that any policy will be easy to parody and the opportunity for you to shape public opinion along the lines most consistent with your favored policies.

Your policy options are not easy to summarize. We have prepared three broad policy strategies, which we present as speeches that you might give in the coming months. All three options recognize that climate change poses varying risks to the U.S. economy and U.S. national security. The speeches differ in their assumptions about the magnitude of climate hazards and in their policy responses.

The first strategy—"minimal effort"—is founded on the principle that the hazards from a changing climate are comparable with other environmental challenges that modern society has managed. This strategy advocates improving our capacity to adapt to a changing climate while making modest investments in new technologies that could allow for lower emissions in the future. This strategy is based, in part, on the claim that even an aggressive effort by the United States would have only minimal impact on the rate of climate change. Developing countries are

adamantly opposed to controlling their rising emissions, and there is little that we can do to alter their interests and behavior. Strident in places, this speech suggests that special interests have inflated the danger of changing climate to serve their needs and warns Americans not to become paralyzed by fear of this problem.

The second strategy—"beyond Kyoto"—follows a radically different approach. It emphasizes that climate change could cause abrupt shifts in weather patterns or sea level, with potentially catastrophic consequences. For humans, adaptation could be expensive; for nature, adaptation may be impossible—leading to mass extinctions and the loss of unique ecosystems. With this perspective, the only sensible response is to slow and stop climate change at its root—with aggressive controls on emissions. This speech embraces the Kyoto Protocol as the only viable international framework. It promises to re-engage with the Kyoto process on the condition that key flaws are fixed. It demands more realistic short term targets for the United States, elimination of the huge windfall of emission credits for Russia and Ukraine, and advocates a much stronger Kyoto framework for the future. It advocates setting aggressive (but achievable) long-term goals for limiting the concentration of greenhouse gases in the atmosphere and mandatory participation of developing countries, with strict penalties for those who do not adhere. It suggests that the need to control carbon is so important that it must become an organizing principle for our foreign economic policy.

The third approach—"making a market"—also recognizes the need for concerted international action to control emissions. However, it rejects the Kyoto Protocol as an unrealistic top-heavy scheme that relies too much on bureaucrats rather than markets to solve the climate problem. This speech argues that the most effective international regimes, such as the World Trade Organization, have emerged over many decades from the "bottom up." They are the result of disparate practices that are loosely coordinated through international institutions but rely heavily on national institutions. In the case of the climate change, this speech emphasizes the need for a diversity of efforts—by key U.S. states, the federal government, and other countries. It advocates creating emission trading systems in these jurisdictions and then allowing these new "currencies" to establish their value as governments and markets (not international bureaucrats in the Kyoto process) determine which permits represent bona fide reductions in emissions. This speech draws on examples such as the creation of the Euro; it applauds efforts in some firms and states to begin experimental emission trading. This speech warns against hasty action to involve all nations in creating this currency since many—such as Russia and most developing countries—do not have the institutional capacity in place nor the desire to control emissions.

These three strategies involve lumping together a multitude of detailed policy choices. At this pivotal moment we want to ensure that your policy decisions are not constrained by our combinations of choices. Thus in this memorandum we unpack the major policy issues in each of six major areas where you face choices:

- The scientific assessment of causes and consequences of climate change;
- Adapting to a changing climate;
- Strategies for controlling emissions;
- Investing in new technology;
- Engaging with key developing countries;
- Informing the public.

Science: The State of Knowledge and Policy Choices

In its simplest form, the physical cause of climate change is not disputed. The atmosphere naturally contains greenhouse gases such as water vapor, carbon dioxide and methane. Absent these gases the planet would cool to a subzero frozen ball, much as the desert cools rapidly on a cloudless night. If humans pump enough of these heat-trapping gases into the atmosphere we will alter the energy balance of the planet. However, the exact relationships between emissions of these gases, their buildup in the atmosphere, and the ensuing changes in climate are hotly contested.

Climate is naturally variable. Small changes in the Earth's orbit around the sun cause the ice ages and other long-term fluctuations in climate. Since the depth of the last glaciation—about 20,000 years ago, when much of New England was buried under ice and mammoths roamed in California—the climate has warmed considerably. In addition to these orbital gyrations, natural changes in the intensity of the sun also affect climate. Some solar cycles occur regularly and are easy to predict, such as the 11 year cycle, which last peaked around 2001. Other changes in the sun have appeared less frequently yet have large consequences. Starting around 1645, for example, the sun dimmed a total of about 1% for seven decades, causing some of the lowest temperatures during what was already a cold snap—the "little ice age" that had begun around 1400 and lasted until around 1900. For the most part, cold temperatures were unwelcome to populations that were already struggling to stay warm and grow crops. Indeed, until the very recent concern about global warming surfaced in the early 1970s, most studies of climate change focused on natural causes and, interestingly, usually equated warming with an "improvement" in climate.

Within these natural variations, the fingerprint of human activities is coming into focus. Through burning fossil fuels and deforestation, humans have already caused atmospheric concentrations of CO_2 to rise about one-third, from 285 parts per million (ppm) on the eve of the industrial revolution to about 365 ppm today. Since the late 19th century, global average temperatures have also risen about 0.6°C, although the change has not been steady. The 1940s were a period of cooling, linked to a slight dimming in the sun. The 1990s are the warmest decade on record; it is highly likely that the 1990s are the warmest decade since 1400, and they are probably the warmest in more than a millennium. Most experts think that most of the warming in the last 50 years is the result of rising concentrations of greenhouse gases. In addition to that observed warming, another 0.5°C of warming is by now "built in" due to the greenhouse gases that have already accumulated in the atmosphere.

The best models today do a good job of reproducing the historical temperature record, but it is not impossible that scientists will discover that natural cycles account for a much larger share of recent warming. Since the historical record is used, in part, to test the predictive capacity of climate models this debate is not merely an academic curiosity. A reliable continuous record of global climate does not exist prior to the late 19th century when global shipping and colonialism allowed the establishment of a global network of somewhat accurate thermometers. To measure earlier climates, scientists must use proxies such as tree rings, ice

cores, fossils, ancient Chinese records of sunspots, and sundry other partial indicators. Much of the controversy about temperature trends has focused on the methods for assembling those proxies into a record of temperature and climate. The best way to take the planet's temperature is by satellite, which assures equal global coverage without bias in the placement of thermometer. Alas, the only reliable satellite records began in 1979, and there have been many important discrepancies between this relatively short satellite measure and longer records from ground-based thermometers, balloons, and rockets. Some of these discrepancies are the result of technical disputes about how to interpret the satellite record, and some reflect the fact that the satellite measure temperatures at different levels in the atmosphere whereas most thermometers sense only at ground level. The National Research Council evaluated these issues in 2003, outlined a research program to resolve the outstanding problems, and underscored that satellite and ground based records alike show that the atmosphere is warming.

As the concentration of CO_2 and other greenhouse gases rise still further in the future, what might be the consequences? The crudest measure of impact is the change in average global temperature if the concentration of atmospheric CO_2 were to reach about 550ppm—a level roughly double that of the "clean" pre-industrial atmosphere. The first ever systematic assessment of that question—in the late 1970s by the U.S. National Academy of Sciences—suggested that doubling CO_2 would yield an increase in global temperature of 1.5°C to 4.5°C. In the 25 years since that study, numerous additional assessment have not changed that range very much. The most recent full assessment of the science, completed in 2001 by the Intergovernmental Panel on Climate Change (IPCC)—an international assessment process involving thousands of scientists from around the world, including most of the best scientists from the United States—examined uncertainties in the full chain from emissions of greenhouse gases to changes in climate. The IPCC concluded that during the 21st century global climate will probably warm between 1.4 to 5.8°C. That range is actually wider than the previous IPCC study just five years earlier, mainly because the most recent emission scenarios account for a much greater variety of possible futures. In 2001 you asked the National Academy of Sciences to convene a panel of distinguished scientists to review several key questions related to climate change, including the main findings of the IPCC report; the Academy panel reached essentially the same conclusions as IPCC.

We find it striking that more than two decades of intense research, reflecting a total investment of perhaps $50b worldwide, has not narrowed the estimated change in temperature; nor has it narrowed any key estimates of other changes in climate, such as the frequency and intensity of storms, the risks of drought, and other changes in weather. As scientists have learned more about the climate system they have uncovered a vast field of unturned stones. In box 1 we summarize the most important remaining unknowns.

---Begin Box 1---
[possibly move to annex]

The list of uncertainties in climate science is long. Five categories of unknowns presently dominate the scientific debate and are especially relevant for policy decisions:

- Climate feedbacks. A wide range of processes affects the sensitivity of climate to changes in the concentration of greenhouse gases. For example, when glaciers and ice sheets melt, the reflectivity of the planet changes—bright ice becomes darker soil and ocean, absorbing more solar energy and warming. Today, clouds probably account for the greatest uncertainties in these feedback effects. Some types of clouds warm the planet—in the last century, for example, a measurable increase in overcast skies explains why nighttime temperatures have risen on average. Other clouds that are particularly bright and reflective cause cooling. The balance of forces is extremely complicated to unravel. Detailed satellite measurements show that the average worldwide effect of clouds today is a slight net cooling, but nobody knows how cloud effects may change in the future. Some think that clouds and the movement of moisture between different levels of the atmosphere may act akin to a thermostat, in effect capping the amount of climate change that can occur; others have plausibly argued that cloud effects could sharply amplify the effects of climate change.
- Carbon cycle. The concentration of carbon dioxide in the atmosphere—the main driving force for climate change—is the result of many natural processes that cycle carbon between different forms. The process is akin to a busy highway, where the number of cars on the road is the balance of those entering and exiting. Some leave for a brief moment to refuel their engines and passengers, only to return quickly—just as vast quantities of carbon dioxide from the atmosphere are stored temporarily in plants during the growing season, only to return when the plants die. Most of the processes that shuttle carbon in and out of the atmosphere are sensitive to the amount of carbon dioxide already in the atmosphere. For example, some plants grow especially rapidly in elevated concentrations of carbon dioxide—as CO_2 rises, this "fertilization effect" could offset some of humanity's emissions. But nasty surprises also may be lurking within the carbon cycle. For example, if climate change causes less rainfall over the Amazon then massive fires in the drying forest could release still more carbon dioxide into the atmosphere and further dampen nature's ability to sop up excess CO_2 from the atmosphere. Although unlikely, this scenario is not implausible—the 1997-1998 El Nino, for example, caused a widespread increase in fire activity in Southeast Asia and in South America.
- Models of Global Climate. What matters most in assessing the possible impacts of climate change on nature and human welfare are particular changes in rainfall, temperature, cloudiness, storms, and sundry other factors in particular locations, such as the wheat growing region of Nebraska or the barrier islands at Cape Hatteras. A starting point for such assessments are models of the entire circulation of the atmosphere and the circulation of the oceans—called atmospheric general circulation models (GCMs) and oceanic GCMs. These models require vast amounts of data for calibration and presently occupy some of the world's largest supercomputers. Still, they are coarse in resolution—typical GCMs treat a roughly 100 by 100 kilometer area as a single unit, and thus they compute the same climate for Seattle as Mount Ranier. Moreover, these models are used to make projections for fifty years in the future and beyond—small uncertainties and errors can accumulate into large uncertainties when compounded over such long periods of time. GCMs have improved dramatically in the last decade. Today's most complex models link

atmosphere, oceans, biosphere and human action; in the mid 1970s, by contrast, models usable for climate forecasting focused only on simple processes entirely within the atmosphere.

- Abrupt Change. The most likely impacts of climate change are within the realm of normal alterations in climate—such as changes in temperature, cloudiness, rainfall and sea level. They are likely to unfold gradually and somewhat predictably, which will ease the task of adaptation. However, the forced change in Earth's heat balance caused by greenhouse gases might also yield abrupt and catastrophic changes in climate, and there is ample evidence of such discontinuities in the past. Climate change could trigger alterations in the circulation of the oceans, which in turn might force a complete change in weather patterns with unknown consequences. (Among the dramatic changes could be redirection in the Gulf Stream that, ironically, would make northern Europe much colder.) There is strong evidence that the North Atlantic circulation has changed abruptly in the past when climate has cooled; the risk of such changes in a warming world are unknown. Already there is some evidence of potential changes in ocean circulation—the poleward ends of the Atlantic ocean have become measurably less salty since the 1950s. Other nasty surprises may lurk in the warming of the arctic tundra, which could release large amounts of methane presently locked away in ice crystals known as clathrates. Methane is a strong greenhouse gas—it's heat trapping effects are ten times that of CO_2. Warmer temperatures might accelerate the normal movement and melting of the West Antarctic ice sheet; although presently thought to be well grounded, there is a small chance that the ice sheet could slide more rapidly into the ocean, which could raise sea level by many meters over just a few decades. The probability of each of these events appears to be extremely low, but the full range of such catastrophic events is unknown.
- Social Sciences. The fact that natural scientists have identified the problem of climate change as a physical phenomenon is not necessarily reason for policy response. Policy analysis also requires integrating insights from the social sciences, which has proved very difficult in practice. The greatest progress has been in integrating economics with physical assessments. These so-called "integrated assessments" link together a large number of different models and make it possible to assess the costs from a changing climate in the same units (dollars) as the cost of policies that could reduce climate change. However, this integration has left several major problems unsolved. Climate change involves costs and benefits that extend over long time periods—even generations. Standard techniques of discounting future costs and benefits into present values may be inappropriate when the consequences involve future generations and we are unable to determine what those generations would want us to do. Assessments also require blending market costs and benefits—such as the impact on commodity crops—with effects that are difficult to measure in dollars. How should we value unique species that go extinct when a changing climate erases their habitat—biodiversity is nature's legacy but is hard to value. Surveys indicate that people are willing to pay large amounts to preserve some species (e.g., Pandas) but not others; for many, the existence of nature's biodiversity is reason enough to make every effort at protection. In addition, some market costs are difficult to apply in politically-charged analyses. For example, climate change is likely to have a larger effect on poor nations that are less able to adapt. However,

because wage levels are lower in these societies the value of lost life and health is also typically assumed to be lower, thus lowering the perceived costs of climate change. However, any study that is built on such assumptions is typically assailed as unfair and unjust, and for non-experts those arguments appear to have great resonance. Beyond these economic issues, assessment of the costs and benefits of climate policy rarely include any treatment of politics, law and institutions—despite the fact that these are organizing elements of society. These models may thus misstate our ability to adapt to a changing climate, and they do a poor job of representing subtle processes such as the invention and application of new technologies.

---end box 1---

All three of the policy options that we outline involve substantial continued investment in the science of climate change—so that future decisions on matters such as controlling emissions of greenhouse gases can be better informed of the risks of changing climate and the costs of both action and inaction. Regardless of the investment, however, it is likely that policy decisions today and in the future must be made in context of extreme uncertainty. Moreover, the standard tools for making decisions under uncertainty are not easy to apply in this case. It may not be possible to hedge against some outcomes—such as extinctions or irreversible changes in climate—because species and climate are unique within our experience on Earth and we have no other planets with which to pool the risk. Scientists have identified many of the hazards and can estimate the range of uncertainties; but other possible hazards are simply unknown.

In 2002 you established a new cabinet-level structure for managing U.S. investments in climate change science and technology. Within that program, your administration created a climate change science program (CCSP) and a climate change technology program (CCTP). We will discuss CCTP later and focus, here, on CCSP. Although government-wide efforts to ensure a rational and strategic investment in climate science date to 1989, the CCSP's ten-year strategic research plan that your administration released in 2003 is the most comprehensive federal vision for climate science to date. It was based on unprecedented cooperation of federal agencies and detailed review by outside experts. In speeches and through the CCSP you have emphasized the need for better monitoring of temperature and other climatic variables, assessment of climate feedbacks, improvements in the carbon cycle, and sundry other fields. CCSP also includes strategic plans for investing in decision support tools since key policy decisions about where to invest in science and what to do about the climate change problem require complex choices within the context of rampant uncertainty. The strategic research plan released in 2003 is impressive in its scientific breadth and has commanded widespread respect from the scientific community.

We think that your investment in science, which builds on earlier administrations' programs, is sound and requires no further attention from you at this point. However, we call your attention to three concerns.

First, you should know that the effectiveness of the government's investment in climate science will depend heavily on factors that are outside your direct control, such as the intellectual

organization of the scientific effort. Over the last three decades the best climate models have become extremely complex and costly to maintain and run. Only two models in the United States and two others overseas operate at the most sophisticated frontier. With this small population of highly complex tools, the scientific community must remain vigilant in ensuring that a diversity of approaches is supported and that efforts to compare model outputs do not yield "groupthink" that tends to over-emphasize conventional wisdom while excluding fringe opinions and outliers that are often the locus of scientific progress.

Second, we find that the integration of social science and natural science modeling remains in infancy. We are concerned that the social sciences are poorly organized to bring their insights to bear. Moreover, the main device for integrating the sciences—so-called "integrated assessments"—are based almost solely on quantitative models that make it difficult for most of the social sciences (except for economics) to participate in the debate. Policy analysis in this context is therefore framed in highly stylized "ideal" policies that do not account for the quirks and inefficiencies that arise when real policies are implemented by real political systems. That problem leaves you and your successors in the position of making policy choices with highly incomplete information about costs, benefits and political consequences. For example, many of the models used to quantify the costs of controlling emissions assume that power plants fired with natural gas (which emits less CO_2 than coal) or nuclear heat (which emits no CO_2) will be available when needed. Yet, in reality, the process of siting power plants and their infrastructure such as reception facilities for liquefied natural gas or disposal facilities for nuclear waste can be time consuming and costly. Political and legal experts have insights into these issues but, at present, are largely absent from the quantitative debate about policy options.

Third, we note that the CCSP declares priorities but is strikingly silent on cost and value. The plan contains no estimates of cost, and the administration's normal budgeting process is focused on an annual cycle that does not correspond with the CCSP's ten year vision. Some aspects of climate science—such as building, launching and operating satellites—are extremely expensive and dominate the total investment in climate science.

We suggest that you direct your science adviser to convene a process to address these concerns. That process would ensure that the scientific community is organized to make optimal use of the increasingly costly monitoring and computer tools. It would also involve a more active effort to assess the value of different scientific research programs for policy decisions, which would make the process of setting research priorities more transparent. In the 14 years of attempts to create an integrated federal budget and strategy for climate change there has never been a serious effort to compare systematically the declared priorities of scientists and policy makers, a sober assessment of investment value, and actual budgetary spending. Yet the size of total spending on climate research is approaching $[2]b per year; future policy makers could benefit substantially from a more rational budgeting strategy.

Adapting to a Changing Climate

The impact of a changing climate on American interests depends on the types of changes that may occur and the ease with which we can adapt. Your assessment of these factors will

have a large influence on your policy strategy. If you think that we are largely immune and highly adaptive then the case for controlling emissions of greenhouse gases is weakened.

The most comprehensive assessment of climate impacts on the United States is the *National Assessment of the Potential Consequences of the Potential Consequences of Climate Variability and Change*, produced as part of the 1990 Global Change Research Act and finalized late in 2000. The report assessed climate impacts in five climate-sensitive sectors, such as agriculture and coastal zones, in twenty different regions of the United States. The report complements a global assessment of climate impacts completed the same year by the Intergovernmental Panel on Climate Change.

The National Assessment concluded that it is highly likely that rising sea levels will cause erosion of coastal wetlands. (Sea level rises because water expands when it warms; in addition, the runoff from melting glaciers raises the volume of ocean water.) Warmer winter temperatures are also likely to reduce snowpack, causing difficulties for watershed management in regions where water resources are already tapped heavily. Alaska is likely to face special difficulties since many roads and pipelines are built on permafrost that is a poor foundation when it thaws. Across much of the United States higher heat indexes and more frequent heat waves are also likely, imposing some costs on electric power systems needed to supply air conditioners. Not all the news is bad, however. The study finds that agriculture and forestry are likely to benefit from higher concentrations of CO_2 (which causes plants to grow more rapidly), but growing stress from heat and water could be harmful, especially to natural ecosystems that are less able to adapt than those that are actively managed by humans, such as crops. The impacts of changing climate are likely to vary considerably across regions. For example, farmers already working at the edge of the climatic zone for their crops will likely face the need to switch crops or face losses. Soybean farming in the already warm southeastern United States is likely to suffer, but new areas for cultivation may open in the far north where temperatures are presently too low for soybeans. Under most scenarios, U.S. farmers and consumers would benefit from higher crop yields and lower prices.

Over time, the United States and most other advanced industrialized countries have become somewhat immune to climate. In 1850 about two-thirds of the U.S. economy depended on the climate—farming, forestry, hunting & fishing, and other "outdoors" activities could be hit hard if climate took at turn for the worse. Today, only about 5% of U.S. economic activity is affected directly by climate, although estimates of the indirect impacts range up to about one-third of total economic output (i.e., about $3 trillion dollars per year). An increasing fraction of the economy is essentially decoupled from climate and weather. We live in office buildings with climate control, fly in aircraft that land and take off in nearly zero visibility, buy food and other products on a world market that increasingly locates production where weather and other factors are most favorable. In contrast, less wealthy societies—both the poor here in the United States and the very poor in the developing world—are generally more vulnerable and less able to adapt.

Despite better climate-proofing, we are not invulnerable. Estimates compiled by the National Oceanic and Atmospheric Administration (NOAA) suggest that on average severe weather events cause $11b in damages per year nationally. In outlier years, which may become more common with climate change, single storms can cause tens of billions of dollars in damage.

The assessed value of coastal real estate between Miami and Palm Beach alone is about $1 trillion—much of its value tied to the proximate ocean yet vulnerable to rising sea levels.

It is possible to reduce those losses. For example, better weather and climate forecasting are already reducing vulnerabilities to "El Niño," a natural climatic cycle that occurs every 2-5 years and affects the whole planet. It brings extreme weather to the United States and causes crops to fail in Australia, Indonesia and elsewhere in southern Asia. The 1982-1983 El Niño, the strongest on record, caused abnormally high water levels on the Colorado river that threatened the integrity of the Glen Canyon dam situated immediately above the Grand Canyon—failure of that dam, or others stressed by high water flows, could cause massive loss of life and cascading dam failures downstream. The 1997-1998 El Niño, normal by historical standards, caused $4.5 billion in total losses of crops and property in the United States alone.

Over the last 15 years governments and the private sector have developed sophisticated weather forecasting tools that can now assign a high probability for the onset of El Niño a year in advance, making it possible to adjust water usage, crop choices, and other factors that fall easily within human control. Equally important is the development of advanced agricultural techniques, infrastructure management systems, and sundry other factors such as efficient water markets that reliably price scarcity. All of these measures to inoculate our economy against El Niño have occurred quite apart from the threat of climate change, but they will aid our response to climate impacts. Similar measures have emerged for essentially all other weather-related hazards, such as tornadoes, intense storms, drought and flood.

As President you will be hard-pressed to identify many ways that the federal government can be effectively accelerate the "climate proofing" of modern society. Most of the growing immunity to climate is the result of development rather than active policy. However, we highlight three areas where you might consider further action. First, you may want to make additional efforts to ensure that potential future climate impacts are known by those whose actions, today, can do the most to alleviate our future vulnerabilities. The need for information is especially great in the planning and construction of costly, long-lived infrastructures, such as bridges, power plants and water treatment plants located in coastal zones where sea level will rise. Small changes adopted during today's projects could greatly ease future adaptation. Already much is underway. River managers are examining the risks from saltwater reaching the public water supply intakes in cities such as Philadelphia. When Boston city planners revamped the waterfront in the 1980s they allowed for a [two] foot rise in sea level in the design for new sea walls and protection against storm surges. Compared with just a decade ago, most large weather-sensitive infrastructures are planned in the United States with an eye to long-term climate change.

Second, and related, is the need to promote institutions that will aid adaptation. Many such institutions already exist, such as futures markets for agricultural products that aid in the hedging of risks and encourage actors in the private sector to gain the information they need about climate and weather impacts. There is remaining cause for concern, however, that agricultural and water markets still fall far short of their efficient ideal. In the West, especially, a plethora of distortions keep water from flowing to where it yields the greatest value. In agriculture, the 2000 farm bill has probably set back the cause of creating an adaptive farm

sector by locking into place centrally-determined crop choices and by distorting the value of farm land. Your administration has announced its intention to roll back that farm program if a similar deal can be struck with the European Union through the foundering talks in the World Trade Organization. The long-term U.S. interest in creating an adaptive agricultural sector—quite apart from saving billions of dollars per year in price supports—is additional reason to pursue such a deal.

Third, many countries will press the United States to be accountable for the effects of climate change in other countries, notably in the developing world where exposure to climate is greater and the ability to adapt is already thin. In India, for example, despite a thriving industrial and service sector, roughly one-quarter of economic output (and two-thirds of all employment) are linked to agriculture. You could invest in programs to assist these countries in adapting, such as by helping them to build modern weather forecasting systems. But the track record with these programs is mixed, in part because it is very difficult to isolate "adaptation" projects from the broader development of the whole economy. An alternative approach is not to invest in adaptation-specific projects at all but, rather, to assist these countries with their normal process of economic development. Wealthier and more democratic societies are generally better able to adapt on their own. Your administration's new "Millennium Challenge Account" (MCA) is an innovative approach to assisting countries that are most likely to use foreign aid for true economic development. This program was not conceived as a strategy for climate-proofing, but through development such programs may have a much larger effect in making countries adaptive to climate change than any policy that is specially targeted for that purpose.

It is probably not possible to achieve complete invulnerability to a changing climate. In particular, you must decide how to weigh three types of hazards that may be difficult to manage. If you assign importance to these scenarios then it will be hard to justify a policy that relies mainly on adaptation to a changing climate rather than controlling emissions and mitigating the climate problem at its root.

First, some countries—mainly developing countries—will face enormous difficulty in adaptation. Low lying nations, such as the archipelago of Vanuatu in the Pacific or large swaths of coastal Bangladesh that sit barely a meter above sea level, face the specter of rising sea levels with trepidation. Economically, it may be much less costly to move these populations (or ignore their troubles), but as a matter of justice and politics that option may not be available.

Second, some climate hazards may be difficult or impossible to contain. For example, many scientists have suggested that a warmer and wetter climate will facilitate malaria, yellow fever, and other water-borne diseases. Industrialized countries have already brought these diseases under control, and developing countries will probably do the same as they become wealthier. However, it may prove difficult to prevent the spread of climate-linked diseases as borders become more porous. One hundred years ago when the United States brought malaria under control it was difficult for malarial patients to travel and re-infect a zone; today, every major malarial zone in the world is less than 24 hours from the United States by airplane, and 40 million international air passengers arrive in the United States every year. Unlike property risks, where insurance markets can respond rapidly to a change in danger, risks to human lives create liabilities that require a whole generation for adjustment. The 1999 outbreak in New York of

West Nile virus—a disease carried in birds that is transmitted by mosquito in a manner similar to malaria—illustrated the dangers and underscored that the public is easily panicked. The virus infected 62 people that year in New York and killed 7.

Third, and finally, it may be extremely difficult to adapt to the consequences of abrupt climate changes—such as a rapid shift in the North Atlantic ocean circulation or the accelerated melting of the West Antarctic Ice Sheet. Better monitoring and gaming of these scenarios could improve our adaptive capacity, but the dislocations could be so large that adaptation is not an option.

Of these three points of vulnerability, we find that the third is most likely to affect U.S. interests and security most directly. Yet the risks are most difficult to quantify. We expect that these hazards will become an ever larger part of the public debate about how to respond to climate change. The most likely consequences of a changing climate may not be much different from other weather and environmental hazards to which modern society has adapted, but the extreme scenarios are of a different character. They are politically salient and also a genuine source of concern. Insofar as you weigh these risks heavily then it would be prudent to make a substantial investment in controlling emissions.

Controlling Emissions

Whether and how you adopt policies to control emissions of greenhouse gases will be politically the most visible and controversial aspect of your climate change policy strategy. Ever since 1988, prominent Senators and Members of Congress have introduced bills to require mandatory limits on emissions, although not one of those bills has attracted enough votes to pass. In 2003, the Senate voted on a bill sponsored by Senators Lieberman and McCain, which would have imposed caps on U.S. emissions of greenhouse gases. The bill lacked details—such as on the method for allocating the extremely valuable emission credits—that would be needed to make the proposed emission trading system operational. However, it did attract 43 positive votes—"free votes," say many observers since nobody expected the bill to pass—which suggests that there is growing interest in adopting some sort of meaningful response to the threat of global warming.

Prior to the vote on the Lieberman-McCain bill, the only other time that the full Senate has voted on climate policy was the July 1997 resolution sponsored by Senators Byrd and Hagel, which passed 95-0. Intended to demonstrate U.S. resolve in advance of the final negotiations on the Kyoto Protocol that fall, the resolution declared that the Senate would not accept any treaty that did not impose binding obligations on developing countries that were comparable to those for the United States. That resolution cast a shadow over Kyoto, which did not impose any obligation on developing countries, and has became a legislative Rorschach test. Now, those who advocate limits on U.S. emissions—including Senator Byrd himself—point to the report adopted alongside the resolution, which emphasized the risks of a changing climate and the need for action. Those who oppose limits point to the tersely worded resolution itself, which demands of developing countries what they adamantly refuse to accept.

Absent mandatory controls, since 1992 the federal government has had in place a program to encourage private firms to make voluntary reductions—also known as "1605(b)" after the section of the Energy Policy Act (EPAct) of 1992. In 2002, 228 entities reported reductions totaling 265 million metric tons of CO_2 equivalents (about 4% of actual gross U.S. emissions that year). Many firms have participated in 1605(b) because they see it as a way to gain public credit for reductions that they would have made anyway (or, in some cases, they have made at very low cost). Many participants also appear to believe that acknowledged reductions will also lead to future rewards, such as extra emission credits in some future emission trading program.

Critics have savaged the voluntary 1605(b) program for its loose accounting standards. (Much of that critique is now blunted by new accounting rules that your administration is putting into place in 2004—indeed, they are so strict that some firms lament that it will be very difficult to achieve registered projects.) Many conservatives remain critical of this scheme—and similar state-level systems for registering emission reductions—because insofar as they offer an implicit promise of future rewards they are, in effect, a back door strategy for implementing a soft cap on emissions. Some of that criticism is rooted in the desire to avoid any controls on emissions at any time. Some of it is inspired by the realization that promises of handouts for early voluntary emission reductions will, in essence, reward incumbent firms that know how to fill out the forms and manipulate the bureaucracy. Alternative methods for allocating emission permits could be much more efficient—for example, an auction of permits (as is done when allocating mobile telephone licenses) would deliver the windfall value of these permits to the public owners of the atmosphere rather than private firms that are talented at filling forms.

Designing Effective Emission Controls

Crafting a strategy for controlling emissions is a very complicated and potentially risky task since it involves altering the metabolism of the industrial economy—fossil fuels. Over the last decade, successive administrations have examined four broad types of policies.

First, the government could make fuller use of voluntary programs. In addition to 1605(b), for example, the government could make more aggressive use of labeling and informational programs. For example, EPA's "Energy Star" program has had enormous success in voluntarily convincing the manufacturers of computer monitors, VCRs, and other devices that used to consume large amounts of power in "standby" mode to reduce this parasitic consumption of power without much altering functionality. Without such programs, few consumers would have been able to figure out on their own why their electricity bills were so high and identify and install viable technological alternatives.

Many voluntary programs have focused on household energy decisions. All told, about one-third of U.S. emissions come from households, and there is ample evidence that households are especially far from the frontier of best practice in their usage of energy. Homeowners often do not invest in even in the simplest and most cost-effective measures, such as adding insulation and buying efficient appliances. The federal government and most states already have in place a variety of programs to overcome these deficiencies, such as mandatory labeling of the energy

efficiency and operating costs of most large appliances and energy audit programs that help homeowners learn about their options. However, it is unclear whether there are additional opportunities for low-cost emission controls through such programs. For example, many states with regulated power utilities have allowed (or even mandated) utilities to work with customers to find low-cost ways to limit demand for electricity and gas. These "demand side management" programs have been inspired by the logic that it is often less costly for society to limit its use of energy than to expand energy supply systems. Yet the actual record of these programs is mixed. Some have been highly successful—especially those involving large energy users (e.g., substituting ultra-efficient heat pumps for traditional air conditioners) and those that require only simple changes in end technologies (e.g., substituting efficient compact fluorescent lamps for incandescent bulbs that use ten times the energy for the same light output). However, many of these programs are justifiable only with low capital costs and dubious accounting allowed by regulators and do not pass normal market tests.

The mixed record with voluntary programs and the lack of visible progress in controlling emissions has led many observers to argue that a mandatory program for controlling emissions is necessary.

Second, you could develop a policy of controlling emissions through direct regulation, such as mandatory energy efficiency standards. Already government imposes many energy efficiency standards; their effectiveness and economic merits are hotly contested. For example, in 1972 the average U.S. refrigerator consumed 1800 kilowatt hours (kwh) per year. Through a successive series of binding standards—first in California and then nationwide—power consumption has declined to about 500 kwh per year, even as the average size of refrigerators has increased and functionality such as through-the-door ice and water service has risen. It is difficult to disentangle the effect of higher electricity prices, awareness of energy issues, and autonomous innovation within the refrigerator business from the specific effect of tightening efficiency standards, but many experts argue that such standards are proof that government can and should force technological change through binding rules on equipment suppliers.

The single largest effect of government energy efficiency standards on total energy consumption and emissions of greenhouse gases is in personal vehicles. Ever since 1975 the United States has set standards that require each major vehicle manufacturer to achieve a minimum average level of efficiency for the fleet of cars and light trucks they sell—the so-called Corporate Average Fuel Economy (CAFE) standards. These standards, along with higher gasoline prices, explain why during the 1980s total emissions from personal vehicles actually declined even as the total distance traveled by cars and trucks rose steadily every year. Only in the 1990s did emissions and total fuel consumption resume their rise—partly because the efficiency standards for new cars have been largely stagnant since 1985 and notably because new tastes of wealthier consumers favored less efficient "light trucks" over "passenger cars." Today, the CAFE standards are 27.5 miles per gallon (mpg) for cars and 20.7 mpg for trucks. (The National Highway Traffic Safety Administration, which administers the CAFE program, has raised light truck standards to 22.2 mpg for the model year 2007.) The category of "light trucks" includes nearly all minivans, crossover vehicles such as DaimlerChrysler's PT Cruiser, and all SUVs—today, 36% of registered vehicles are "light trucks." About [8%] of personal vehicle

sales are trucks that weigh more than 8500 pounds and therefore not even subject to the relatively lax fuel economy standards for light trucks.

In 2002 the National Research Council issued a report showing that it was possible to increase fuel economy for new passenger cars and trucks by about 50% over the next decade, with little impact on vehicle safety. They also recommended eliminating the bureaucratic distinction between "cars" and "light trucks," which is a vestige of much earlier policies that aimed to exempt short-haul industrial vehicles from being subjected to the same strict fuel economy standards for passenger cars. In that era, higher weights were essential and lawmakers wanted to avoid imposing hardship on already strapped small firms and farmers. That era, however, is largely over.

There are ample opportunities to make greater use of direct regulation. We find, however, that most firms and economists are unified in their belief that direct regulation is excessively costly. For example, strict energy efficiency standards force consumers to spend capital on efficiency features that they otherwise would not select; more costly vehicles cause consumers to delay purchases, which in turn probably makes the vehicle fleet older and perhaps less efficient than it would be otherwise.

Third, you could pursue a market-based policy that relies on taxing emissions—often called a "carbon tax" since carbon dioxide is the main greenhouse gas. The tax sends a price signal to firms and households, encouraging them to reduce emissions. As economic policy it is attractive because the tax does not require the economy to cap its emissions at a particular level in any particular year. With a tax you know the cost that your policy imposes on the economy; unlike a policy that caps emissions (which we discuss below) there is little risk that your policy could accidentally impose a cost on the economy that is higher than Americans are willing to pay.

The central problem with this approach is its political difficulty. The last Presidential effort to create a broad-based tax on fossil fuels was the Clinton Administration's ill-fated "BTU tax" that was part of his 1993 economic recovery package. Although the proposed tax was very small (about [4] cents per gallon of gasoline, which is less than the typical variation in fuel prices during the summer driving season), voters and most in Congress hated the measure. The conventional wisdom from that debacle is that direct regulation and other stealth measures are politically much easier to pass than higher taxes. Arguably, however, the failure of the BTU tax stemmed from the lack of any clear purpose for the measure and the absence of a coherent strategy for utilizing the revenues from the tax. Given your visible stand against most other taxes, even with a clear articulation it would be extremely difficult to organize the votes needed to pass such a policy. In addition to these carnal political reasons to avoid taxes, many environmental groups abhor the tax approach because its effect on emissions is uncertain. Emission caps, by contrast, make it clear what the economy must deliver for the environment.

Taxes also present special problems for international coordination. If you impose a meaningful tax on the United States you will want to ensure that other countries impose similar measures on their firms as well. In practice, though, countries that have already adopted carbon taxes riddle them with loopholes and special exceptions to reward politically powerful groups

and to reduce the real costs of compliance. A coordinated international approach based on taxation would require complementary rules to limit these practices, and such rules would be difficult to enforce. Indeed, similar types of disciplines on tax policy exist in the WTO, where despite sophisticated enforcement institutions it has been very difficult to assure compliance. (The same criticism about the difficulty of international coordination also applies to voluntary and mandatory regulations. Indeed, when the European Union proposed building the Kyoto Protocol around long menus of voluntary and binding policies, the United States vehemently argued that the approach would be inefficient and impossible to monitor.)

The problems with the preceding policy options have led most analysts and politicians to focus on a fourth option—a market-based "cap and trade" system. In this scheme, each nation would adopt a binding cap on its total emissions. The nation would then allocate emission credits within its borders—probably far "upstream" at power plants, mines, oil wells, and other users of fossil fuels that cause emissions of greenhouse gases. (A "downstream" system could be impossibly costly to administer since millions of firms and households would hold emission credits.) Firms would then be free to trade these credits, which would ensure that actual emission controls are applied where it is cheapest. The United States has successfully used such "cap and trade" systems in phasing out lead in gasoline and in controlling emissions of sulfur dioxide, the leading cause of acid rain. This vision for a cap and trade system is already built into the Kyoto Protocol, mainly from the insistence of the United States government.

Political and Economic Considerations in the Design of an Emission Trading System

Our deliberations focused extensively on ways to design a cap and trade system for the United States and how to couple that system with trading opportunities in other nations. The issues are exceedingly complex. If you decide to proceed with a cap and trade system we recommend that you convene an inter-agency process to develop proposals in detail. For now, we highlight five important issues that you should keep in mind as you contemplate your policy strategy for climate change.

First, an emission trading system offers opportunity for political arbitrage. The permits that are allocated under this system are extremely valuable and can be used to blunt opposition and reward politically powerful constituencies. When the Congress crafted the 1990 Clean Air Act it awarded most of the sulfur emission credits to existing emitters, the interest group that would have been most adamant in opposing emission controls. Studies show that awarding just ten percent of carbon emission permits to the hardest hit stakeholders—coal mining firms in particular—could make them whole and blunt their opposition. We question the economic efficiency of a scheme that diverts large resources through an ailing industry—rather than allowing the market itself to determine coal's fate—but as a matter of political expediency such allocations are probably unavoidable. Your economic advisers will urge you to auction the permits, as is done in a large number of other areas where the government leases a public good for private purposes (e.g., radio spectrum for cellphones). Using standard methods for calculating asset values, the total value of U.S. emission credits would be in the range of $1 trillion, making this the largest allocation of public property since the opening of the American West.

Second, creating an effective trading system is akin to inventing a new form of money—the carbon credit. Already several entities have created pilot programs to trade credits and prove the merit of the concept. For example, the Chicago Climate Exchange opened in December 2003 for trading between 19 North American entities who have agreed to reduce their emissions voluntarily; at present, carbon futures are trading for less than $1 per ton—an extremely low level that reflects the lack of any meaningful incentive to control emissions in the U.S. economy. Similar pilot efforts are taking shape in Massachusetts and New Hampshire; the European Union has created a binding trading system for large industrial sources that will begin operation in 2005.

The value of this new currency will be a function of the number in circulation and the rules that govern exchange. Following this analogy, we find that a poorly designed trading system could not only fail to address the environmental problem but could also cause harm to the U.S. economy. Mindful of these risks, we urge you to develop a careful strategy for deciding which nations should be allowed inside the trading system.

On the one hand, it is useful to involve as many countries as possible in the trading system because that offers the greatest potential gains from trade. Pilot projects have already proved that flexibility in the geography of emission control can cut costs dramatically. For example, American Electric Power—the largest coal-burning U.S. electric utility—has demonstrated that it is less costly to limit net emissions to the atmosphere by protecting a rainforest in Bolivia than to control emissions from its existing power plants located in the US. Gas companies in western Europe and pipeline companies in Japan are exploring ways to get credit for investing in better pipelines and compressors on the gas transmission system in Russia—Gazprom, Russia's gas monopoly, welcomes this approach because it would attract badly needed investment in its crumbling gas transmission system, and the western firms see it as an opportunity to enter the Russian gas market and control emissions at much lower cost than in the already tight and efficient systems they operate at home.

On the other hand, the countries that have the greatest opportunity for low cost emission controls—developing countries as well as Russia and Ukraine—are those that have the weakest internal institutions and thus are least likely to be able to monitor and enforce the system. In effect, countries with weak institutions will be printing excessive quantities of this new currency, degrading the value of the scrip held by all others and causing higher emissions that undermine the scheme's environmental objectives. No durable currency has ever sprung forth by starting with large numbers of highly diverse agents in the absence of strong institutions that are essential to protecting the currency value. It is useful to keep in mind the experience in Europe with creation of the Euro. In that case, 12 countries created a common currency within an existing context of strong collective institutions, independent courts, a strong administrative bureaucracy, and a new central bank. Even then, the transition has been far from seamless—the EMU was reluctant to penalize France and Germany even though in 2003 both countries failed to comply with limits on their budget deficits and thus, in essence, siphoned value from compliant members. Doing all this in the context of much weaker international law with countries such as Russia and most of the developing countries that question the need for any emission controls is daunting.

The analogy with creating a currency suggests that it would be better to build a market from the "bottom up" rather than attempt to create an international trading system with centralized Kyoto-style rules that work "top down." Countries that care most about the environmental problem at hand would establish their own trading systems (currencies) and enforcement rules. Then portals (exchanges) between the systems would be established according to bilateral consent. Thus countries could control their exposures to poor enforcement and excessive allocation by deciding where they open portals. Preserving the original identity of emission credits the market could assess the integrity (value) of different national emission permits. (In contrast, the Kyoto rules envision co-mingling all emission credits such that once they are traded a permit is assured full face value.) Inspired by the early years of the General Agreement on Tariffs and Trade (GATT), members in this bottom-up regime might also create international rules of mutual recognition, reciprocity and most favored nation arrangements that ensure that those who accept the strictures of core trading arrangements gain the benefit of access to all markets that are part of the regime. Enforcement would rest principally with member states and the market, which would value each country's scrip individually, just as currency markets assign different and varying values to Dollars, Yen, Euros and Rupees.

This bottom-up approach can't be sustained forever. As the number of parties grows there will be a need for better central coordination and multilateral enforcement systems. But that is a topic for the distant future. Indeed, the architects of the GATT did not create any provisions for multilateral enforcement; a system of "dispute panels" arose within the GATT system. Only today, more than fifty years after the modest creation of the GATT, has an effective enforcement system arisen through experience, learning and the creation of institutional arrangements such as the WTO.

Your view of the urgency of the climate problem will have a large effect on how you strike this balance between including many nations versus starting with a small number of like-minded countries that already have strong institutions in place. If you think that substantial controls on emissions are necessary and urgent then a global approach involving most or all nations is important since you must gain leverage over the majority of world emissions. If you think that we have several decades (or longer) to develop an effective emission control system then you can afford to pursue a policy strategy that starts much smaller and evolves from the bottom up.

This small "bottom up" process may require that you open a dialogue with other like-minded or important countries through an institution that is smaller and more flexible than the United Nations. Periodically, this issue has arisen on the G8 agenda, but it has not had much staying power and the G8 does not include any major developing countries. Several regional forums involve industrialized and developing countries; however, none of them is appropriate as the foundation for a global strategy. It may be useful to resurrect the G20 forum of finance ministers—established originally in the wake of the Asian financial crisis to aid coordination of policies across the major industrialized and developing countries. In addition to providing a forum with participation of a limited number of important countries, that forum would also centrally engage finance ministers who have been largely absent from efforts to create an effective climate regime as environment and foreign ministries are dominant in the Kyoto world.

Third, even if you employ a well-designed market-based system of emission trading there are many potential economic risks. Most important is the magnitude and timing of the cut. Modest cuts in emissions—such as a 5 to 10% cut below the trajectory of emissions over a decade or longer—probably pose few risks for the economy. Firms and households will respond with low-cost, minor changes in technology and practice; an emission trading system will allow flexibility in exactly where the economy makes the reduction. The timing of deeper cuts, however, requires greater care. Roughly half of U.S. emissions come from a capital stock that has a lifetime of approximately 25 years or longer—such as power plants and steel mills. This stock turns over slowly. Tight limits imposed with little warning over a short period could require the owners simply to abandon these facilities, which would sharply inflate costs. Yet such premature retirement of capital equipment would offer few environmental benefits since the climate change problem itself is caused by the slow accumulation of greenhouse gases in the atmosphere. The amount of warming is more sensitive to the trajectory of emissions over time than to the exact timing of emission controls.

There are no precise map to the timing and cost of emission controls. The previous administration commissioned two studies through the Department of Energy on this question and received diametrically opposed answers. One, a survey of national laboratories, found that many emission control technologies were already available for rapid and deep emission controls (perhaps up to [40%]) at little or no cost. The other relied on macroeconomic models and suggested that more modest cuts such as those implied in the Kyoto Protocol could cost hundreds of billions of dollars.

We note that long-lived capital assets are typically much more responsive to policy incentives than suggested by their old nameplates. The White House, for example, is two centuries old; yet throughout the building you find modern conveniences and energy-efficient equipment from computers to refrigerators that were unavailable when John and Abigail Adams took up residency in 1800. The nation's oldest fossil fuel power plants that are connected to the grid date to the 1920s, but inside the brick walls the facilities have little in common with flapper-era technology. However, we also note that those who have argued that rapid and deep emission cuts are feasible often fail to recognize that technologies do not automatically appear where they are needed. Rather, technological change is encumbered by the organizations and networks that must evolve alongside any transformation of the whole system. Consider passenger and freight transportation, which accounts for about one-quarter of all U.S. emissions of greenhouse gases. Beyond the 10-15 year lifetime of new cars, another five years is typically needed to develop a new line of new products, and still longer is required for testing and acceptance of truly radical new technologies. Ultra-efficient hybrid engine vehicles, for example, first appeared in the U.S. market in 1999; yet four years later they account still for only 0.3% of new vehicles sold in the United States and a much smaller fraction of the total passenger-miles driven in the United States. As a rule, complete transformation of the energy system takes about five decades. The shift to automobiles as the dominant mode of transportation in the United States required building new infrastructures (roads), head-to-head competition with the incumbents (rail cars and horses), and a complete shift in fueling systems from solid coal and hay to liquid oil-based products. Few pondered in the 1880s—when personal cars entered the U.S. market as weekend toys for the super-rich—the slow pace of diffusion of automobile technology nor how pervasive

they would eventually become. The New York vehicle census found that cars outnumbered horses for the first time only in 1912—and New York's rich population was at the forefront of this transportation revolution. Yet today horses play essentially no role in mobility. We are also mindful that analysts often overstate the potential of new technologies, forgetting that for every transformation traced to an original technological seed there have been dozens of false starts that never flowered--such as [Ford's] amphibious car that had promised to allow seamless interconnection between road and waterway mobility.

If you impose an excessively tight cap on U.S. emissions while the international trading system is in its infancy you could repeat the experience with Kyoto in which an unrealistic cap forced the United States to consider either a politically unrealistic shell game of purchasing credits from Russia or simply exiting the regime. One solution to this problem is to create a "safety valve" in the trading system—a mechanism that allows the government to issue additional emission credits at an agreed price. In effect, this "valve" would limit the price of the emission credits and would make a cap and trade system behave like a tax if the cost of compliance rose higher than expected—if, for example, firms did not have enough time to meet a stringent cap on emissions with the normal turnover of the capital stock.

Fourth, in developing your climate strategy you should be aware that many gases trap heat and cause changes in climate. Carbon dioxide is a relatively weak gas, but it is emitted in such prodigious quantities that it accounts for most of the current and expected future change in climate. Methane, by contrast is a much stronger greenhouse gas but the volume emitted is tiny compared with CO_2. Whereas CO_2 lingers a century or so in the in the atmosphere, methane survives in the atmosphere for just a decade. Thus efforts to control methane will have a rapid effect on climate but little impact on the long-term. Scientists have developed indexes that account for these different effects, allowing for crude conversion of different gases into common units—typically measured in "carbon dioxide equivalents."

In 2002, the gross U.S. emission of greenhouse gases totaled 6.9 billion metric tons of CO_2-equivalents. Of that total, 84% was from CO_2 itself; the rest was as methane (9%), nitrous oxide (5%), and other gases (2%). Offsetting those gross emissions was the absorption of CO_2 by U.S. forests and croplands, estimated at perhaps as high as 1 billion tons of CO_2. (Nobody is quite sure how much carbon is absorbed on United States territory. Some studies suggest that the quantity is extremely large because U.S. forests are still rebounding from massive deforestation in the 19th century.)

In principle, any effort to control emissions should set broad goals and then leave firms and households to find the emissions that are least costly to control. For example, firms such as the sanitation giant Waste Management have discovered that it is inexpensive to control methane from landfills by adopting new technologies to contain and manage landfill gas. The gas is so rich in methane—which is also the main ingredient in natural gas—that the landfillers have been able to sell the gas and make a profit. By encouraging the search for such innovative low-cost solutions, a multi-gas strategy can be cheaper than policies that focus on just one gas (e.g., CO_2) or even on just one activity (e.g., emissions from large electric power plants). In practice, however, many of these gases and activities are difficult to monitor, and thus you must balance a comprehensive approach against the cost and difficulty of its administration. Faced with exactly

this challenge, the European Union, which is developing the world's first international system for trading emission credits, has opted initially to restrict emission controls just to CO_2 from burning fossil fuels at industrial sources—allowing other sources to enter the system later.

You should be aware that a controversy is brewing within the scientific community about the role of soot in climate change. Soot can absorb heat on its own, which contributes to climate change. Soot particles also accelerate the formation of certain types of clouds that may also boost climate warming. Indeed, there is a measurable increase in cloudiness downwind of major industrial soot sources; particulates from dirty marine engines explain why major shipping lanes are cloudier than their less traveled counterparts. Whether these clouds amplify or dampen warming remains disputed. Other sources of tiny particles—such as dust storms—also influence climate in uncertain ways. Partly in response to criticism about your withdrawal from the Kyoto process, your administration launched a Climate Change Research Initiative in June 2001 with the goal, especially, of enhancing research on the effects of soot and other particulates on climate.

If soot proves to be a major cause of climate change then several important policy consequences will follow. It will be additionally important to allow for flexibility in emission controls because limiting the emission of soot is probably much less costly than many of the other available options for controlling CO_2 and other greenhouse gases. It is also important to recognize that the world economy is likely to regulate much soot on its own because of its link to local air pollution. With development, households and societies invest in environmental protection. If soot is considered a major cause of current and future warming then the U.S. share of the blame for climate change is likely to decline a bit. Nobody knows exactly where the world's soot comes from. Developing countries are likely to account for a large share as they tend to disproportionately use the older technologies—from primitive home cookstoves to coal-fired power plants that lack the technologies that remove soot particles before they are ejected from the smokestack. In the extreme case, perhaps the United States' share of greenhouse gases would decline from one-quarter to one-sixth. More likely is that our share of total warming would change by only a few percentage points, if that.

Fifth, the metrics that are used to measure progress could have a large impact on the cost of compliance. In most countries, and in the Kyoto Process, goals have been set in terms of the volume of emissions—tons of CO_2 equivalents per year. Those terms often make the United States look like a poor performer, as we account for about one-quarter of the world's total emissions, which is hardly surprising since the United States also accounts for about one-quarter of the world's economic activity. The second-largest emitter (China) is quite far behind, with only 13%. After that follows Russia (7%), Japan (5%), India (4%) and then many others spaced closely together.

Volumetric measures are also problematic as instruments for policy because they leave the United States and other countries exposed to unintended consequences. Over the short term, the greatest single factor in determining emissions in the United States has been the size of the economy; when the U.S. economy grew rapidly in the late 1990s so did our emissions, making the Kyoto targets increasingly beyond the American grasp. By setting obligations in terms of the total volume of emissions, Kyoto unwittingly appeared to put environmental protection into

direct conflict with economic growth. Indeed, when measured in terms of emission volumes the advanced industrialized countries that have performed best have done so by halting economic activities. Germany has shut factors in East Germany; Luxembourg, which achieved the deepest percentage cut in emission volumes of any industrialized nation in the 1990s, owes its success to closing a major steel plant and relying more heavily on imported (rather than domestically generated) electricity.

When you announced your climate change policy in February 2002 you therefore adopted the measure of "greenhouse gas intensity"—the ratio of emissions to the size of the economy. Figure 1 shows this measure for some key countries and reveals that the United States is in the pack. Our carbon intensity is about 210 grams of carbon emitted per dollar of economic output. Japan and France rest at about two-thirds that value, reflecting aggressive energy efficiency policies and high energy prices as well as large sources of carbon-free nuclear power in both countries' energy systems. By this measure, many developing countries actually appear worse than the United States—China's official statistics suggest a carbon intensity of around 300 gC/$. South Africa has among the highest carbon intensities with 400 gC/$, as its heavy mining and industrial economy is based on the least costly electricity in world—nearly all of it powered by carbon-intensive coal. India's carbon intensity is about the same level as the United States, but the level is rising due to industrialization of the Indian economy. (These values are computed by converting different economic data into common dollar units using "purchasing power parities," which account for the higher purchasing power of money in developing countries. Use of market exchange rates would give developing countries much higher carbon intensities than the United States and other industrial economies.)

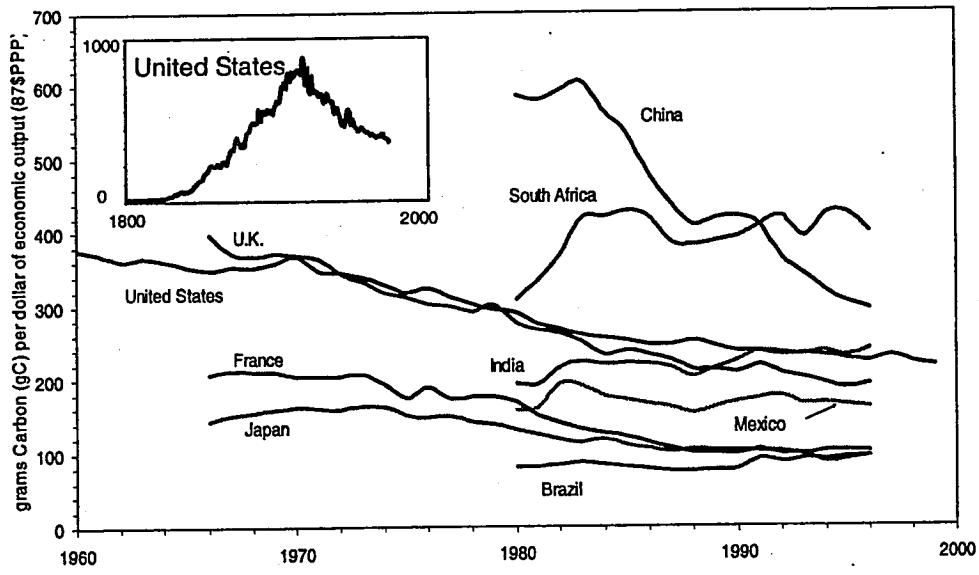

Figure 1: The Carbon Intensity of Selected Industrial and Developing Economies (grams of carbon emitted as CO_2 per dollar of economic output).

So far, the United States is the only major country to focus on intensity as the measure of responsibility and progress. Two factors explain why others have not followed your lead. First, the 18% target that you announced is widely seen as lacking ambition. The U.S. intensity peaked in 1922 and has been declining at about 18% per decade ever since. (See the inset to figure 1.) Second, intensity is a convenient measure only in countries where the energy system is changing slowly and in favorable ways. In some countries, intensity measures are actually more volatile than total emissions, especially when the economy (the denominator in the intensity measure) changes abruptly—when the Soviet Union collapsed, for example, intensity rose sharply because the economy shrank more than total consumption of energy. Nor will all countries accept the premise that carbon intensity should decline over time. Brazil, for example, has traditionally relied on carbon free hydroelectric power and has had an extremely low and stable carbon intensity (about 80 gC/$); now that most hydro sites are occupied and Brazil has seen the cost of blackouts in dry years, the government is encouraging new fossil fuel powered plants. Although a new pipeline from Bolivia as well as recent gas finds offshore Rio has made it possible to use ultra clean gas in these new plants, Brazil's carbon intensity is nonetheless rising.

Many developing countries favor per-capita measures of responsibility, which make them look favorable as their populations are large and their emissions are relatively low. China's per-capita emissions are only one-tenth those of the United States. Some academics and a few diplomats from developing countries have favored an approach that focuses on historical responsibility, which would hold each nation accountable not only for its current emissions but also the accumulated concentrations that are still lingering in the atmosphere from their past emissions. That historical approach would assign responsibility for about one-third of today's to the United States, while developing countries (whose emissions have risen only recently) would account for only a small share. Such proposals are harmful to the United States' interests since they imply that we have already spent a larger share of our part of the atmospheric budget.

Investing in New Technologies

To the extent that you think climate change is a problem that merits limiting future emissions you will need to consider the special role for technology policy. Adopting a credible limit on total emissions will send a strong signal to innovators. However, the technologies that will be needed probably will not arrive autonomously. Some will be very risky or expensive, making them prohibitive for private firms to adopt. Many of the key innovations will be difficult to appropriate, which is an additional reason for public investment.

To give you a sense of the magnitude of the technological task, consider that the entire world's economy today is powered with about 14 trillion watts (terawatts) of primary energy. Of that, about one-quarter emits essentially no greenhouse gases—mainly nuclear power and hydroelectricity, but also much smaller quantities of wind power and tiny amounts of solar power. Over the next fifty years, total world energy consumption may rise to about 35 TW; if, at the same time, the world decides to stabilize atmospheric concentrations of carbon dioxide at 550

parts per million (about twice the pre-industrial level) then the amount of carbon free power must rise nearly five fold. In other words, by 2050 the total amount of zero carbon power supply must exceed the total power supply of all forms on Earth today. Historically, the supply of carbon-free technologies has grown at only about 0.3% per year faster than the total energy supply, and at that rate perhaps only 10 TW of carbon free power will be available in 2050; this historical rate of "decarbonization" is not even fast enough to prevent total emissions of CO_2 from rising in the future.

There are many options available, from advanced nuclear plants to new wind turbines and perhaps exotic energy forms such as satellites tethered in space that beam power collected from the sun back to Earth. None of these technologies, however, is ready to deploy in the large quantities needed. As you consider whether and how the federal government could play a role, you should be aware that there is a long and checkered history of U.S. policy intervention in the invention and deployment of new technologies. That history suggests four lessons that can guide your thinking.

First, there are many examples of technological spinoffs from government programs. Fuel cells, which convert hydrogen fuel into emission-free electricity and could become the backbone of a zero-carbon "hydrogen economy" are the byproduct of academic tinkering in the 19th century applied in the space program. Transistors, the Internet and many other technologies embedded into today's economy and society are accidental offshoots of governmental programs and private tinkering that, originally, were directed at other goals. Who thought, in the 1960s when the defense department supported packet switching partly with the goal of creating an invulnerable communications system that could withstand the rigors of nuclear war, that the resulting Internet would become a self-managing utility that today is a backbone of the modern economy? These spinoffs are often used to justify open-ended technology programs on the faith that something useful will appear from the investment. That faith-based approach to technology policy is very dangerous since it is hard to predict, *a priori*, which programs will be most effective.

Second, the desire for grand solutions to grand problems will yield political pressures for grand projects—a new "Manhattan Project" or "Apollo Program" to eliminate carbon. Such analogies are dangerous. Neither the construction of the first nuclear weapon nor putting a man on the moon required much attention to cost, and both were implemented within hierarchical military-style organizations. In contrast, completely transforming the economy will require enormous sensitivity to the cost and ease of transition—especially if developing countries are to be enticed down low-carbon pathways. And the transition will occur within a market that operates most efficiently without hierarchical regulatory instructions.

The record of grand energy technology programs is checkered and generally not encouraging. Even programs that have been successful in creating new technologies have often failed the test of markets. Through the nuclear submarine program of the U.S. Navy, the U.S. government provided most of the seed funding for light water reactors; that support, along with the regulated utilities that bought most reactors explain why nuclear power rapidly diffused into widespread use in the electric power system. But those same protections also sheltered nuclear technology for too long from commercial considerations. Even more than the 1979 accident at

Three Mile Island, the obscene and growing cost of reactors killed the industry. The potential for commercial improvement is evident in today's more competitive electric power market—new owners of reactors have found many innovative ways to squeeze about one-fifth more electricity from their plants than was typical under the old regulated environment. Perhaps the worst failures in energy technology programs were the multi-billion dollar efforts inspired by the oil crises of 1973 and 1979. A massive clean coal technology program, designed to make greater use of U.S. coal resources, was laden with special interests; politics, rather than market potential, drove the choice of technologies. These political tendencies rise as the programs become more visible and costly. It is hard to square the need for widgets in every Congressional district with the need for nimble, efficient and ruthless technological choices.

The standard lesson from these programs is to avoid prematurely selecting "winners." However, it is difficult to put that advice into practice, and you should be wary of policy proposals that claim they will not anoint the early sprinters or political ponies. Managers of these programs find it relatively easy to avoid picking winners at the earliest basic research stages because supporting a portfolio is relatively inexpensive. The real problem arises when technologies become sufficiently mature that a demonstration project is necessary. Almost always, industrial scale demonstration of energy systems is very costly and thus it is impossible to afford a large portfolio of projects. Today's conventional solution to this problem is to require reviews by outside experts, which can help avoid projects that are certain failures but often are unable to exert the subtle scrutiny that is needed throughout the management of successful projects.

Another standard remedy to this problem is to require private sector co-financing. The logic for these partnerships is that the private sector can help select the most promising technologies and is unlikely to risk its money on poor prospect. The Partnership for a New Generation of Vehicles (PNGV), a program adopted in the 1990s with the goal of enticing each U.S.-based auto manufacturer to produce an 80 mile per gallon prototype car, adopted this approach to sharing costs and following industry leadership (with outside expert review) in selecting technology pathways. The result was that PNGV followed paths that industrial partners probably would have followed on their own anyway—with PNGV, however, their research was in effect subsidized. Yet the effort inside the PNGV program to draw a line between pre-commercial (public) research and commercial (private) research meant that useful findings were immediately appropriated by the private investor. Added to these woes was the fact that the 80 mpg target bore little relation to realistic efficiency goals. While U.S. manufacturers toiled within PNGV, Japanese manufacturers Honda and Toyota created hybrid cars with around 40 to 45 mpg that had the useful attribute that real people could afford to purchase them, and real people could actually drive them on real roads.

Not all these partnership technology programs have been disasters. The U.S. government created Sematech, a partnership with U.S. semiconductor manufacturers that has proved profitable and probably stemmed the decline of U.S.-based semiconductor fabrication. (At the time, halting that loss was seen as a strategic goal for the economy and national security, which made Congress willing to appropriate the necessary funds.) The enterprise with the strongest record is the Defense Department's Advanced Research Projects Agency (DARPA), which deploys a large fund across a portfolio of innovative but risky prospects. Like a venture

capitalist, DARPA expects that only a few will yield social payments—but the ones that do work pay for the entire portfolio. DARPA has thrived because of its connection to the defense agenda and the fact that most of its innovations have not required tests of commercial viability. If you adopt a technology policy that implies large amounts of spending on particular technologies—"winners"—you should consider the DARPA model rather than the moon shot or Manhattan project.

Third, it is very difficult to draw boundaries around the field of "energy" or "climate" technology. No field of scientific and technological research dominates the supply of plausible ideas for a carbon-free energy system—new concepts can be found in high energy physics, most fields of engineering, and chemistry. Biology is even a contender, as genetically engineered microbes could be jiggered to produce hydrogen; the hot field of nanotechnology also holds promise, and microscopic carbon tubes could prove to be effective hydrogen storage devices. Unable to pick the best frontier at the outset, it might be best to pursue a broad sprinkling of resources earmarked only loosely for "carbon free energy" and "ultra efficient energy systems" through existing basic science institutions—at NSF, DOE, and (to a lesser degree) NIH. Over the last twenty years, U.S. spending on basic science has risen on average [8%] per year, and there is strong bipartisan support for science.

Fourth, the nature of radical and novel technologies as a public good suggests the need for close attention to international coordination. Whereas international coordination on controlling emissions of greenhouse gases is difficult because a large number of countries with highly disparate interests must be engaged, coordination on an international technology agenda is probably much easier. The United States, Japan and the core group of large European nations together account for about 85% of world spending on R&D. All these nations already share a common (though not identical) interest in addressing the problem of climate change, and all have well-developed public institutions for administering collective research programs. There is a long history of collaboration on basic research programs, from joint experiments in the atmosphere, oceans and in Antarctica; these nations also collaborate on multi-billion dollar scientific facilities, such as CERN (a high energy physics facility on the French/Swiss border) and ITER (the next generation of facilities that aims to demonstrate scientifically and economically viable nuclear fusion, for which a location has not been selected but sites in Japan and France are on the short list).

The more aggressive your technology policy on climate change the greater the need for international collaboration. At present, there is almost no international collaboration on energy R&D, except in a few special areas marked by extremely expensive facilities (e.g., ITER) or a long history of international coordination (e.g., advanced fission nuclear reactors). The main international program in this area is managed by the International Energy Agency and consists of little more than governments declaring their own greenhouse gas R&D programs and exchanging broad reports with an international secretariat. Rarely do international collaborations lead to the point of international collective funding; however, even efforts to achieve a coordinated research plan and strategy could be beneficial.

The need for international coordination may be especially great for reasons that will be difficult for you to acknowledge publicly. Some technologies are so risky or stigmatized that

they can't be developed in the advanced industrialized world. In crop engineering, for example, Europe has slipped far behind the world's top innovators because of public concern about the technology—those concerns could spill over into genetic engineering that may be useful for novel energy systems. In nuclear power, even the industrialized countries that have most embraced that technology—Japan and France—find it ever harder to deploy new reactors. Interestingly, these facts have created niches for developing countries. One of the promising new reactor designs is currently being developed by the South African electric power utility Eskom. China appears to have reached the #2 spot (just behind the United States) in crop genetic engineering due to a combination of generous government support for R&D, some pilfering of western intellectual property, and notably a public that is not opposed (or not allowed to oppose) field testing and growing of the novel strains.

Your administration has already developed a technology strategy that incorporates many of these lessons. The Climate Change Technology Program (CCTP) gives particular attention to two major projects. One involves co-funding (with industry) the FutureGen power plant—a highly innovative project that would gasify coal and produce electricity while sequestering the CO_2 underground. This plant builds on earlier experiences with Integrated Combined Cycle Gasification (IGCC), such as at the Washbash River Power Plant. Not only is this a promising way to decouple electricity production from the emission of CO_2 while allowing us to continue burning America's enormous coal reserves, but IGCC is also a promising export market. IGCC plants are much more efficient than standard pulverized coal plants, and other nations will demand this technology as they face constraints on carbon. The other major element of your technology investment is in hydrogen—notably the FreedomCAR initiative (joint with U.S. automobile manufacturers) to produce hydrogen-powered cars as part of a shift to a hydrogen energy system. For these and other initiatives, including tax incentives for adoption of new technologies, your FY04 budget request includes $4b.

While both these initiatives are admirable, earlier technology programs offer some warning signs. In particular, we highlight the danger of pushing advanced technologies without any credible signal in the marketplace to favor investment in low-carbon systems. We also note that the FreedomCAR initiative is strikingly similar to the PNGV venture, both in its parochial attention to U.S.-based auto manufacturers and in its embrace of futuristic technologies. The National Academy of Sciences recently reviewed the prospects for a hydrogen economy and concluded that the barriers such as onboard fuel storage in passenger cars remain formidable and the vision of a hydrogen economy is probably more distant than widely believed.

Finally, we note that your choices about technology policy for climate change are not isolated from other energy-related policies. These include subsidies, such as the many implicit subsidies for fossil fuels as well as the substantial 1.8 cent per kilowatt hour (adjusted for inflation) production tax credit for wind power, which partly explains the rapid rise in this source of electric energy. (That subsidy expired at the end of 2003 but is likely to be renewed if an energy bill passes this year. For now, the lack of that subsidy has cut the 2004 forecast for installation of new wind turbines from 2000 megawatts to just 500 megawatts.) Wind power emits no CO_2, and several states are experimenting with new power dispatch systems that can accommodate more easily the intermittent nature of wind power systems. Insofar as such low- and zero-carbon technologies become widespread the cost and need for active CO_2 limitations

will diminish. Also important is extension of the Price-Anderson Act, which limits liability for nuclear power plant operators in case of accident and is widely seen in the industry as an essential prerequisite to constructing any new reactors. A new generation of more market-savvy nuclear reactors is on the drawing boards, and a comprehensive study by MIT has shown that these reactors will be able to compete in U.S. electricity markets if we adopt policies that create an incentive to limit emissions of CO_2.

Perhaps most important for the near term is the crisis in U.S. natural gas markets. A possible pipeline from Alaska, which has been considered as part of the failed 2003 energy bill, could alleviate some pressure on U.S. gas prices, which in the last two years have climbed to their highest levels in history as efforts to find new gas supplies in the lower 48 states have faltered. Recent rulings by the Federal Energy Regulatory Commission have encouraged investment in liquefied natural gas (LNG) terminals, which will allow for greater imports of gas from distant countries, such as Trinidad, Nigeria, Qatar, Venezuela, Australia, Indonesia and Russia. Iran is a potential major supplier of LNG, and soon we will face the need to square our policy on Iran with its growing potential role in this new global energy market. Meanwhile, pressure on United States gas supplies is intense. Of all the new electric power capacity commissioned in 2003, 98.7% was fired by gas.

The debate over the new energy bill has left other important issues still unsettled. The versions of the bill under consideration have had no direct provisions to reverse the long slide in industry spending on R&D; at present, electric utilities and generators invest barely 0.3% of their turnover in research, which is lower than the national average for industrial R&D (about 3% of turnover) and puts electricity near the bottom in the ranks—far below the food industry, footwear, and most other industrial sectors. It is hard to reconcile the magnitude of the technological tasks facing the electricity industry with this very low level of R&D spending.

Potentially very important is the repeal the Depression-era Public Utilities Holding Company Act (PUHCA), which has prevented most electricity companies from owning other utilities outside their home market. Absent PUHCA, the electricity industry is likely to become financially much stronger, which should make it easier to encourage firms to take technological risks, especially if they see credible limits on their greenhouse gas emissions on the horizon. But the transition to a post-PUHCA will be highly disruptive, with most firms focused on immediate survival and consumption of their rivals—an eat or be eaten corporate ecology.

Engaging Developing Countries

If you are persuaded that efforts are needed to control emissions of greenhouse gases then you must also decide whether and how to engage with developing countries. Politically and economically it will be difficult to avoid crafting a credible policy toward developing countries. For the last decade, developing country participation has been a litmus test for U.S. foreign policy on climate change. The demand for meaningful participation of developing countries was the centerpiece of the Byrd-Hagel resolution. When large energy firms and their customers wanted to fan opposition to the Kyoto Protocol they ran advertisements in which the camera focused on a pair of scissors that cut around all the developing countries—exempting most of the

world while regulating the United States and other industrialized nations, the voiceover proclaimed, was unfair and ineffective. These advertisements were the Harry and Louise of climate policy.

Our deliberations have focused on four broad options for engaging developing countries. First, you could do nothing. This approach makes sense if you do not think that the climate problem merits much attention, or if you think that efforts to engage developing countries will end in failure. The "do-nothing" policy implies that the bulk of your climate policy will involve adaptation to the likely effects of climate change.

For the developing countries themselves, lack of engagement appears to be the favored option. These countries have expressed concern about climate change, and mounting evidence shows that they are more vulnerable than industrialized nations to storm surges, heat waves and drought. Compared with advanced industrialized nations, their economies are more dependent on weather-related activities such as agriculture; they are less able to devote the capital to invest in climate-proofing for infrastructures, and they are less likely to build institutions such as systems for forecasting extreme weather events that can help reduce climate vulnerabilities. Their preference for inaction reflects not the lack of concern and exposure but, rather, the higher priority they place on the immediate task of development. These countries are mindful that the United States and other advanced industrialized countries developed without limitations on the use of fossil fuels. They also insist on the need for advanced industrialized nations to take the first steps in implementing meaningful policies before they are willing to act. Indeed, opposition to binding commitments is the one issue on which nearly all developing countries agree.

In the future it may be additionally difficult to gain these countries' participation since the Kyoto experience is widely seen as a false promise. The Clean Development Mechanism (CDM) had been touted as a device for attracting foreign investment into projects that reduce emissions, but so far only three minor projects have gained approval. The World Bank has helped to jump start the CDM by organizing the Prototype Carbon Fund (PCF)—a $180m consortium of six governments (excluding the United States) and seventeen firms (none based in the United States) to fund a portfolio of CDM-like projects. Because PCF's mandate is to promote only the highest quality projects, most of the PCF projects are sited in countries with strong domestic institutions. None is in the largest developing countries—such as China, India, Indonesia, and Malaysia. Just one project is in Brazil and one in South Africa. More than one-third of the PCF projects are in Eastern Europe and do not involve developing countries at all. From the perspective of most of the key developing countries, the promised investments for climate protection are still elusive.

A second option is to demand that developing countries accept caps on their emissions. This approach requires sailing into strong diplomatic headwinds, but failure is not guaranteed. You could construct targets based on emission intensities or other metrics that developing countries find acceptable. As mentioned earlier, Chinese emission intensity has declined sharply from about 600 gC/$ in the middle 1980s to around 300 gC/$ today. China is proud of that accomplishment, although perhaps half of the reduction reflects reported declines in the consumption of coal in China that many analysts believe are fictitious. It might be possible to design emission caps that reflect the interests of key developing countries and set at levels high

enough to allow them to grow. However, you should be aware that developing countries will refuse caps unless they are generous. But generous caps could undermine the integrity of emission trading systems in the United States and other industrialized countries. Generous caps could be akin to the vast windfall of surplus emission credits awarded to Russia in Kyoto; failure to enforce trading rules within developing countries could lead to a flood of bogus emission permits from those nations into permit trading systems elsewhere in the world.

It might be possible to force developing countries to accept strict caps by linking this issue to other matters like the World Trade Organization. Such linkages will be difficult to craft and will probably backfire. The WTO agenda is already over-crowded by many issues, and developing countries (as well as most trade experts) are already opposed to integrating environmental standards into trade rules. The effects of loading environmental, labor, human rights and other standards on the world trading system may include the loss of welfare for all nations by raising barriers to trade as well as greater risk that new trade rounds will fail to make progress due to conflicts over these new rules and standards.

You might try to reduce opposition in the developing world to accepting limits on emissions by raising awareness in these nations of the dangers of climate change. However, such campaigns are difficult to organize and unlikely to have any substantial near-term effects. Moreover, the standard response from developing country diplomats—demanding that the United States, especially, take the lead—will be difficult to counter. Insofar as there is any awareness of climate dangers in developing countries it is usually organized by NGOs that are nearly uniform in their view that the industrialized countries (in particular the United States) are the root cause of this problem. Calling attention to this problem may raise the visibility of that argument, which could actually make it harder to achieve meaningful action in developing countries.

A third approach involves reinvigorating the Kyoto system, in particular the CDM. In our review of the efforts to elaborate the Kyoto system we found the CDM system to be encumbered with rules and highly politicized procedures. However, these problems may have remedies. Procedures for approving CDM projects could be streamlined; true experts rather than politically instructed diplomats could be empowered to make more of the key decisions about the level of credit that would be awarded for projects, and the practice of shunning certain types of projects (e.g., nuclear and large hydro) from CDM credit could be abandoned. The United States could make reform of the CDM a condition of its re-engagement.

Many other countries would welcome such a strategy since a more effective CDM would be useful not only for developing countries but also the main industrialized nations. A recent report from the European Environment Agency suggests that the European Union will miss its Kyoto target by a few percent; however, the decline in emissions has already stagnated and most EU countries show a rise in emissions due mainly to rapidly rising emissions from transportation. European firms and governments are expected to purchase emission credits overseas to make up the difference. Japan and Canada are also likely to fall short on their targets; they, too, will need outside permits. So long as the CDM remains hobbled and inefficient, Russia and Ukraine remain the only potential international suppliers of large quantities of emission credits, giving these countries potential power in the Kyoto market and

ensuring that international trading activities focus on paper credits rather than bona fide reductions that channel investment to developing countries.

However, there are substantial risks stemming from such a strategy. Conditional re-engagement with the Kyoto Protocol will require making promises that might be hard to deliver, just as it proved impossible even for the Clinton administration, which professed deep concern about the climate change problem, to ratify the Kyoto Protocol. Many of the CDM's deficiencies are already written into the Kyoto system—either into the Kyoto treaty itself (e.g., the discouragement of nuclear power projects) or into the procedures that govern the CDM and were painstakingly negotiated over a four-year process that finished largely in 2001. With so much invested in all that, many countries may be unwilling to revisit closed deals. Perhaps only a spectacular failure will force the necessary re-thinking. Moreover, many observers claim that it will be impossible to make the CDM system work efficiently even under the best conditions. These observers claim that it is impossible to make the hypothetical "baseline" calculation—the level of emissions that would result in the absence of a particular project. The experience to date suggests that these observers are probably correct; however, the absence of U.S. involvement in the Kyoto system has dampened demand for CDM credits, and that too explains the lack of robust investment in making the CDM work. A major push by the United States could resuscitate the CDM, although you should be aware that even after such re-invigoration the patient may still be mortally wounded.

Fourth, you could craft a new strategy for engaging with developing countries. The three options presented so far—disengagement, emission caps, and an offset scheme such as the CDM—have dominated most policy discussion for the last decade. None has been effective. The fourth strategy could involve working with developing countries to craft "climate friendly" development strategies. Unlike the CDM, which aims to animate investment by awarding credits, this approach would attempt to put climate issues into the mainstream of development policy. It would focus on broad policy initiatives, such as investment in natural gas infrastructures that make it easier for countries to operate natural gas fired electricity generators where they otherwise would pursue coal. Many countries are already making such investments. China and India, for example, are in the midst of installing large gas infrastructures. In China these include a gas pipeline from gas reserves in Western China to Beijing and Shanghai as well as LNG terminals in southern coastal cities. In India these infrastructures include new gas pipelines, incentives to develop newly discovered offshore gas reserves, and India's first ever LNG terminal, which took its first delivery in late January 2004. Within the CDM system such broad programs would probably never gain any credit because it would be too difficult to quantify the effects of these investments across the entire economy.

For the United States, this strategy of mainstreaming climate into development would involve working directly principally with the policy organs in developing countries that are responsible for development—for example, finance, industry, and planning ministries. The U.S. role would involve supporting activities that would help countries realize their own development goals in ways that also happened to reduce carbon emissions. The advance of this approach is that it would involve swimming with the tide—identifying activities that the host government would favor (and fund) already and activities that already align with the interests of private profit-making ventures. For example, the United States already has extensive development

assistance programs in major developing countries, mainly through the U.S. Agency for International Development (USAID). These programs include attention to the improvement of energy efficiency and to reorganization of energy systems in ways that encourage investment in modern technologies. A slight refocus of these programs could make carbon a central organizing principle; by helping these countries reorganize their energy systems to make them more profitable and to serve better the needs of the local population, such programs could also lower the intensity of greenhouse gas emissions. As Bangladesh and India have learned how to introduce gas into their electric power systems, such programs could help ensure that the lessons are learned in neighboring Nepal and Pakistan. Already, USAID programs have helped countries identify ways to make fuller use of low carbon renewable power—for example, in India a USAID project has helped a sugar cane refinery recycle crop wastes to generate heat and electricity, which has reduced the need for fossil fuel energy.

This approach has the advantage that it could leverage large amounts of emission reductions. However, it carries many dangers. Developing countries may simply choose to embrace those programs that they would pursue anyway. By design, the exact reduction in emissions will be difficult to quantify, which will lead many environmental groups to claim that the "mainstreaming" approach is simply a rhetorical device that pretends (but does not deliver) real solutions for the climate problem. The program could create expectations that it will be a large source of funds that, inevitably, will yield disappointment. The West-East pipeline in China, for example, involves $20b in mainly private investment; in such huge projects it may be difficult for relatively tiny amounts of climate change-related programmatic funding to have much effect. In China's Three Gorges hydroelectric dam, for example, efforts by the World Bank to leverage its funding by demanding the application of western environmental and human rights criteria led the Chinese government to raise the needed capital on its own—outside the Bank's leverage.

Informing the Public

The sixth major dimension where you face policy choices is communication with the public. It appears that public opinion about the climate issue is highly malleable. Awareness of climate change is high, but willingness to act has varied considerably and understanding of the underlying processes and options is extremely poor.

A survey of polls by the Program on International Policy Attitudes (PIPA) at the University of Maryland finds that a small minority of the United States population dismisses the theory of climate change altogether. A Gallup poll in March 2001 revealed that slightly more than half of Americans thought that the majority of scientists believe that global warming is occurring. Americans generally know very little about Kyoto. A Pew poll in April 2001—in the middle of the firestorm about your administration's withdrawal from Kyoto—found that only 26% of those polled were willing to venture an opinion as to whether you had withdrawn from the treaty. Interestingly, there is some evidence that professed public support for Kyoto has risen since 2001 even as it has become increasingly implausible that the United States could ever meet its Kyoto commitments.

Willingness to pay for emission controls varies especially with the state of the economy. In 2000, when the public perceived the economy as strong, a Gallup poll showed a majority willing to support environmental goals even at the expense of the economy. Two years later, as the economy faltered, that public commitment had dropped considerably. A January 2002 poll by ABC News and the Washington Post ranks environmental issues far down the list of priorities—below the campaign against terrorism, economic growth, education, social security, health care, national defense, prescription drugs for the elderly, and balancing the federal budget. A PIPA poll in October 1998 suggested that two-thirds of Americans were willing to spend $50 per household (or less) to comply with the Kyoto treaty—that number is comparable to the estimate cost per household from the Clinton Administration's Council of Economic Advisers' (CEA) study on the cost of meeting Kyoto. That study implied that about 85% of the effort at reducing emissions would take the form of overseas investments and purchasing emission credits. That same PIPA poll showed that most Americans opposed emission trading until the concept was explained. Then, 65% favored trading with less developed countries. Yet the CEA's own analysis implied that most trading would probably occur with Russia—a scenario that pollsters have not explored.

Regardless of your policy we recommend that you devote considerable effort to explaining it to the public. If you choose the minimal course of action—which we represent in the first speech—we think you should explain why the climate change problem does not require dramatic action. In February 2002, when you announced your administration's policy, you did not articulate a fundamental view of the climate issue; rather, you raised concerns about the costs of action, which is a line of argument that your opponents may blunt easily by arguing that technologies are available to control emissions and that threat of changing climate is so severe that it requires radical action. Your case for minimal action would be easier for the public to understand if you demonstrated that the climate problem does not pose challenges that are substantially different from other environmental challenges. No president has ever articulated these views, and they may be shocking for a public that is inclined to believe that environmental quality is deteriorating even as many key measures of our environmental health have improved dramatically in recent decades.

If you choose to support reinvigorating the Kyoto system—our second speech—then you will need to explain why the United States withdrew from Kyoto in the first place and why it makes sense to re-engage. At present, the small fraction of the American public that pays attention to Kyoto-related matters probably also views the U.S. exit as evidence of arrogant American unilateralism. This second speech argues that you had no choice because the United States could never have complied with the Kyoto targets—a point you made in March 2001 when you withdrew from Kyoto, but the point was lost in the furor of the moment. You can articulate how re-engagement with Kyoto will yield enormous diplomatic leverage that the United States can use to make Kyoto more effective and less discriminatory.

Finally, if you choose to do something radically different—as we outline in the third speech—then the public will need your vision as a guide. In almost every aspect of this issue—the natural science, the economics, the role of firms, public administration, etc.—the public is exposed to a wide range of conflicting opinions. The public needs help to frame the issues, establish models and analogs, and to comprehend what is at stake because all the major elements

of the climate problem—its causes, effects, and remedies—are beyond the grasp of normal human experience.

SUMMARY OF THE THREE OPTIONS

We have organized the wide array of policy choices into three broad options. Each is a coherent package. We underscore, however, that these three options are hardly the only combinations.

Minimal Effort

This option rests on the notion that uncertainties in the science of climate change make it premature to spend resources on the control of emissions. The speech underscores that the effects of a changing climate are unlikely to be different from variations in weather and climate that we already experience, and thus adaptation will be relatively easy. The speech also underscores that while analysts have identified many ways to control emissions at low cost, in practice these measures are likely to be much more difficult to implement—there is great risk, therefore, that the cost of controlling emissions will be high, possibly very high. This option thus presents the minimal effort that probably could be justified. It envisions voluntary programs to control emissions, modest investment in new technologies that might yield breakthroughs, minor efforts to improve the adaptive capacity of the economy, and continued investment in science so that we can improve understanding of the problem.

Pros

- Minimal cost to industry and to the federal government at a time when any action that could threaten economic growth will be viewed with alarm and when the federal deficits are growing.
- Articulates a reason—adaptation—for why the United States should not invest in emission controls. This reason is probably more durable than simply arguing that the science is uncertain; the American public has proved that it is willing to spend large resources combating uncertain problems, such as food contamination. The arguments about uncertain science have had credibility with a small (and probably shrinking) minority. Adaptation, if articulated clearly, has the promise to be more durable.
- Focuses narrowly on U.S. interests and does not attempt to appeal to effects in developing countries.
- Unlikely to disrupt incumbent industries in the production and use of oil, gas and coal.

Cons

- The argument for minimal action is subtle and rests on our ability to adapt. Opponents might characterize this as a "let them eat pollution" strategy. For other environmental problems Americans have generally not tolerated policies that acknowledge the existence of a problem while simultaneously claiming that the problem poses no hazard. If adaptation is your policy it might be more effective not to give a high profile speech calling attention to that fact.

- If the climate change problem becomes a major issue then public support for more aggressive action—controls on emissions—will grow stronger. The lack of any binding controls may make it hard to retain credibility in that context.
- Other nations will view this as inadequate, especially as it retains hostility to the Kyoto system. Good or not, Kyoto remains by far the dominant international institution on the subject of climate change.
- Insofar as you believe that limits on carbon may be imposed eventually, a rousing speech against binding limits may actually harm U.S. industry by protecting it (temporarily) from the need to plan for a carbon constrained future. U.S. firms may be less able to compete against firms that have already found ways to cut carbon, and U.S. exporters will not have developed the technologies needed to compete in the global market.

Beyond Kyoto

This speech defines climate change as the most serious international environmental issue of our era. It argues that the effort to cut carbon should become an organizing principle for U.S. foreign policy. It envisions re-engagement with the Kyoto process because creating an alternative to Kyoto would require a huge effort for little benefit. It envisions that the United States would extract the maximum price—measured as the deepest reductions in long-term emissions of greenhouse gases—by offering to rejoin Kyoto. It acknowledges that the short term targets in Kyoto are unachievable and would demand renegotiation of new targets, including targets for developing countries. It would also expand the Kyoto commitments to include investment in new technology, and it would aim to set a long-term goal for stabilizing the atmosphere. The speech underscores that adaptation to all the effects of climate change is not possible.

Pro

- This speech will be most appealing of the three to the core constituency for climate policy. It recognizes and supports the Kyoto system; it emphasizes the need to start now with the implementation of policies to bend emission trajectories.
- Other industrialized nations, especially Canada, Japan and EU, will see this as a re-engagement with an institution (Kyoto) that is very important to them.
- Offers a bold vision for solving a problem that, at least periodically, commands public concern.

Con

- So long as the public is focused on the economy and the war on terrorism, concern about environmental issues (especially distant global issues) appears to remain low.
- Unknown cost. A well-designed policy can minimize cost, but opponents will portray this as a scheme to tax energy that could bankrupt the economy—those same opponents were effective in organizing opposition to Kyoto on similar grounds. The public is unlikely to be aware of the technical differences between a well-designed policy and the Kyoto scheme that was easy for opponents to attack.

- Developing countries will be furious as they have adamantly opposed meaningful limits on their emissions. Reaching agreement with them could be extremely difficult unless you allow liberal "headroom" in their targets (which will recreate the problem of surplus credits with Russia under Kyoto). Or, you might need to link this issue to other matters of importance to developing countries such as trade talks, but that could complicate and undermine U.S. objectives in those other areas.

Making a Market

This speech also accepts the climate problem as a serious long-term threat to America's prosperity. However, it argues for a dramatically different approach than the previous speech. It sees the Kyoto framework as unworkable because it tries to create an emission trading system from the "top down," whereas the most successful new currencies establish value from the "bottom up." This speech gives little attention to the science and effects of climate change, except to declare that the evidence is strong enough to warrant prudent action. Rather, it focuses on changing the public understanding of the problem at hand, comparing the task to the creation of a new form of money. It argues that we must focus on establishing integrity in that monetary system by working first with other countries that, like the United States, have a strong interest in creating a strong currency. The speech is strident in arguing that we must move slowly and cautiously in that effort as failure will undermine the value of the currency, erase the political will for action, and ultimately lead to high economic cost and low impact on the problem of climate change. The speech focuses on the need for each nation to establish its own emission trading system and then to forge reciprocal links between those systems that demonstrate true integrity—starting, most likely, by linking a U.S. system to the emission trading system that is taking shape in Europe.

Pro

- You will gain political benefit by re-engaging with an international process and offering a credible vision for a global strategy.
- Your vision puts the market at the centerpiece, and that will resonate with business. It will allow you to present a package of market-based measures for addressing environmental problems—alongside your other proposals such as the Clear Skies initiative—that will be attractive to centrist voters, including many Republicans who count themselves as environmentalists.
- Offering a thoughtful and different vision for how this problem can be addressed may establish a historical legacy, attached to your name.
- Pursuing a different track within a multilateral vision offers a high chance of success. Frustration with Kyoto is leading many to look at alternative international arrangements, but so far the United States has not offered an attractive rival vision.
- By offering an explicit link to the European system you may split some of the phalanx of opposition to your current policy. The EU system is new and fragile; outside recognition will help to establish its legitimacy, which is very important for key European nations (notably the UK).

Con

- The attack on Kyoto will produce negative reactions in many quarters, although most of those who are likely to support Kyoto are already opposed to your current policy—it is hard to do worse in their eyes.
- Developing countries may react negatively. By arguing that the current approach to engagement with developing countries is not working and that in the future developing countries must undertake binding obligations you will question their current diplomatic storyline on global warming, which is that current efforts are sound (and must be reinforced) and that future obligations must not include meaningful binding caps.
- Outlining a new vision on a complicated subject inevitably leads to a complicated speech. Communication may be easier if you adopt simple slogans and messages that correspond with what the public already thinks about the climate issue and its solution.
- A grand alternative vision, announced with fanfare, is a liability if you do not see it through to realization.

RECOMMENDATION

We recommend that you convene a meeting of your key economic, science, and national security advisers, employing this memo and the three alternative speeches as a starting point for the discussions. We suggest that you develop a policy by giving feedback on the options addressed here, leading to one central choice that can serve as a platform for constructing a detailed policy. With that platform and your critique we can then elaborate a fuller policy and speech that you would present to the nation and to our allies.

[SPEECH #1]

Location: Massachusetts State House, Boston.

Text on background poster: "environment and prosperity"

My fellow Americans,

I speak with you today from the great city of Boston about a challenge that is larger than this city—or any city, state or nation. The challenge is our changing climate—what some call "global warming"—and its reach extends across the globe. Every nation on Earth, including the United States, causes its share of climate change. Every nation will be affected, though some less than others.

How shall we confront this planetary problem? The answers to this question are not nearly so difficult as the newspapers, scare shows, and pseudo-documentaries would have you believe. For the truth is that climate change is no greater than other challenges that we have faced.

Imagine, before we begin, the scene just 100 years ago. A speaker in this august chamber who was asked to comment on the pressing environmental problem of that day would have given his address to the matter of mud and dung. The streets were full of it, and when the rains came it flowed amply and everywhere. Travel was next to impossible.

Bostonians overcame the mud challenge, and we too will overcome the threats of global warming. Yet it is easy for us to forget how our challenges change with the times. We are tempted to overreact to today's apparently insurmountable difficulties only to let us become distracted—blindsided by different problems tomorrow. That should be humbling as we think about how we might respond to the threat of climate change—the effects of which will manifest themselves, if ever, over 50 to 100 years. Let us hope that the leader elected by our great great grandchildren does not stand up here on this pedestal to chastise us for inventing a clever and costly solution to today's equivalent of the mud crisis, only to find that the real world had moved on. We can serve them better by focusing on fundamentals—by investing in economic growth and knowledge that can be passed across the generations.

Today I would like to explain the real nature of the threat of climate change, what we are doing already, and how your federal government will pursue a balanced response in the coming months and years.

There is little doubt that the climate is, indeed, warming. Scientists around the globe—including here at the Massachusetts Institute of Technology—have painstakingly assembled records from weather stations, ship buoys and untold other sources. The record is pretty clear. Since the 1950s the global temperature has risen by half a degree. Many scientists think we are on a path to raise the average temperature another few degrees over the next century. Sea level will rise a bit, which will affect some places in the United States. But in other places, [such as

most of Alaska and the Pacific Northwest], sea level is actually falling as the continents rise slowly out of the oceans—they are still rebounding from all the weight of the glaciers during the last ice age.

Beyond that, the scientific crystal ball gets cloudier. Even the simplest questions—such as whether Earth is warmer today than at any moment in the last 1000 years—have no simple and declarative answers. Some experts say that climate change will cause more frequent and intense storms; so far, however, there is little firm evidence to support that hypothesis. Some say that wet areas will get wetter; areas prone to drought will get dryer. Hot summers will get hotter in most places. The likely effects of a changing climate include good as well. Cold winters probably will become less intense in most places, and we must not forget that more Americans die when it is cold than hot.

The rampant uncertainty doesn't stop there. As my administration reviewed the evidence we also found that our best economists don't really know the cost of controlling emissions of greenhouse gases. You may have heard about policies that can reduce emissions at zero cost. We looked at those policies as well, and it turns out that even these "free" policies are often laden with hidden costs and perverse effects.

For the last five years this nation has allowed firms to claim credit for voluntary actions to reduce emissions. Some say that this program has had a large effect on emissions by calling attention to the problem and spurring firms to act. The list of participants is long and distinguished. They include General Electric, located just down the road outside Boston, which is the world's top producer of ultra-efficient gas turbines. Similarly, the government has sponsored a host of other programs that have helped businesses of all sizes, as well as American households, reduce their energy consumption through more efficient technologies. Next time you buy a TV or computer monitor look for the decal with the rainbow and the star—the sign of EPA's "Energy Star" program that helps consumers identify products that sip energy while not compromising on functionality. These programs—voluntary incentives and information for consumers—are examples of government at its nimble best.

But alongside these successful programs is a minefield of failure—a long list of policies inspired by the idea that government knows best. These policies have tied firms and consumers in red tape; they have blocked innovation and stripped consumers of their power to choose. They undermine our competitiveness and threaten our way of life. For example, my administration is opposing rules that would impose radical new efficiency standards on the manufacturers of new air conditioners. Higher efficiency is not free—it requires making a more expensive product that is not affordable to everyone. For households that survive paycheck to paycheck, this new rule would force them to spend even more scarce savings on something that they need. Is it right for government to assume that you, the consumer, are unable to read the labels on products and decide for yourself what is best?

And that's just the beginning. What will it cost to make the deep cuts in emissions that some scientists say will be needed to stop greenhouse warming? Any serious answer to that question requires knowing, right off, that developing countries are adamantly opposed to doing anything about the threats of climate change. They say that they have other priorities—

development, for one. Yet these nations already account for half of the world's net emissions of greenhouse gases, and their emissions are rising rapidly. That means that a deep cut in global emissions will require America and the rest of the industrialized world to do more—much more than our share. In this global economy, how can we expect our factories to compete with those in China, Brazil or India if we are hobbled by a costly mandate to eliminate fossil fuels from our economy while they face no such constraint?

Some still say that it will be inexpensive—perhaps even profitable—to eliminate fossil fuels from our economy. They imagine that we will stumble on some miracle energy source that satisfies our need for energy services yet is free of CO_2 and causes no other types of harmful pollution. That's a tall order. Your government, along with industry, is supporting research and development on a portfolio of promising technologies. So far, however, nothing in that portfolio is likely to deliver the magic bullet.

We are giving a fresh look at nuclear power, and I find it encouraging that several utilities are likely to announce in the coming few years that they will commit funds to building the next generation of nuclear reactors. I know that many people are opposed to nuclear reactors, but I implore you to look carefully at the risks and benefits. Nuclear power is one of the cleanest ways to make electricity. With the price of natural gas high, as it has been for the last two years, nuclear power is also highly competitive. Since my administration took office in 2001 we have helped to clear many of the obstacles to a rebirth of the nuclear power industry. We have [secured] renewal of the Price-Anderson Act, which holds reactor owners accountable for their actions yet puts a reasonable cap on their liability; without this limit, no sane company would invest in this technology that already supplies about one-fifth of the electricity that America needs. We have finally opened the permanent repository for spent fuel at Yucca Mountain in Nevada. And, with the Federal Energy Regulatory Commission, we are making progress in introducing market forces to the U.S. electric power system. The lack of market discipline explains why utilities invested your money in so many unprofitable reactors. Indeed, in the last decade alone, as market forces have come to the U.S. electric power system, new operators have dramatically improved the performance of U.S. reactors. Across the United States, the cost of wholesale electricity generated from nuclear plants has actually declined about one-fifth as market-sensitive operators have found ways to cut costs and keep their reactors online generating electricity for more hours every year.

We must also explore ways to make use of America's abundant coal reserves. Several major utilities, along with the federal government, have launched the FutureGen program to study and demonstrate a promising technology called coal gasification. This technology will make it possible to use our nation's abundant coal reserves to generate electricity while capturing the CO_2 before it is emitted into the atmosphere.

These are sound investments. But it is one thing to back novel technologies with uncertain delivery and quite another to bet our economic future by imposing strict limits on emissions. Until we know more about what it will really cost to control emissions it is not possible to justify imposing binding limits on emissions. You elected me in a time of great economic strife in America. With determination we are rebuilding the economy, and we won't

threaten that recovery with ill-conceived limits on fossil fuels aimed at achieving a highly uncertain impact on a highly uncertain problem that we probably can't control anyway.

My administration's thorough review of the climate change issue has also revealed that the likely effects of climate change are not as serious as you might think. A few degrees' change in temperature is within the realm of what we already experience; some months are warmer than average, and others are colder. Variation in rainfall will affect our reservoirs and farmers, but America's quiver of response to a changing climate is stuffed full with effective arrows. When farmers see the real price of water rise they have found myriad ways to cut their consumption, such as through the deployment of new seed and crop varieties. In some settings they have also installed drip irrigation—itself an innovation from water-starved Israel, proving once again that necessity is the mother of invention. We can respond and adapt easily, if American ingenuity is allowed to work its magic.

In my meetings with civic leaders here in Boston I have heard fears that rising sea level will swamp the city. But it is important to recognize that higher sea levels, if they occur at all, will manifest themselves over decades during which time we can prepare at little cost. Again, it is important to put the long time scales into historical perspective. One hundred and fifty years ago any discussion of rising sea levels would have focused on the shallow swamp called Back Bay. Then, during the 1850s and 1860s, the dominant industry of the day—railroads—filled in Back Bay. Beacon Street, which starts just down the hill from where we are assembled today, ran across the top of a long and wide dam that was used to control the tides. Today, Back Bay is land, not water, and invulnerable to the tides. Similarly, in the redevelopment of Boston harbor in the 1980s, planners factored into their plans a likely rise in sea level—by preparing they have made Boston adaptive to changing climate, at little cost. The big dig, which put Boston's central road artery under ground, is also constructed with the possibility of higher sea level in mind. Every city with responsible leaders and a distant vision has planned for such contingencies—London and Venice, for example, have movable sea walls to protect humanity's great physical asset from a flood tide. Such investments make sense even without global warming. Venice was already sinking into the ocean; its leaders have found a way to limit the danger of its natural sink and higher sea levels all at once.

We found that most claims of the high cost of climate change are built on a fallacy. They look only at losers and ignore the many winners. For every ski area that loses a day of sales from the earlier spring, global warming alarmists shed a tear and tabulate a cost. But they ignore the new business for fishing guides and outfitters who can open earlier and close later. In fact, when Americans speak with their pocketbooks they prefer warm weather. They spend more on fishing—a sport that, except for the hardiest, is a warm weather activity—than on skiing. Americans have moved in droves to warm weather. Even this audience of great Bostonians, I am sure, longs for a Florida respite in the dead of winter. The press corps, I fear, has not understood that lesson. Every summer I hear them grumble when we set out for Crawford.

It is easy to be lighthearted about the weather, but I underscore a deadly serious point. We must be cautious about the "threat industry" that is drawn to the problem of global warming like termites to wood. A vast enterprise of analysts thrives—I dare say, draws its paycheck—from the exaggeration of environmental calamity. This same industry tells you that the streets

are not safe, that your child's history textbook is misleading, that prayer is corrupting, that the sky is falling. This same industry draws millions from malpractice lawsuits. They tell you that they are drawing your attention to problems; they say that they are making the world safer. But the reality is that it is you, the American consumer, who pays for them to tilt at windmills.

The threat industry draws its sustenance from fear. It is not science, which seeks inspiration from scrutiny, skepticism and the truth. The threat industry works inside narrow confines of the present fad. In the early 1970s analysts looked at the possibility of global cooling, triggered by grand plans at the time for a massive fleet of supersonic aircraft that would travel the globe. (Those plans were never realized because supersonic travel proved too costly; only the French and British Concorde program went ahead, and that only because those governments wasted vast resources on a program for national pride.) At that time the fear was global cooling. Sure enough, a plethora of detailed studies confirmed that cooling was bad news.

I have always found it puzzling why our nation, which has never been richer nor more powerful, is paralyzed by defeatism and malaise on environmental matters. Compare today with the turn of the twentieth century when soaring demand for wood fuel, railroad ties and the clearing of forests for farming had triggered fears of a "wood famine" in the United States. Another Republican president created the U.S. Forest Service in 1905 to manage that strategic resource—to provide, in the words of the first Forest Service director Gifford Pinchot, the "greatest good for the greatest number of people." Today, America's forests are larger and healthier because we have found ways to make productive use our natural resources without over-exploiting them. The effects are nowhere more visible than here in New England, where the countryside was virtually denuded of trees while today healthy forests abound. Or, compare today with 1970, when Richard Nixon's administration created the Clean Air Act, the Clean Water Act, and the National Environmental Policy Act—the most significant cluster of environmental legislation in our history. Or, compare today with just barely a decade earlier when a Republican President oversaw the creation of a nationwide system for trading pollution credits that has cut in half the gases that cause acid rain. The long history of Republican environmental achievements underscore that a healthy economy and respect for market forces are the best ways to protect nature.

That is what we have found in our review of the global warming problem. To be sure, there is more to do, and let me outline the achievements that we are planning for the next months.

My administration will continue the bipartisan tradition of investing in the science of climate change. We must learn more about the risks and opportunities in a changing climate. Perhaps we will discover credible evidence of threats in the changing climate. Until we have that evidence my administration will not impose such costs on the American economy. We are spending nearly $2b per year on climate science, focused on a wide range of important questions so that future leaders have better information for making these tough policy decisions.

We will continue to develop sensible policies and incentives to reduce emissions where that can be achieved at little or no cost. At the same time, we will scour the legacy of projects of policies for those that make no sense—activities that saddle industry with regulations, which

undermine the consumer's right to choose, and which sap American ingenuity. At the same time, we must ensure that programs designed to acknowledge and encourage firms that make voluntary reductions in their emissions are not merely gaining a public relations benefit for things they would have done anyway. My administration is now implementing new rules that aim to reward only genuine reductions in emissions, and I commit here to review the effectiveness of those rules in the coming months.

My administration will continue to invest in the development of new technologies that might make it much less costly to reduce emissions in the future. It is essential that we have these options ready at hand in case we find that steep cuts are needed, and it is less costly to invest in research and development on these options now. These investments include the FutureGen program for coal-burning electric power generators as well as a broad initiative to pursue the possibility of a hydrogen economy.

I don't know if these technology programs will pan out. That is the nature of bold technological investments—they are risky. We must expect failure but hope for success. I can assure you that these programs are already yielding important insights. Throughout these efforts we are working with industry so that the federal government is not given the task of paying the full cost and so that these programs are guided by practical considerations that industry knows best. We seek new technologies that work, not a gold-plated behemoth that excites engineers but terrifies hard-nosed businessmen.

As we search for new energy systems, we must be mindful that real applications of technology depend on many factors, not just clever blueprints. We must create the market context that puts proper prices on energy and allows markets to transmit signals to final users. We must assure that we also meet our needs for energy security, which requires ensuring that America does not become too dependent on imported energy. Thus today I repeat my call for Congress to create the funding guarantees needed to encourage the private sector to build a gas pipeline to deliver the vast gas reserves in the North Slope of Alaska to markets here in the lower 48 states. Similarly, I applaud recent decisions by FERC to encourage the construction of liquefied natural gas receiving stations, which will help America overcome the crisis of high natural gas prices and, in turn, will make it easier for utilities to justify building gas plants that are intrinsically much less carbon-intensive than coal-fired electricity. All these measures will create flexibility in the U.S. energy system, which is good news for the economy.

I am also issuing a series of executive orders that will help improve the nation's capacity to adapt to changing climate. I am directing the Federal Emergency Management Agency to review the practices that govern settlement of coastal zones. Already the normal pattern of surging seas and storms periodically causes great harm to coastal settlements, such as on the barrier islands off the Carolinas. Government must strike a balance between compassion for the people affected by these disasters and creating incentives for coastal dwellers to take risks with the government's money. There is mounting evidence that government insurance and relief programs are actually impeding the natural changes in the landscape. We are spending billions to tame Nature. I am also directing FEMA and other agencies of the federal government to work with state and local authorities to be sure that the likely consequences of climate change are known—so that, where prudent, they can include these in their planning. In some cases it will

make sense to build sea walls to fend off high sea levels and storms—almost always, the cases where such investments make sense are those where such investments would be wise even without the risk of rising sea level. Where we have already spent tens of billions of dollars on buildings near the coastline it makes sense to protect them, rather than retreat.

I would also like to outline some things that my administration won't do. For too long the policy response to global warming has been painted in stark, black and white terms. The threat industry has manufactured the terms of debate, and the noise has drowned voices of reason. In that polarized environment, analysts and politicians with special interests have brewed up steep potion of mischief. My administration won't be serving that up.

I won't scare you with wild scenarios. Analysts have claimed that global warming will threaten America's security by spreading disease. Some claim, for example, that global warming will make Malarial breeding grounds in the US, implying that we will see a resurgence of that deadly disease here. The fact is that technology and policy are what determine the threat of malaria, not climate. During the Civil War the U.S. south was racked with malaria, driving up the world price for quinine—the only reliable cure for the ailment. Programs to eradicate mosquitoes and control the disease explain why the south has long been malaria-free. The threat industry has concocted an endless array of other terrifying scenarios. I can't tell you that all are impossible. But I can say that the threat of climate change—like so many other policy challenges today—will require that we think in terms of probabilities. And the probabilities of these terror storylines are exceedingly low.

I won't re-engage with Kyoto. The problems with the Kyoto system are so severe that no amount of tinkering at the margins will fix them. It is hardly clear that substantial, coordinated reductions in emissions are needed. Nor is it clear that the cost of meeting Kyoto's targets is commensurate with the benefits. The most useful aspects of the Kyoto system envision engagement with developing countries; yet that system, known as the Clean Development Mechanism, has virtually no achievements to its credit. Environmentalists and European nations have burdened that Mechanism with a plethora of special rules and procedures that make it difficult, if not impossible, for private firms to make the most sensible emission-reducing investments in developing countries. It is no wonder that developing countries have unanimously viewed this issue with suspicion. Moreover, Kyoto offers no vision for international investments in new technology. It does include some useful ideas about the need to promote adaptation, but the method for encouraging adaptation is the creation of a bureaucratized international fund—a sure loser. As a global strategy for tackling the problem of climate change, Kyoto is a backwater of paralysis and irrelevance.

Finally, I won't substitute government for your good common sense. We will not construct elaborate government programs based on the idea that government is a nanny who must instruct you on the proper use of energy. Americans are smart; armed with real information about real risks and rewards they will make sound choices. I view the role of government as helping, in those limited cases where markets fail, but leaving you—the consumer, parent, and steward—the freedom to choose.

In many ways the hypothetical dangers of climate change are, of course, quite different from the environmental problems that America has confronted in the past. The time scales are long; the causes are global; solutions are much more costly than anything else we have contemplated. But the global nature of climate change is not a reason for catharsis. In fact, we can handle these risks in our stride. In the near future we have little control over the emissions that contribute to a changing climate, not least because most emissions already come from other nations that are steadfast in their desire not to alter their behavior.

We must adapt and learn. The effects of a changing climate, if evident at all, will unfold on the same time scale that we will make many other changes in our society and technology. We must invest in better understanding the science of climate change and in improving energy technologies that might be needed to control emissions. You wouldn't know it from the crisis atmosphere that surrounds media reporting of this issue, but we are doing all that already.

SPEECH #2: "Beyond the Kyoto Protocol"

Location: Special Address to the United Nations General Assembly.

Mr. Secretary-General, distinguished delegates, and my fellow Americans,

Today I speak with you about a grave threat to our prosperity. Addressing this challenge will tax our ability to work in unison as a community of nations. But we must prevail, and time is short.

The danger is global climate change, and I come today to speak about why it is different from anything we have addressed before—and what it demands of us, the community of nations.

Climate change is unlike the threat of global nuclear war, a subject that occupied this body throughout the cold war, because its solution does not lie merely in the hands of a few powerful states. Nor is this challenge like the gripping fear of the 1970s—that swelling human population would outstrip our ability to feed itself. That problem we solved, in part, by inventing new technologies and practices—the "green revolution"—that have allowed rich and poor farmers alike to grow more food. Nor is climate change like most environmental problems in our past, which we have solved mainly by inventing new devices to bolt on our tail pipes and smoke stacks. And the challenge of climate change is unlike terrorism, which we are addressing by working together to isolate and extinguish a few rogue elements.

Global climate change is different because it is intrinsic to the metabolism of our modern economy—it is a byproduct, mainly, of burning fossil fuels that power our prosperity. Fixing this problem requires a transformation in our industrial engine. That transformation must be complete and global, because all nations cause the emissions that lead to climate change. We should not underestimate the challenge. Not only must we sustain unprecedented international cooperation, but the models we have for planning industrial transformation are not encouraging. In the last century, the only experience with active industrial planning on a large scale was the Soviet Union—a colossal failure. We must find ways to make this transformation in a manner that is compatible with the markets and institutions that are intrinsic to our industrial society.

The challenge is grand, but we can meet it.

First, we must understand why the challenge of climate change merits a response. One of many areas where the United Nations system has provided leadership on this issue is in its creation, in 1988, of the Intergovernmental Panel on Climate Change (IPCC). The IPCC follows a long and distinguished tradition in the UN system of applying science to modern problems. IPCC doesn't do the science, nor should it—the world's nations already amply fund and coordinate an impressive program of scientific research. This nation alone spends nearly $2b per year on climate science, and we will continue to increase our investment. IPCC's contribution is to supply a neutral assessment that involves scientists from all nations. It has done that admirably through three intense rounds that have involved thousands of scientists, all of them

volunteers. The present head of the IPCC is an Indian economist; before him was an American atmospheric chemist, and the first head was a Swedish geochemist. The IPCC flies the UN flags; it not only supplies the most sophisticated assessments of climate science, but it also ensures that all nations are part of the process.

The IPCC reports are technical and not easy to read, but their message is unmistakable. The problem of climate change is real. Temperatures are rising. 2003 was the third hottest year on record; the 1990s the hottest decade, by far, of the last one thousand years. 1998 was the hottest year on record. Although climate change that year was attributable both to man and a strong El Nino, the human fingerprint is almost certainly evident. 1998 was still significantly warmer than 1983, the last time we were subjected to a strong El Nino.

It's not just temperature. Most other indicators of changing climate are also moving as the theory would expect. Satellites that are monitoring northern countries find that in just a decade the spring thaw has arrived a full week earlier on average. Studies that have carefully culled the reports from thousands of amateur birdwatchers show that migratory birds arrive in their summer grounds earlier and leave later. In northern Alaska, the tundra once remained frozen solid for 200 days per year; now that figure has dropped in half. Of course, we must be mindful of flaws and critiques—although most indicators of a changing climate are moving as expected, some are not. We must be careful not to silence the skeptics—their criticism will make the theory better. But we must also not ignore the mounting evidence. The theory is sound, and its implications are ominous.

The IPCC reports, corroborated by many other studies, suggest that sea levels will rise, areas prone to drought will become drier, extreme storms may become more common. Natural ecosystems such as wetlands and forests will be under stress.

In the past, many in the United States have shrugged off these likely effects. They say that we can adapt by changing our crops, shifting our houses inland away from the approaching sea, and building dikes to channel flood waters and irrigation to quench the parched. I say that view is dangerously mistaken and I intend to take action to combat the threat of climate change

It is true that Americans can probably adapt to most of the likely short-term effects of climate change. Just west of here city planners in Philadelphia are planning for the possible need to relocate intake pipes for the city water supply. Builders of new power plants near the coast have, in some cases, installed the intake pipes for coolant water a few feet higher than normal—in anticipation of higher future sea levels. But it is a stretch to say that merely moving a few pipes will make us immune to climate change. Our coastal zones are already battered by storms; rising sea level will make matters worse. In the barrier islands off the Carolinas and Florida, big storms already cause billions of dollars of property damage. And in most of the rest of the world such adaptation is not so easy. In Bangladesh alone nearly [10] million people live within three vertical feet of sea level; Bangladeshis already suffer floods and devastation from coastal storms. Elsewhere in the developing world, societies that are least able to adapt to a changing climate are those that are most on the front lines. These problems are serious for these societies, and they will affect us in the industrialized world as well—by creating environmental refugees, breeding

grounds for climate-related diseases, and other stresses that will contribute to the same despair that has animated terrorists who have struck the United States.

While I am confident that we can protect much of the built environment from changing climate, what will we do about Nature? For many ecosystems the rate of change that is likely to occur as the world warms will be much more rapid than Nature's ability to adapt. Scientists studying unique [butterflies] that have adapted to mountainous cloud forests in Costa Rica have shown that as temperatures rise the clouds, too, will move higher up the mountain. What happens when they reach the top—when the clouds no longer shroud the forest? The ecosystem disappears and the butterflies go extinct. Ecologists are uncovering similar, detailed stories of stress and extinction everywhere that they look. Some have even suggested that perhaps one-third of species worldwide could go extinct in the coming century from the effects of global warming alone. That sounds abstract until you realize that coral reefs, wild forests, and many other gems of nature hang in the balance.

How should we evaluate such evidence? I worry that too many have focused on the integrity of the evidence itself. They have picked apart the studies by asking questions whose answers are not knowable. How do we know that the butterflies extinct on one mountain do not survive on tenterhooks somewhere else? Are we certain that exactly these effects will unfold in 50 years? What if some bird gets to the weakened butterflies first—are we, then, to blame for extinction? How do we know that future generations won't invent some clever device that will let us move the butterflies to other mountains?

These are important questions. The nature of science is skepticism, and we must encourage scientists to turn every stone, question every fact, and re-question every hypothesis. But we, as global citizens, must also recognize the cost of indecision. Information is not free, and in this case the cost of waiting until all the facts are in is very high indeed. The very nature of the climate problem is one of uncertainty; the best information that we can expect is not declarative but a matter of probabilities. Climate change shifts the odds, but we will never be able to say that a particular hot summer or a particular dead bird is the victim of changing climate.

Even more important is that the effects are irreversible. Not only are we are saddling future generations with our effluent, but if they decide that they would have liked a world in which we did not run to extinction one-third of Nature's diversity there is nothing they can do to reverse what we have imposed. It isn't right to impose those costs on the future. God did not put us on Earth to play dice with his legacy.

Taken together these factors—the vulnerability of the world's poorest, the risk of catastrophic change, and our unfortunate legacy—are why we must eliminate the threats of climate change at their root. Adaptation—"rolling with the punches," as we often say, is not an option. We must slow and stop climate change beginning now.

From this realization, other maxims follow. The principal human cause of climate change is the emission of carbon dioxide. Today, world emissions of CO_2 are about [XX] tons per year, and they have been rising at about [XX]% per year. As emissions rise, so does the

concentration of carbon dioxide in the atmosphere. Today the atmosphere has about 370 parts per million of CO_2—already one-third higher than the level at the onset of the industrial era. A growing chorus of analysis suggests that the world should aim to stabilize the concentration at a level no higher than 500 to 550 parts per million. To meet that goal we must not just slow the rise in emissions, we must actually reverse course—emissions must eventually be 60% *lower* than they are today. And we must do that while allowing enough space in the global emission budget for the needs of developing countries. Nations such as the United States, which have already amply used their shares of this budget, will have to do proportionately more than the developing world. But we must all do our part.

550 parts per million seems a long way off, but it is closer than you think. The climate system and the industrial energy system both have enormous inertia. To hit the 550 target our trajectory of emissions must start shifting today—a little bit now, and a lot by 2020 and beyond. For the United States and other countries that must take the first steps, that means acting now—we must start by improving the efficiency of our existing energy system and investing in low-carbon options where they exist. None of these will be easy choices. We must have debates about nuclear power—do we want more reactors, and where? Do we want more windmills? If we build more gas-fired power plants in countries like the United States where gas is already scarce, where will we get the gas? Obtaining politically viable answers to these questions takes time.

Every year that we wait to confront these questions is another year we lock ourselves into the old paradigm. Yet we know that business as usual is not sustainable. In 2003 the United States commissioned [354] power plants with a total capacity of [42] gigawatts. The largest of those plants will operate for 30 years; many will probably last even longer. The oldest grid-connected fossil fuel power plant in the United States was commissioned in the 1920s, and many small hydro dams date even earlier. We must be mindful of the durable consequences of our actions even today, and we must promote a similar awareness elsewhere in the world. Last year, China built [20] gigawatts of new power plants, and India built [7] gigawatts. As the world economy regains its stride, the building will accelerate even further. The International Energy Agency's authoritative World Energy Outlook suggests that two-thirds of the coal-fired electric power capacity that will exist in 2030 has not yet been built. Although we are locking in long-lived capital equipment, we still have room to maneuver if we act quickly.

Our response must be twofold. We must create a viable international institution for addressing the climate problem. And, within each nation, we must begin to implement concrete actions.

At the international level, I am mindful that my nation met a firestorm of criticism for leaving the Kyoto system. In our defense, the targets that we had accepted in Kyoto were not achievable by the United States, and our domestic political debate—Democrats and Republicans alike—had placed inordinate emphasis on setting binding limits for developing countries. Neither the last administration nor mine could have submitted Kyoto to our Senate for successful ratification, and it was better not to pretend that Kyoto was viable. We bit off more than we could chew, and in that respect the United States was not alone. All nations have learned from the Kyoto experience, and whether our first try at creating an effective global institution to

address one of the most complex issue on the international agenda today was successful is less important than our continued effort in good faith.

Looking to the future, we know that Kyoto is important for many other nations. We also know that Kyoto is the only established institution for addressing the climate issue. Thus today I am instructing our diplomats to engage more fully with the Kyoto Process, with the aim of achieving a viable plan for the United States to re-enter the Kyoto system.

Let me underscore, however, that the United States will not attempt to rejoin the original Kyoto accords, which focused on the period 2008-2012. 2012 is just eight years away; there is not much that can be done to alter the American emission trajectory over such a short period. Several other nations will meet their Kyoto commitments, but we must not confuse lucky accidents of history that put some nations fortuitously on track to meet their Kyoto commitments with the type of serious long-term strategy that no nation has yet to implement.

America's re-engagement with Kyoto comes with strings attached. We will demand solutions to the flaws in the original Kyoto accords, and we will work aggressively and constructively with all nations to find fair and effective remedies.

In fixing Kyoto, we will be mindful that well-meaning diplomats tried to achieve too much in the short-term even as the Kyoto framework has proved to be woefully inadequate for the long-term. We must rectify that imbalance. We must set meaningful but modest goals for the short-term but send credible and demanding signals for the distant future. We are lucky that the consequences of climate change will unfold over decades—giving us time, if we start now, to transform the global economy with the normal pace of technological change.

America will rejoin the Kyoto process only with solutions in hand for Kyoto's three deficiencies.

First, the new Kyoto must contain realistic targets with no free rides. The United States accounts for one-quarter of global emissions and therefore must do its share. Many, especially in this august body, have criticized America for its large environmental footprint, claiming that our consumer culture guzzles energy and intrinsically harms the environment. The reality is that America's emissions normalized for economic output—what is often called "emission intensity"—is in line with that of most other nations. It is a bit higher than that of France and Japan, mainly because we use less nuclear power. It is lower than China and India. Like most nations, U.S. emission intensity is declining steadily over time.

The U.S. emits one-quarter of the world's CO_2 because we account for one-quarter of the world's economic activity; we buy nearly [one-third] of the world's traded goods and services. Economic activity is not the enemy; it is essential to human welfare. It is the bedrock of development. What matters here is the trajectory of emissions—the path of emissions over time, and our success in decoupling emissions from economic growth. Every nation on Earth must strive for a low—eventually zero—emission intensity. We must have vibrant economies without harmful emissions.

We recognize that part of the trouble with Kyoto stems from the method for expressing commitments. Kyoto's architects focused on the total quantity of emissions. That approach seemed to make sense because the climate problem is caused by emissions, and simple measures of responsibility (it was thought) would make it easy to measure progress. We must explore alternative measures, and it may be necessary to build the new Kyoto on packages of measures and metrics rather than a single, simple set of emission targets. We should explore using emission intensity as the measure, since that would help nations—including the United States — demonstrate to their publics that the central goal is to decouple emissions from the economy, not to shut down the economy. We must also explore mechanisms that allow countries to cap the cost of compliance. Fear that the cost of meeting Kyoto targets could prove to be much higher than expected has been one reason why it has been hard to build strong domestic support for the Kyoto system in many nations, including here in the United States. We must have credible answers for those who question the economics. We must move beyond simply branding people who worry about costs as enemies of the environment.

In the new Kyoto we must also confront, head on, a subject that has been taboo: commitments for developing countries. So long as the community of developing nations is unified in rejecting any limits on emissions there will be no substantial progress in addressing the climate problem. And I warn that that is bad news especially for developing countries as they—like most nations—stand to lose from unchecked global warming. Back in 1997 the U.S. Senate voted 95-0 to signal its rejection of any pact that did not include meaningful participation of developing countries. Now, as then, that standard must be met.

Second, the new Kyoto must set realistic and meaningful long-term goals. No firm or government can plan a rational investment strategy without a compass—a star on the horizon. Over the last few months my administration has undertaken a comprehensive review of its policy strategy on global warming, and I have met personally and confidentially with the leaders of major energy companies. Most have expressed to me the need for clarity about goals. They say that if our climate policy consists of cutting emissions by possibly a few percent every five years then they will not much alter their business plans. They will install technologies that are a bit more efficient; they will invest in projects overseas where substantial reductions in emissions are achievable at very low cost. But if our goal is a radical reduction in emissions then business plans would be different. Even today, if our aspirations were clear, some utilities would build new nuclear plants and invest in larger wind farms. A clear vision would uncork innovation in zero-carbon energy systems, such as the elements of a hydrogen-based energy system. Some firms are investing in these futures, but the effort is much more tentative than if a clear goal for radically decarbonizing the economy were set.

We must send a clear and unambiguous message. Our goal is nothing less than radical decarbonization of the world economy. We will need 50 years or longer to achieve that goal. And we need a target for stabilizing the atmosphere, so that we can measure and assess the pace of our immediate actions. I propose that we start with 550 parts per million as a goal; we should write that number prominently into the new Kyoto agreement, and we should also create a process for evaluating that goal regularly. I know that this statement will be seen by many, especially in the scientific community, as foolhardy. How do we know that 550 parts per million is safe? We don't, and we may never know what is safe. But we do have a good idea about the

rates and magnitude of change implied by this target, and I am confident that the 550 goal is achievable. We will not lock this goal into place, but we should set it as a starting point. I can assure you that having set this number a flood of studies will follow to show why it is deficient. That, exactly, is the dialectical process that we must inspire.

Third, the new Kyoto must inspire action far beyond the mere cutting of emissions to meet targets. The only viable way to decarbonize the economy is to develop and install new technologies. Even with a credible long-term goal, the needed investment will not flow automatically. Many of the new ideas that will be needed to decarbonize the economy are public goods—everyone in the world will benefit from these new ideas, but no single firm or government can justify the costly investment on its own. We know that society tends to under-invest in knowledge, and in this case the under-investment is truly global. I commend the good work that the United Nations has done on global public goods, and I challenge the leaders of all other nations to rise to the occasion and find ways to solve this problem.

In the present Kyoto regime there is no reward for nations that invest in technology. Indeed, a system that sets new targets every five years actually discourages some technological investments because a nation that lowers its emission trajectory puts itself at a disadvantage for later round of negotiations. We must eliminate these perverse incentives and create a strong, direct incentive for productive investment in new technology.

The exact form of this technology investment program still must be negotiated. At minimum, governments should focus on a wide package of measures as their contribution to addressing the problem of climate change, not merely compliance with emission goals. We must establish a process of government peer review that encourages each nation to look closely at the technology investment plans in the private and public sectors of other countries. We must create international mechanisms for collaborative research on new large scale technologies, such as a future generation of commercially viable and safe nuclear reactors as well as strategies for making renewable power widely available.

In addition to invigorating a new Kyoto, my administration is also committing the United States to a more aggressive course of domestic policy. We will demonstrate our dedication to creating an effective international response through our own substantial response at home. Our policy will include five major elements.

First, we will complete the installment of an effective voluntary registration system. This system has been in place since 1992 and has achieved mixed results. The reforms that we have already adopted will address many of the criticisms that the system had inadequate accounting and was rewarding firms with recognition for projects they would have undertaken anyway. A voluntary approach is not enough, but it is what we have right now—available immediately to help jump-start a mandatory, economy-wide response. My administration has already proposed new procedures for strengthening our register of voluntary reductions, and we will also examine ways to award credits for these reductions in a future emission trading system.

Second, my administration will introduce legislation to create a binding emission trading system for all significant sources of carbon dioxide in the United States. We will start with CO_2

because it is the easiest to measure, but we will create provisions for the inclusion of other gases in the future, exactly as the EU is doing in its own emission trading system, as it becomes easier to monitor these other gases reliably. Until then, we will regulate these other gases through other voluntary and mandatory programs, such as the Environmental Protection Agency's programs to encourage capture of methane from landfills, its partnership with the aluminum industry for reducing emissions of perfluorocarbons, and a number of other programs.

Third, the U.S. government will encourage—where it can—the many special programs that encourage low-cost ways to control emissions. I am always amazed when I hear stories such as the ability of BP to cut its emissions of CO_2 by [20] million tons per year at no cost to the company. In economics you learn that there aren't any $100 bills lying on the street because if there were, people would pick them up. From my experience talking with industry leaders, the street is filled with $100 bills, and we just need to learn how to find and grab them. Firms are already doing this—at least some of them. Government can help with informational programs that aid other firms in starting the search. Government, including local government, can also help households with the search. About one-third of the energy consumed in the United States is used in households, and a plethora of studies has shown that homeowners are typically unaware of how they can save money (and cut emissions) through more efficient appliances, upgraded insulation, low-energy lighting, and other simple changes.

Fourth, we will redouble our investment in new technology. My administration has launched programs to develop the technologies that will be needed for a zero-carbon hydrogen energy system, and we welcome the many private initiatives in this area as well. From India to Iceland we have found enormous interest in joint international exploration of this promising energy future. Last fall the U.S. government hosted a major international conference on the hydrogen economy; high level delegations from [33] countries attended. It is a sign that this conference attracted much larger representation from the highest levels of government than any so-called "conference of the parties" convened since adoption of the Kyoto Protocol. Governments that are serious about addressing the climate change problem know that technology is the key. With industry, the U.S. government is also supporting the demonstration of an advanced coal gasification power plant—what we call FuturGen—that will make it possible to generate electricity from coal while capturing and sequestering the CO_2 underground. These are a start; we will do more. We also expect that the private sector will do more—much more—when they see a credible signal that the world and the United States are serious about cutting carbon. We expect to spend $4 billion on climate technologies this year and more in the future.

Fifth, we will continue to invest in scientific research on the causes and consequences of climate change. Already the United States spends about $[2] billion per year on climate science. We fly satellites and plumb the depths of the oceans for clues about past, current and future climates. Nearly all that work is done in partnership with other nations. We contribute mightily to the IPCC process. Sound science is essential to sound policy. While sustaining and increasing this investment, we must also be sure that the many uncertainties that are inevitable in this issue do not become an excuse for inaction. We must look at the likely effects of climate change, and we must be especially mindful of the extreme effects—outcomes that may be unlikely but, if they occur, could be catastrophic. More work is needed to understand and predict

those effects, as they will dominate our attempts to set a safe level of greenhouse gases in the atmosphere.

Finally, I must emphasize that climate change is not a political island. We are rising to this challenge even as we in the community of nations address many other matters of energy policy. Energy efficiency makes sense for many reasons. Almost every strategy for cutting carbon will also cut the emissions of other pollutants. Many have said that the transition away from fossil fuels will be bad news for oil rich nations. But the reality is that oil revenues have not created wealth—rather, a "resource curse" has befallen so many oil exporters. It has come back to hurt us as well—in the form of Saudi support for Sept 11. All nations must decouple their prosperity from the vagaries of natural resources; we must embrace the post-industrial future that lifts welfare even as we tread more lightly on Earth.

Two decades ago, this body—the United Nations General Assembly—created a commission to study the fate of the global environment. The result—chaired by Norwegian Prime Minister Gro Brundtland—was an impressive report that bears revisiting. The Assembly created a vision for improving human welfare while also protecting the environment, and they called it "sustainable development." The Brundtland Commission argued that the two—environment and economic growth—were complementary, not contradictory. "Our common future," they said, required assuring that each generation pass the planet to the next with its vital resources intact.

We must reaffirm the Brundtland vision by addressing the danger of climate change with a truly global and long-term strategy that befits the problem at hand. If we are to assure our prosperity and a cleaner environment we must not wait. Our efforts must begin now and gather steam in the coming decades. I stand before you to assure that when focused on effective solutions to climate change, the United States will be at the forefront in reviving that global effort.

SPEECH #3: MAKING A MARKET

Location: Portland, Oregon

My Fellow Americans,

I have spent the day traveling the Columbia river—meeting small business owners and citizens here in Oregon and in Washington. They have shared with me their aspirations and visions; many have discussed their fears as well. Quite often they have expressed worries about the environment. Many have told me that environmental quality is why they are here. For a large fraction, the environment is their livelihood. They are outfitters and innkeepers and farmers. The environment, they say, is luxury and necessity all in one.

Over the last two centuries our modern society has confronted and solved many environmental problems. Nearly all these have been local or regional in nature. About 100 years ago this great nation faced a terrible timber crisis. Railroads and farmers, especially in the East, were cutting trees much more rapidly than the forests could recover. We created the forest service and helped farmers learn to grow more food on less land and solved the crisis. Similarly, we have largely solved the local pollution problems that, until recently, bedeviled city life. From mud and dung in the streets to killer smog we have risen to the challenge. Today, we are cutting emissions of sulfur dioxide, nitrogen oxides and mercury from power plants. For those who claim that environmental quality is in perpetual decline, I say look at the record. It is quite impressive. We have caused real harm, but we have also found real solutions.

Now we confront the problem of climate change. I am not exaggerating when I say that this is today's most serious long-term threat to environmental quality. I will not recount the evidence in detail, but you have all heard it. Global temperatures are rising now and will rise further. Weather patterns will change. Sea level is likely to rise, at least a bit, and storms may become more intense. The stress of a changing climate will alter natural ecosystems, driving some (perhaps many) species into extinction.

You will see the effects of climate change right here. Warmer temperatures are likely to reduce snowpack, which will change the annual cycle on the Columbia river. More water will flow in winter—when it otherwise would have been locked up in snow and ice on the mountains. Electricity prices may rise since the water for Bonneville and other dams along the river is much more valuable in summer, when demand for electricity is growing as more people install air conditioners. Hot summer temperatures will probably affect fish in rivers and the rest of nature. Such effects, though varied, will be felt anywhere and everywhere on Earth. For the first time in history, there is no place on Earth where the signature of mankind's pollution—carbon dioxide and other greenhouse gases—is not measurable.

It is safe to say that we don't know the exact consequences of a changing climate. But it is also safe to say that we know enough to be worried and to take prudent actions now.

Today, I'd like to outline the response that we—as Americans and as citizens of the Earth—should pursue.

We will be successful in solving the problem of climate change only with new thinking about the role of government in the economy. We will never find cost-effective solutions if we think about carbon dioxide and other greenhouse gases the way we have traditionally thought about pollutants—with mandates for end-of-pipe technologies. We must create economic incentives for private firms and individuals to re-invent the economy with a new metabolism—new methods for carrying and supplying energy that don't emit greenhouse gases. It probably means, over fifty years, building a new economy that does not require fossil fuels. To understand the magnitude of the task, imagine your day without fossil fuels. No car; no electricity in most of the country; no air travel; no gas for cooking and heating.

There are great dangers in undertaking this transformation of our economy. The costs could be enormous if we adopt foolish policies, such as regulations that require strict fuel economy standards or mandates for firms and households to adopt particular technologies. Some say that we should not pay attention to cost because the urgent needs of planet Earth must come first. I don't think that is realistic—we must pay attention to cost because a program that imposes an excessive burden will not be supported by the voters. For those who care most passionately about solving the global warming problem, I warn you: ill-conceived remedies that are not politically sustainable can cause even more harm than inaction.

The only way to make this transformation is through the market itself. The market must reflect the real cost of carbon dioxide. Today, the price of gasoline made from oil or electricity made from coal does not reflect the burdens of global warming. Except for altruism, the consumer has no incentive to seek out the less carbon-intensive products and services—they have no incentive to select hydropower from the Pacific Northwest rather than coal-fired power imported from Nevada. They have some incentive to demand that Detroit sell them a car powered by an ultra-efficient hybrid engine, rather than a gas guzzler; if the price of gasoline reflected the real cost of action more fully then the incentive would be stronger. And most important: inventors see few rewards from dreaming up new schemes to get the carbon out of the economy. America is a nation of invention. Our economy is strong because our productivity is high. If we guide the gale force winds of invention to the problem of global warming, solutions will be at hand sooner than we think. To do that requires getting prices right.

Already there is much that we can do. We can start by not getting prices wrong. The energy industry is second only to agriculture in the level of subsidy that you—the taxpayers and citizens—deliver. [add 1-2 sentences on the nature of current subsidies.] Because of those subsidies we have succumbed to pressure to subsidize new entrants as well—in a fake effort to level the playing field. Thus today we not only subsidize fossil fuels but also wind and solar and nuclear energy. We invent reasons for still more subsidies—we subsidize ethanol, a liquid fuel made from corn, in part on the fiction that ethanol blended fuels are a cost-effective way to clean the air. We need to stop the subsidy spiral. Our government can't afford it. It undermines the principle of free market environmentalism. It is bad policy, and it must stop. We must also work with other countries to end all subsidies for fossil fuels.

To go further—beyond removing insidious subsidies—we must create new policy instruments. The model is the highly successful program that we adopted in 1990 to control emissions of sulfur dioxide, the leading cause of global warming. In that case, we cut emissions in half by imposing a cap on all the major sources and then letting firms trade emission credits. Some firms found inexpensive ways to apply new technology, giving them surplus credits to sell or bank for the future. Others elected to buy credits rather than install costly technologies. The incentive to control emissions spurred innovation, which is evident in the large number of patents for sulfur control technology issued during the period—proof, again, that environmentalism can go hand in hand with innovation and strong economies. Today, U.S. firms are among the leaders in world pollution control technology; our exports create jobs and wealth here at home. My administration is making much greater use of markets for controlling many other forms of pollution as well. We have new proposals for a market in nitrogen oxides and a new market in mercury pollution. Although much of the federal government's efforts to protect the environment still employ traditional "command and control" methods—where government, in essence, tells you which technologies and processes are best—we are making progress in introducing market-based strategies. You may not know it, but the results are visible all around and even in your pocketbook. Good studies by serious economists have shown that market-based systems typically achieve the same result as a command-and-control system for about half the cost. That leaves more resources for the environment and the economy.

We must create an emission trading system for carbon. Since1992 we have had a voluntary program in place—firms have been able to register reductions in emissions. The program has revealed some important information about the range of options available for reducing emissions. It has probably encouraged some firms to act early. But the program has also had severe deficiencies. Accounting standards have been lax; my administration recently introduced new rules to tighten them up. But the key problem is that the program is voluntary. Firms that participate are mainly those that would have implemented reductions anyway. The full power of the economy—the full range of possible reductions—remains untapped.

We must create a binding system. We must include all sources, so that no firm or family is disadvantaged. We must be careful in the design of this system because we do not know exactly what it will cost to cut carbon. It might turn out that cutting carbon swiftly is very inexpensive. That was the lesson from the sulphur trading program, in part because reforms in railroad pricing that were adopted at about the same time had the unanticipated effect of making it easier to deliver low-cost, low-sulfur coal from the West to markets in the East. But carbon may prove more difficult to control, and overly ambitious targets could impose a severe cost on the economy—if new technologies are not available on the expected schedule, if new power plants prove difficult to site, if the chips don't fall in just the right way. We must protect ourselves against that nasty outcome, and devices are available to do that.

That logic is fine enough, but global warming is a global problem. We can make some first steps to demonstrate that the United States is serious about controlling emissions. Oregon is at the forefront of those efforts. You have set voluntary targets for reducing emissions. You have formed a pact with Washington and British Columbia to pursue a regional strategy for controlling emissions, and complementary efforts in California are leading to a western states approach. Several states in the Northeast are developing a trading system for emissions of CO_2

from power plants. Auto makers are exploring hydrogen-powered vehicles, in part because they are concerned about possible future limits on CO_2. Big utilities are putting big money—along with the support from the federal government—in an innovative program called FutureGen that explores ways to burn coal for electricity while sequestering the CO_2 safely underground. Such programs are examples of a better way to conduct research—through public-private partnerships. They envision the federal government exiting once the commercial potential of a radical new technology is proven; they avoid creating a steady stream of subsidy that has characterized many past federal efforts to support new technology. Japan, Canada and the European Union all have credible programs to cut emissions under way. These are a start; we will do more.

But how will the incentive to cut carbon spread worldwide? We must not have any illusions. If we do not have a credible answer to this question we are unlikely to solve the problem of global warming.

The only viable answer to this question leads us down a path that is very different from today's conventional wisdom. For the last decade the countries that have cared most about solving the global warming problem have tried to create a global regime for capping the emissions of greenhouse gases, as well as an international system for emission trading. They have worked "top down"—focusing their efforts on the Kyoto Protocol.

The Kyoto vision has not worked. For one, it is not possible to set strict caps in an international treaty that does not have fair and strong enforcement provisions. In the case of the United States, the caps were set at a time when America's diplomats were unaware of how rapidly our emissions would rise. We sought special rules to make it easier to meet our objectives, but we only got so much. Others in the Kyoto negotiations refused U.S. demands for more lenient and achievable targets. Faced with this onslaught we couldn't just walk away because everyone—including the U.S. government—had trumped Kyoto as the only way to solve the problem of global warming. But when you look at this system from the distance of history its wrongheadedness appears in stark relief. Trading emission quotas at midnight just to get a deal of symbolic importance is no way to protect our economy. Taken at face value the emission credits allocated at Kyoto could be worth trillions of dollars. Yet some countries—notably Russia—received obscenely generous allocations. The goal of Kyoto—to slow global warming—is admirable. But the method was so flawed that failure was inevitable.

To find an effective solution we must return to fundamentals. Our goal is to get the market to reflect the real costs of carbon. We seek that solution by putting a cap on emissions and then letting the market discover the price of action. In other terms, we create these caps and emission credits so that the market reflects the limited ability of the climate system to absorb all the CO_2 that we are emitting.

For too long we have thought about this task as an environmental problem. The real nature of our challenge is little different from inventing a new form of money—a carbon currency. Eventually, holdings of these carbon credits will be important, strategic assets. Everyone in the market will examine the carbon consequences of their actions, just as everyone today thinks about the capital requirements of their behavior—whether it is building a new factory, buying a car, or constructing a home.

The reason that Kyoto will not work as the central strategy for solving the carbon problem is that new currencies are not created from the top down. Rather, they establish value from the bottom up—through the millions of transactions that determine the real need for a currency. When Lewis and Clark traveled down the Columbia River and spent the winter of 1805-1806 at Fort Clatsop they traded in currency that was valuable at the time—medals, jackets, fish hooks, roots, and lynx skins. Values were established by need and ability to pay. One day, Clark traded a portfolio of six fishooks, a file and some fish for a panther skin. The next day, prices rose—two files were demanded in exchange for some roots—and Clark did not trade. Thomas Jefferson, way back in Washington, did not set the price when he sent Lewis and Clark on their journey two years earlier. Rather, he endowed them with a collection of potentially valuable items; their real value fluctuating with the interests and terms of trade as the expedition made its 4000 mile journey west.

So too we are at the early stage of a journey. We will have success if we focus on assuring that carbon emission credits have real value—that they represent real reductions—and that the government does its best to stay out of the way as markets find their prices. We can start that process by establishing a trading system here in the United States. Europe has started that process by creating their own trading system. Canada is exploring a similar move; we should urge Japan, also, to look at using markets rather than the inefficient and probably ineffective collection of partial measures and "voluntary" commands that the government is crafting.

We have an interest in other countries establishing effective trading systems, and they have an interest in us doing the same. As each creates its own sound trading system the zone for trading will grow—and so will the gains from trade. Exactly that logic—open trade for goods and services—has underpinned the remarkable economic growth that we have seen ever since the Second World War. The failure of governments to support that logic explains why the economic crises of the early 1930s rippled through to create a deep global recession. Governments raised the barriers and each nation became an island.

We will not succeed in creating this global system by ordaining all countries equal and all emission credits equal, which is largely the approach taken in Kyoto. Rather, the emergence of different zones is a healthy and welcome outcome. It allows us to discover which countries are managing their new currency well. We will trade with them. It also allows us to spot those that are printing extra permits and adopting procedures that undermine the strong currency. We will allow them to trade credits only at a discount. In extreme cases, we may bar them from our markets altogether. The values that markets discover will reflect the integrity of each system—each currency.

How will we move from the system that is emerging today—where each trading zone is largely an island—to one where emission credits have greater mobility between markets? Kyoto's answer to that question is to create, in big bang style, an international trading system. In fact, the Kyoto targets were so demanding for most industrialized countries that few nations, including the United States, could meet their Kyoto targets without engaging in international trading. But that answer—a top-down, big bang system—has led us down a dead end.

The right answer is to build an international trading system from the ground up. We must start with bilateral agreements in which one trading zone recognizes the permits of the other. This arrangement keeps the tools of enforcement—the control over the value of our new currency—in the hands of the countries that have the greatest interest in assuring that this system really works. In the Kyoto system, by contrast, enforcement is the function of an international body that has no real powers and whose membership is stacked with countries—notably developing countries—that don't have an immediate economic incentive to get prices right. Through bilateral arrangements we can assure fair terms of trade.

This view will be controversial. For too long those of us who have accepted the need for serious action to slow global warming have also accepted the conventional wisdom that a top-down international treaty was the best solution. Having accepted that conventional wisdom we then built a top-down treaty that incorporated the sound logic of emission trading. The result was a system that has drifted ever further from the real lessons of history. Consider the World Trade Organization—today's most effective and successful example of international regime building. The WTO did not spring forth from a top-down vision for international trade. Rather, it was built up through a series of bilateral agreements through the General Agreement on Tariffs and Trade (the GATT) that were packaged together into a truly multilateral approach. In the first decades of the GATT, from the 1940s through the 1960s, there was essentially no international enforcement mechanism—rather, reciprocal tariff agreements were self-enforcing. Countries that didn't find they got a fair deal could withdraw other tariff concessions. Later, as the number of countries and the complexity of trade commitments grew, a more effective enforcement mechanism was put into place. Today, we have the WTO—the result of more than fifty years of patient multilateralism, constructed from the ground up. That is a good model for what we must do to combat climate change.

This alternative vision helps us to focus on what we must do now. In the Kyoto system, most experts have anticipated that trading would begin with Russia and the developing countries. Those countries offer the greatest opportunity for low cost emission controls. But these countries are also least likely to create a sound currency—in general, they do not have the legal and regulatory institutions in place to assure adequate enforcement. In the case of developing countries, the Kyoto approach doesn't even cap emissions, making it essentially impossible to know whether emission reductions are genuine. A much better strategy would create a zone of trust first with the countries that we know share our interests and have the capacity to support sound money.

Some will criticize this vision as too slow and too small. We must start with all nations—especially developing nations—and we must move rapidly, they will say. But we must not underestimate the difficulty of the task in front of us. There are few examples of international currencies created by consent. The European Union has recently created a new international currency, the Euro. That has been a long and arduous process; enforcement has proved difficult when powerful countries such as France and Germany violate the rules; keeping the system on keel has proved difficult, despite the fact that Europe has strong institutions and created a new central bank especially to manage the Euro. We must not underestimate the risk to our prosperity and to our success in slowing global warming if we get this wrong. We cannot afford to include in our new currency nations and markets that will undermine integrity, just as

we do not tolerate those who counterfeit our dollars. As a businessman I learned the importance of credibility and confidence. I can assure you that there is no faster way to erase, with great pain, our diligent efforts at slowing global warming than to hurriedly create a system that will come unraveled when some unscrupulous trader in a distant land is given the opportunity to attack.

Just because we start constructing this new currency by working with our allies in the industrialized world does not mean that we should ignore the opportunities for controlling emissions worldwide. Indeed, the stronger the effort we make in our currency zone the greater the need for those outside the zone—notably Russia and the developing countries—to make comparable efforts. Certainly we must take the lead, and certainly we must make a greater effort, for we in the industrialized world care most about this issue and we have also caused most of the problem. But we must also be vigilant in ensuring that the playing field does not tilt too sharply against us, as that will make it harder to sustain the political will needed for this great transformation in our economy.

We can work with these other countries on broad programs for controlling emissions. Already there are many opportunities for controlling emissions that are in these countries' interest and could be pursued more rapidly. They include plugging the holes in the Russian gas pipeline network. They include the efforts in most countries—including China and India—to make greater use of natural gas instead of coal. Gas emits just half the CO_2 per unit of useful energy as does coal. When China builds its gas network it will lock itself into a future energy system that is cleaner. That is good for China, good for the world, and good for the nations—from Australia to Indonesia and Russia—that sell the gas. We can encourage that by sharing information about gas networks and ensuring that private investors in the gas business have fair access to the Chinese market.

We must not pretend that such efforts will advance by awarding China, Russia or any other nation that is not part of our currency zone a pile of emission credits. How many credits should China get because it builds its gas network? Should we reward Russia just because its economy has collapsed and it is investing in projects, such as energy efficiency, that make sense anyway? These difficult questions have been a mainstay of debate in the Kyoto system, and they lead to a trading mechanism that will be tied in red tape. Already Kyoto has created something called the Clean Development Mechanism that had sought to award emission credits project-by-project for investments in developing countries that would reduce emissions to a level lower than would have occurred otherwise. That was an admirable idea at the time, but it has proved unworkable because the most important investments for reducing long-term emissions—such as building gas networks to displace coal—are not discrete activities for which it is possible to make an unambiguous determination of credits. It is telling that the Clean Development Mechanism, while slated to start four years ago, has made barely any progress in awarding real credits.

These programmatic efforts—in cooperation with governments as well as business, including our firms interested in promoting exports—will help put these countries on better pathways. They will work only if they rest on sound economic principles. And they must be viewed as interim measures. We must also be clear to these countries that we expect them to

implement meaningful limits on their emissions—to create their own emission trading systems and to join, eventually, the growing trading zone. Many of these countries will object to this requirement because they have steadfastly opposed limiting their emissions through the Kyoto process. To overcome this opposition we must work with finance, industry and energy ministers in these countries, who understand often better than their environment and diplomatic counterparts the need to transform energy systems. And we must be prepared to make the other benefits of citizenship in the global community contingent upon determined progress in addressing a problem that affects us all.

As I see it, we are lucky because the time scales involved with the climate change problem are long. The effects that should worry us will not appear in the next decade or two. Rather, the risks will accumulate slowly. They are acceptable if we act now, but they will grow more urgent—and more expensive—the longer that we fail to create a credible incentive to change our energy system. Our task as policy makers and citizens is to create those incentives and then to let our market-based economy do what it does best—invent and apply solutions.

Along the way, we must stay focused on our challenge. Most of what we read in the newspapers and see on television about the climate change problem focuses on the scientific and technological questions. Is climate change real? What will it cost to control emissions? Is cheap nuclear power finally a reality? These are important questions, but the most difficult challenge is institutional. Our task is no less complicated than inventing a new form of money. If we are successful then every firm and household will have an incentive to cut emissions, and new businesses with new jobs emerge around the mission of supplying low-carbon energy here and abroad.

We can be successful in this effort, but only if we do not tilt at false windmills. With Kyoto we have tried both too much and too little. We have not paid close enough attention to assuring the integrity of our new currency. We have not explored adequately ways to work with our allies—especially in Europe—to create a system here that links with the trading system that is already taking shape over there. And we must ensure that we do not frustrate these fragile but important efforts by loading ever larger subsidies on the already grossly distorted economics of energy.

I am confident that when we get the incentives right that solving the climate problem will be much easier and less expensive than we think. Lewis and Clark may have been surprised as winter set in and prices for food shot up. But they responded—they hunted elk, they found new things to trade. And most important, their descendents—successful generations of settlers—found new and more productive ways to catch and grow food. In the winter of 1806 food was the biggest expenditure; securing its supply was the main subject of conversation. Today, Americans spend about [12]% of their incomes on food, and most of that is in restaurants where variety and entertainment rather than sheer nutrition are the attraction. Today we are concerned about greenhouse gases that are the consequence of practically every economic activity—a problem, like the food problem, that seems daunting. But with the incentive and time for change, we will reorganize ourselves and our descendents will remark on our determination, efficiency and success.

INHOFE PRAISES BUSH ADMINISTRATION'S PROGRESS ON CLIMATE CHANGE PLAN.txt
From: Hart, Will (EPW) [Will_Hart@epw.senate.gov]
Sent: Thursday, February 19, 2004 4:35 PM
To: Hart, Will (EPW)
Subject: INHOFE PRAISES BUSH ADMINISTRATION'S PROGRESS ON CLIMATE CHANGE PLAN

For Immediate Release:
Contact - Will Hart: 202-224-5762
February 19, 2004

INHOFE PRAISES BUSH ADMINISTRATION'S PROGRESS ON CLIMATE CHANGE PLAN

WASHINGTON, DC - Sen. James Inhofe (R-Okla.), Chairman of the Environment & Public Works Committee, commented today on the National Academies of Science (NAS) review of the Bush Administration's Final U.S. Climate Change Science Program (CCSP) Strategic Plan. The Strategic Plan was introduced by Commerce Secretary Evans and Energy Secretary Abraham in July 2003, and is a management plan for climate change research in the federal government.

"I am very pleased with the release today of NAS's review of the Bush Administration's Strategic Plan on climate change," Sen. Inhofe said. "The leadership provided by the Administration on this issue has produced a management plan with clearly defined goals, deadlines, and timetables which make President Bush the first President to fulfill the statutory regulations required by Global Climate Change Research Act of 1990. NAS stated in its review and I wholeheartedly agree that, 'The nation and the global community will be better prepared to address the challenges of climate and associated global changes if the Climate Change Science Program's vision and overarching goals are achieved.' Congress must continue to be mindful though that scientists' reviews routinely request additional funding for science. During this time of tight budget constraints, we must only provide responsible and balanced funding in a way that all viewpoints on the issue of climate change are funded and considered equally."

The Bush Administration has spent nearly $2 billion in pursuit of climate change science each year and has exceeded the last years of the previous Administration's funding on this issue by $50 to $100 million. Furthermore, United States research on this topic exceeds that of the European Union and Japan combined.

"I concur that the President's Climate Change Science Program 'could permit it to effectively guide research on climate and associated global changes over the next decades,'" Sen. Inhofe concluded.

The full review by NAS can be found at: www.nas.edu <http://www.nas.edu> .

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FYI -- NRC global change metrics committee meeting agenda.txt
From: Rick Piltz [rpiltz@usgcrp.gov]
Sent: Friday, February 20, 2004 11:56 AM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: FYI -- NRC global change metrics committee meeting agenda

Attachments: agenda_3.04(2).doc

Attached is the agenda for the March 3-4, 2004, meeting of the NRC Committee on Metrics for Documenting Progress in Global Change Research. The first day of the meeting will focus on some possible principles for developing metrics, and case study examples drawn from the CCSP Strategic Plan. On the second day, the committee will talk with science historians on evaluating scientific progress, and with agency representatives on their experience with GPRA, the R&D investment criteria, and the budget assessment tool, PART. Nearly all of the meeting is open and the committee encourages agency representatives to attend.

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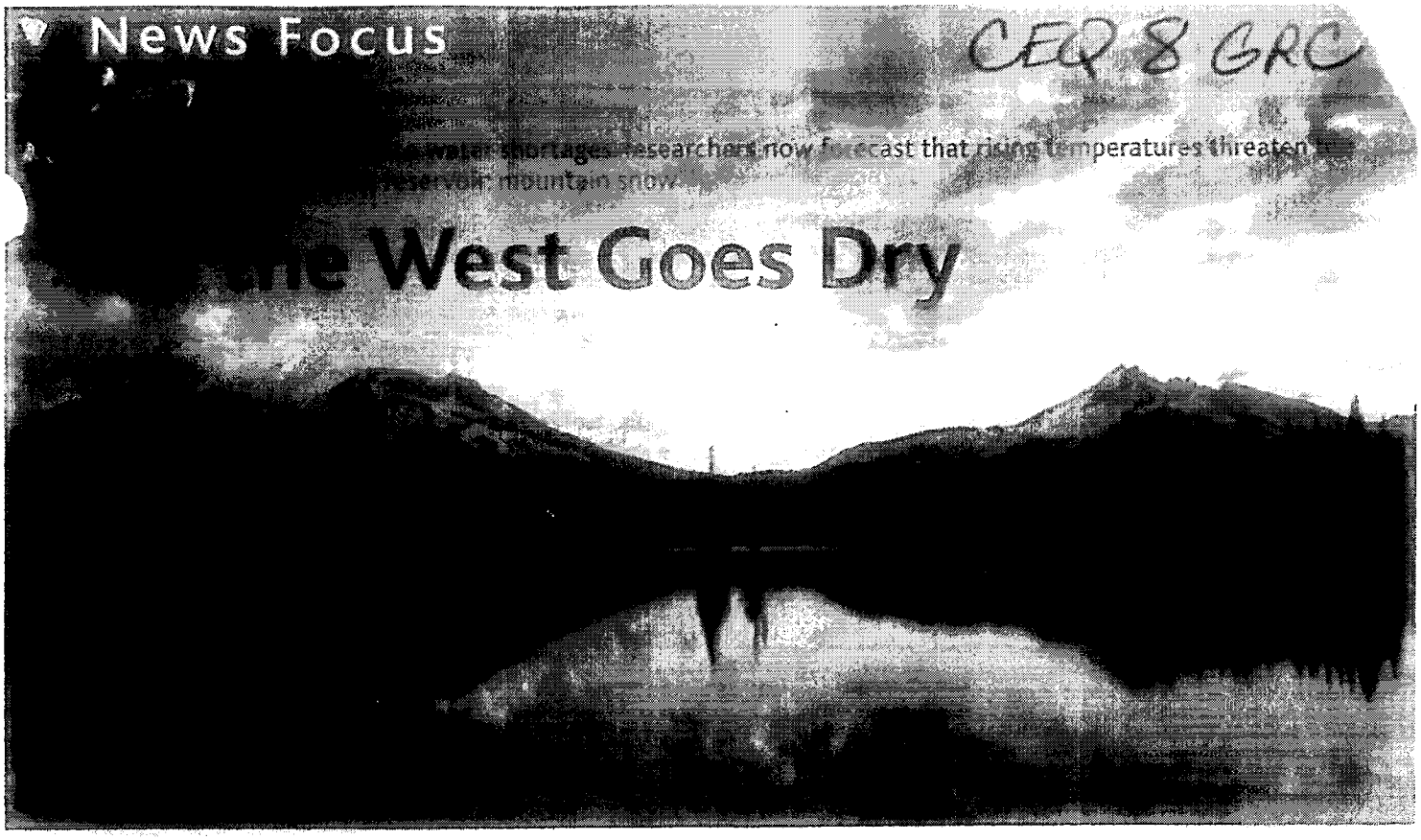
...ne West Goes Dry



MOUNT BACHELOR, OREGON—Under the dome of a concrete-gray sky, Stan Fox assembles four pieces of aluminum tubing into a 3-meter-long hollow pipe. After standing it on end, he plunges it through more than 2 meters of snow at Dutchman Flat, an alpine meadow perched on the shoulder of this 3000-meter mountain. Fox, who heads the Oregon snow-survey program for the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), removes the tube and reads the snowpack depth, a measurement that has been tracked at nearby sites monthly since the 1930s. Today the snow is 250 centimeters deep, and by comparing the weights of the tube both filled and empty, Fox and a colleague determine that the snow contains about 30% liquid water. If all the snow were instantly liquefied, the water would be nearly 1 meter deep. Not too bad. In a region prone to spikes in precipitation, Dutchman Flat is more than 15% above its 30-year average. "The snow in these mountains is a virtual reservoir," Fox says. As the snow melts in the spring and summer, it will slowly release that water, filling streams and reservoirs, which provide lifeblood to the region during the normally bone-dry summer months.

But indications are that this age-old cycle is beginning to change. New assessments of decades' worth of snowpack measurements show that snowpack levels have dropped considerably throughout the American West in response to a 0.8°C warming since the 1950s. Even more sobering, new studies reveal that if even the most moderate regional warming predictions over the next 50 years come true, this will reduce western snowpacks by up to 60% in some regions, such as the Cascade Mountains of Oregon and Washington. That in turn is expected to reduce summertime stream flows by 20% to 50%. "Snow is our water storage in the West," says Philip Mote, a climatologist at the University of Washington (UW), Seattle, who leads a team that has produced much of the new work. "When you remove that much storage, there is simply no way to make up for it."

The impacts could be profound. In the parched summer months, less water will likely be available for everything from agriculture and hydropower production to sustaining fish habitats. Combined with rising temperatures, the dwindling summertime water could also spell a sharp increase in catastrophic fires in forests throughout the West. With much of the current precipitation headed downstream earlier in the winter and spring, the change is also likely to exacerbate the risk of floods.

For resource managers already struggling to apportion limited water supplies throughout the West, the predictions are grave. "If that's true, it would have a huge impact," says Christopher Furey, a policy analyst with the Bonneville Power Administration in Portland, Oregon, which markets electricity from over a dozen power-generating dams in the Columbia River Basin that provide power to millions of people. In a region where farmers, fishers, recreationalists, an municipalities already compete for wate climate change may be setting the stage fc an entirely new round of conflicts. "W think of the water wars in the past," say Fox, referring to the epic battles over rerou ing western waters in the early 20th centu "In the future they will probably be mor peaceful but much more prevalent."

Too wet, too soon

The root of the problem is easy to state: T semiarid West has too little water, spread t unevenly throughout the year. Most of Mo tana sees less than 46 centimeters of preci tation a year. Even rainy Portland receiv only about one-tenth of its annual 91 cer timeters of precipitation during the summe For most of California the fraction is eve smaller. Philadelphia, by contrast, typical receives 102 centimeters of annual precipit tion, 30% of which comes in the summer.

Thanks to massive dam-building in t first half of the 20th century, more than (million people—roughly one-fifth of t U.S. population—now live in the Pacif and Intermountain West. Those tens of m lions of people are dependent not just water, but on snow. Snowmelt makes 75% of all water in streams throughout t West. If that snow falls as rain or melts t early, there will be little water left in t virtual reservoir come late summer a fall. Unfortunately, that is just what appea to be happening.

Back down the mountain in a conferen

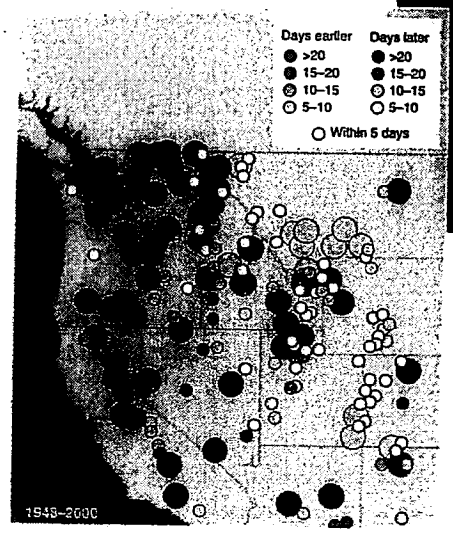
oom at a small ski resort outside Bend, Fox and a collection of about 50 water experts from the Northwest settle in to listen to Mote describe some of his group's latest data on western snowpacks. Perhaps fittingly, outside the temperature has warmed up on this mid-January day to about 5°C. Icicles encircling the roof drip steadily.

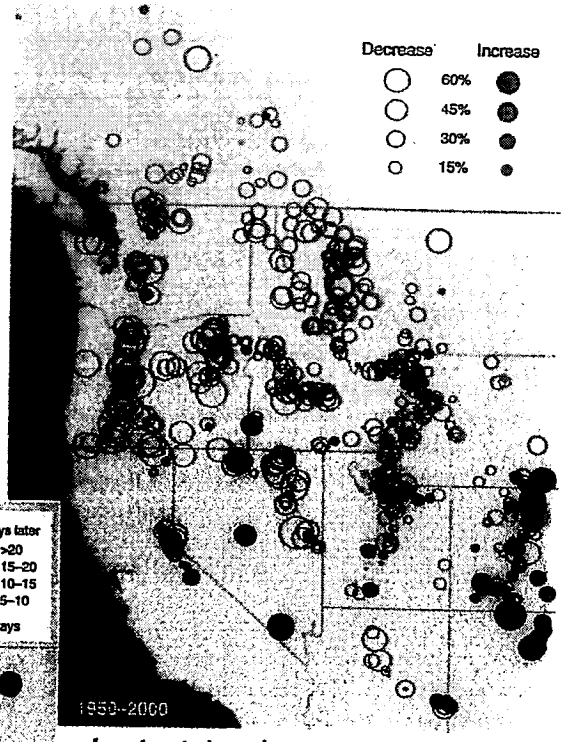
Mote describes work published last year in *Geophysical Research Letters*, in which he took a detailed look at the trend in snowpack accumulations throughout the Pacific Northwest over the last half of the 20th century. Mote reviewed federal records of snow water equivalents (SWE)—the amount of water in a given depth of snow—on 1 April, typically the peak of the season's snowpack. Of the 230 sites where SWEs were measured back to the 1950s, Mote found that nearly all showed negative trends, even as precipitation increased in most places. The hardest hit: areas in the Cascade Mountains in Oregon and Washington, which saw as much as 60% declines in total snow accumulation. The most likely explanation, Mote says, was the region's temperature rise. When he plotted the snowpack declines against the elevation of the snow-tracking sites, he found that the biggest decreases occurred at the lowest elevations, suggesting that the moderate warming throughout the region was raising the freezing level.

That's just the beginning. In work presented last month at the American Meteorological Society meeting in Seattle, Washington, Mote teamed up with UW Seattle colleague Alan Hamlet and University of Colorado, Boulder, hydroclimatologist Martyn Clark to expand his initial analysis to look at historical snowpack levels throughout the West (see righthand figure). The news was better, but not much. Snowpacks decreased at 85% of the nearly 600 snow-measurement sites throughout the West. The biggest decreases hit the Northwest, where the mountains are smaller and the temperatures warmer, thanks to their proximity to the Pacific Ocean. Declines in the northern Rockies were mostly in the range of 15% to 30%. In these inland areas, Clark points out, winter temperatures are typically far lower than in the Pacific Northwest, so a rise of a few degrees still does not push the mercury above freezing. "In the interior regions all the winter precipitation falls as snow," Clark says. And some regions in the Southwest even witnessed large SWE increases, thanks primarily to a rise in precipitation.

Other clues also suggest that the West's snowpack is changing. The biggest: Snow is melting earlier in the spring. "There has been a fairly broad tendency in snowmelt basins to exhibit advances in runoff timing," says Daniel Cayan, a climate researcher at the Scripps Institution of Oceanography in La Jolla, California. Last month, Cayan, postdoctoral assistant Iris Stewart, and Michael Dettinger, a hydroclimatologist with the U.S. Geological Survey (USGS) in San Diego, reported in *Climatic Change* that the peak of the annual spring runoff in streams throughout California's Sierra Nevada now comes as much as 3 weeks earlier than it did in 1948 (see lower figure). Again, the effect was most pronounced in streams adjacent to lower elevation snow that is more sensitive to temperature increases. "This is very consistent with the evidence Phil [Mote] and company have seen with the snowpack," Cayan says. In a paper now under review at the *Journal of Climate*, Clark and colleagues at the University of Colorado recently found much the same shift for streams in the Northwest. "There is definitely something happening," Clark says.

That evidence is further bolstered, Cayan points out, by records that track the first springtime blooms of flowers such as honeysuckle and lilac, which show a similar 1- to 2-week advance. "This is a totally independent measure and one that is quite strongly related to temperatures in the springtime," Cayan says.





In retreat. A modest temperature rise since the 1950s has reduced spring snowpacks throughout the West (*top*) and shifted the peak snowmelt earlier in the year (*left*).

Not everyone is yet ready to believe that these trends will continue. George Taylor, the state of Oregon climatologist and a climate researcher at Oregon State University in Corvallis, for example, argues that broad trends in temperature and snow accumulation over the past century are most likely due to natural multidecade swings as the climate oscillates between periods of relative warm and cold temperatures. "There was significant warming in the 1920s, '30s, and '40s, cooling in the '50s and '60s, and warming again from the 1970s through '90s," Taylor says. "In my opinion, the effects of human-induced global warming are small compared to the multidecadal cycles."

Greg Johnson, a climatologist with NRCS in Portland, also points out that Mote typically starts his analysis of snowpack trends at the beginning of the 1950s, which saw some of the largest snow accumulations over the past century. "If you use those numbers, you will show large decreases," he says. Decadal swings in climate caused by El Niño and the Pacific Decadal Oscillation, he adds, further muddy the numbers.

"I'm not saying it's a nonissue, just that we need to keep watching it closely," Johnson says. "The point is, if you look at the historical record, we've seen some warming and drops in low-elevation snowpack. The question is what can we tie it to. But from a planning standpoint, I think people have to be concerned about this."

Mote agrees that the trend data may be skewed to some degree by the high-snow years of the early 1950s. However, he says, before the 1950s there were so few snow measurement sites that earlier data are suspect. Furthermore, he says, the snow loss is still best explained by the region's modest warming. "The thing that really stands out is that the largest losses are at the lowest eleva-

TY OF WASHINGTON

T TO RIGHT) ADAPTED FROM I. STEWART, D. CAYAN, AND M. DETTINGER/USGS/SCRIPPS INSTITUTION OF OCEANOGRAPHY; P. MOTE/U.

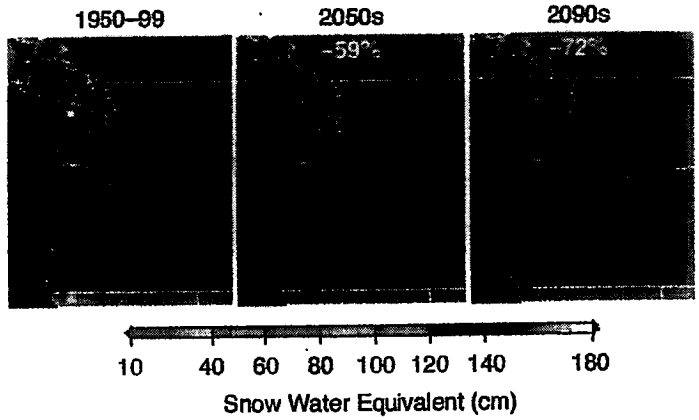
tions, which can only be explained by warming," Mote says. As for whether this warming is best explained by the decade-long climate swings, Mote defers to the latest work by the Intergovernmental Panel on Climate Change (IPCC), the global body of hundreds of scientists that has assembled the "standard model" of climate change. Although IPCC's latest report does show that both natural and human-induced factors explain portions of the last century's global temperature record, climate models that take both into account do the best job at reproducing the complete temperature record.

Dry times ahead?

No matter what the historical picture, Mote, Cayan, and others argue that the picture for western snowpacks looks far more bleak when the anticipated future warming is taken into account. Here, too, several teams have been working to understand how events are likely to unfold. All agree there is considerable uncertainty. Precipitation trends, for example, "are all over the map" in different climate models, because precipitation can vary drastically over a short distance, Mote says. However, Mote, Cayan, and others agree that climate models generally do a far better job of estimating temperature, because temperature differences drive winds that tend to reduce those differences. Regional climate models suggest that over the next 100 years, western temperatures are likely to rise between 2° and 7°C, depending on—among other factors—the rate of increase of greenhouse gases in the atmosphere. And unlike the precipitation forecasts, the models all show an increase in temperature.

Modelers then feed these temperature data and other variables into another set of computer programs called hydrology models that compute the effects of changing climate on snowpack and stream runoff. And these hydrology models consistently show that even low-end temperature changes produce big effects. As part of a study described in last month's issue of *Climatic Change*, for example, UW Seattle hydrologist Dennis Lettenmaier and colleagues used a global climate model to compute how the western snowpack would respond to modest temperature increases. They found that a temperature rise of 1.5°C by 2050 resulted in a loss of nearly 60% of the 1 April snowpack in the Oregon and Washington Cascades, and a 3° rise by 2090 reduced those snowpacks by 72% (see figure). "That's the best-case scenario," Mote says. "By the 2090s with a warm scenario, you would have essentially no snow left in Oregon by April 1st." When the Pacific Northwest is taken as a whole, the picture is only a bit better, showing a 35% loss in 1 April snowpack by the 2050s and 47% loss by the 2090s.

In a *Geophysical Research Letters* paper last year, Cayan and former postdoc Noah Knowles—now with USGS in Menlo Park, California—computed a similar analysis for the watersheds that make up the western drainage of California's Sierra Nevada Mountains. They found that a predicted temperature rise of about 2.1°C over the next century would reduce the Sierra snowpack by one-third by 2060, primarily at mid to low elevations, and would halve it by 2090. A separate analysis by L. Ruby Leung and colleagues at the Pacific Northwest National Laboratory in Richland, Washington, together with researchers from the National Center for Atmospheric Research in Boulder, Colorado, and Scripps reached similar conclusions when they looked at the effect of climate throughout the West. The one notable difference: In the Rockies, the colder wintertime temperatures are expected to limit the losses to 30%. Without putting too much faith in the exact amount of losses, Mote says, "it's nearly inescapable that we're going to continue losing snowpack."



Virtually gone. Computer models suggest that even moderate warming will drastically reduce the spring (peak) snowpack in the Oregon and Washington Cascades.

"Enormous impacts"

"It doesn't mean we've lost water," Cayan hastens to point out. "It means the water is coming off earlier." Rather than sticking around as snow into the late spring and summer, western snowpacks will wash down mountainsides in the winter and spring. Simply stated, the upshot is wetter winters and drier summers.

In the Sierras, for example, Knowles and Cayan's models predict that the portion of water that flows through the watershed's rivers from April through July each year will decline from 36% today to 26% by 2030. "This represents over 3 km^3 [3 billion c meters] of runoff shifting from post–Apr to pre–April 1 flows," the authors write. Th figure nearly doubles by 2090. Other studie show that parts of the Columbia River Basin are likely to fare worse, whereas the Colorado River watershed, with smaller anticipated declines in snowpack and generally colder temperatures, is likely to emerge comparatively unscathed. Overall, however, a steady temperature climb will likely affect tens of millions of people. "There are enormous impacts from this potential change," Cayan says. "Water management in the West has been to use the snowpack as a natural reservoir. This reservoir is really important. It's water that will come later when a lot of the water demand is heaviest." Without that water "people will need to make some difficult choices," adds Todd Reeve, who directs watershed restoration programs for the Bonneville Environmental Foundation in Portland.

That's particularly true in the Pacific Northwest and California. Reservoirs in the Columbia River Basin capture only about 30% of the region's annual runoff, whereas California's reservoirs hold slightly more. The typical pattern is to fill these reservoirs with late spring runoff and use that water throughout the summer and fall for irrigation and then in the early winter for power generation. An earlier snowmelt means that the water must be spread over a longer dry season when irrigation, recreation, and municipal demand peaks. "You're losing natural storage and taxing built storage. Something has to give," Lettenmaier says. (Here too, Lettenmaier says, the Colorado River Basin is unique, because reservoirs there can store four times the region's annual precipitation.)

With less summertime water, one of the hardest hit areas is likely to be agriculture. Today, farmers in California use about 75% of the state's water. Earlier this month, agricultural economists Wolfram Schlenker of the University of California, San Diego, and W. Michael Hanemann and Anthony Fisher of UC Berkeley presented a preliminary study at the American Economic Association meeting in San Diego of the likely impacts of climate change on California agriculture. Using a range of hypothetical climate and stream-flow scenarios in line with published modeling results, the researchers forecast that snowpack losses could lower farmland values by more than 15%. If that pattern holds for the state's 3.84 million hectares of irrigated farmland, the loss to the

...te's agriculture economy would be measured in the billions of dollars.

What is more, Fisher says, because access to irrigation water in California depends on the historical system of first-come, first-served water rights, those losses will likely be absorbed primarily by the farmers lowest on the water-rights totem pole, driving many out of business. That same pattern is likely to hold true in the Northwest, particularly in the dry lands east of the Cascades. "It's not going to be feasible to have the irrigated acreage we have now," Mote says—fighting words in a region long wedded to an agricultural way of life.

Forests are also likely to suffer, according to Anthony Westerling, a climate researcher at Scripps. Westerling recently fed data from Cayan and Knowles's climate and hydrology models of the Sierras into a model of his own that attempts to forecast changes in wildfires. Westerling says his preliminary results show that fire danger will soar. "The mean area burned more than doubled by 2090" relative to the present, Westerling says.

Although less easily quantified, low summertime stream flows are also expected to exacerbate problems with declining fish runs, crimp water supplies for recreation and cities, and increase the likelihood of winter and springtime flooding throughout the Northwest and California. But not all the impacts are sure to be bad. Last year, John Fazio, a river flow analyst with the Northwest Power and Conservation Council in Portland, plugged some of the UW group's hydrology forecasts into his Columbia River flow models and found that a warmer Northwest may actually benefit Northwest electricity consumers. Warmer winters, Fazio says, will likely lower the need for electricity during the region's peak demand period, and an expected small increase in wintertime precipitation could churn generators to the tune of an extra 1900 megawatts of power—nearly enough to power two cities the size of Seattle. Of course, if precipitation swings toward the dry side, it could wind up costing rate payers hundreds of millions of dollars, he says.

No matter how the climate evolves, water managers will face uncomfortable tradeoffs between providing water for agriculture, hydropower, and recreation, and keeping it in streams to support fish runs. In their current *Climatic Change* paper, for example, Lettenmaier and colleagues show that to keep summertime flow levels in the Columbia River high enough to support endangered-fish recovery plans, water managers will likely have to sacrifice 10% to 20% of the river's wintertime hydropower generating capacity, because it will force water managers to draw down their reservoirs in the summer. "Even with these reductions in power, late-summer minimum flows would still be lower than at present," the authors write.

More big dams?

In a region prone to water shortages, talk of such tradeoffs doesn't go down easy. "We already have a problem with shortages," says Maury Roos, chief hydrologist for the state of California. And coming up with the water to deal with population growth throughout the region is already an acute problem, he adds. "This will certainly make the problem worse."

In hopes of heading off some of those problems, Roos and other water officials are beginning to incorporate climate change into their regional water plans. California's latest draft water plan, for example, discusses climate change, although it doesn't yet recommend changing California's infrastructure. Portland, Seattle, and other cities have begun studying the issue in detail to see whether they need to change their water-management plans.

Initial rumblings are also being heard among advocates for building new dams throughout the West. That comes as something of a surprise to many, because during the Clinton Administration, then–Secretary of the Interior Bruce Babbitt claimed that the era of big dam building was over, due to their adverse impacts on fish and wildlife. Already, for example, California is considering building several new dams as part of a joint state and federal effort to provide water for threatened ecosystems while keeping water available for farmers. Washington too is flirting with building a dam at a cost of more than $1 billion in the eastern part of the state to provide irrigation water for farmers near Yakima. And Idaho water managers say that climate change may force them to build new reservoirs to prevent winter floods along the Boise River, where one-third of the state's inhabitants currently live.

But due to their high dollar and environmental costs, many water experts doubt whether such projects will go forward. "Dams are tough fights and so expensive," says Hal Anderson, planning chief for the Idaho Department of Water Resources. And even if built, they will only soften the blow.

Dangerous consequences. Over the next century, larger winter and spring runoffs from melting snow are expected to increase flooding and catastrophic wildfires.

With the amount of spring snow expected to be lost due to climate change, "there is no way we're going to build that many dams to capture it all," Mote says.

Other strategies may help. Most water officials agree that there is much that can be done to conserve water, particularly by lining irrigation canals and making other improvements to irrigation. As well, a handful of new programs have sprung up recently to buy or lease water rights from farmers and then keep the water in stream during the low-flow months to improve habitat for fish. Last year, for example, one umbrella effort called the Columbia Basin Water Transactions Program sponsored 32 such deals to keep 28.4 million cubic meters of water in tributaries where it's needed most. That amount of water pales in comparison to what stands to be lost. But for now, water planners still have some time to act before climate change alters the American West in a way humans have never witnessed.

–ROBERT F. SERVICE

(LEFT TO RIGHT) RICH PEDRONCELLI/AP; JONATHAN YOUNG/EPA/AP

From: Cooney, Phil
Sent: Friday, February 20, 2004 5:16 PM
To: Peel, Kenneth L.
Subject: FW: Expert review of Arctic Climate Impact Assessment draft Overview -- due March 5

Importance: High

-----Original Message-----
From: Rick Piltz [mailto:rpiltz@usgcrp.gov]
Sent: Friday, February 20, 2004 3:51 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Cc: BrandelSK@state.gov
Subject: Expert review of Arctic Climate Impact Assessment draft Overview -- due March 5
Importance: High

To--
CCSP/SGCR Department/Agency Principals, Executive Office and Other Liaisons
CCSP Interagency Working Group Co-Chairs, CCSP key contacts

In 2003, on behalf of the Climate Change Science Program, the CCSP Office assisted in coordinating the U.S. component of the expert review of the draft Arctic Climate Impact Assessment (ACIA) Scientific Report. In all, 53 U.S.-based experts, both inside and outside the U.S. Government, submitted review comments on the report.

This e-mail is to notify you that we now have available for review the draft ACIA Overview Report. The draft Overview Report summarizes the most important findings in the 18* chapters of the ACIA Scientific Report in a style accessible to a policy and lay audience.

The draft Overview Report has been reviewed by the Lead Authors of the chapters of the ACIA Scientific Report and is now also being reviewed by external experts, as well as the International Arctic Science Council (IASC), the Arctic Monitoring and Assessment Programme (AMAP), and Conservation of Arctic Flora and Fauna (CAFF). The CCSP Office has sent the relevant information to the U.S.-based expert reviewers of the draft Scientific Report, inviting and requesting their participation in reviewing the Overview. Following the same procedure that was used in reviewing the draft ACIA Scientific Report, individuals are requested to send comments directly to the ACIA Secretariat.

If you wish to review the draft ACIA Overview Report, or wish to invite additional individuals to submit comments, the following information explains how to participate in the review process. Please don't hesitate to get in touch with me if you have any questions about the review.

--Rick Piltz

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To access the Overview Report, as well as the revised draft of the ACIA Scientific Report chapters that underpin it, go to the ACIA Web site at: <www.acia.uaf.edu>. There you can click on a link (located under the photo) taking you to the reviewer page. At the login menu, type:
Name: reviewer
Password: taxi
The ACIA asks that you please keep this information confidential.

Please send your comments by e-mail to the the ACIA Secretariat <aciarev@iarc.uaf.edu>, using the format described below, by MARCH 5.

The ACIA is interested in receiving comments on content, any errors or major omissions, and inconsistencies with what is in the ACIA Scientific Report chapters.

* (A new chapter, entitled "Conservation of the Arctic's Biodiversity in a Changing Environment," by lead author Michael Usher, has been added to the assessment. This is referred to as Chapter 10b in the Scientific Report.)

Format for Comments

□ Please provide your name, organization and area of expertise.
□ General comments (those not specific to any particular page) on the full Overview should follow and should be numbered.
□ Comments that are specific to particular pages and paragraphs should follow your general comments. For each comment, identify the page number and the paragraph number to which they apply.
□ Comments that refer to a table or figure should identify the table or figure by description and page number.
□ Order your comments sequentially by page and paragraph number.
□ Because comments from a number of reviewers will be collated, please insert your name in the line following each comment.

Sample Format for Comments

I. Background Information
Name:
Organization:
Area of Expertise:

II. General Comments/Synthesis Comments
1. First General Comment
Reviewer's Name

2. Second General Comment
Reviewer's Name

III. Specific Comments

Page 5, paragraph 3: (Comment)
Reviewer's Name

Page 34, paragraph 2: (Comment)
Reviewer's Name

Figure on spruce bark beetle outbreak, Page 52 (Comment)

Reviewer's Name

--

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From: Rick Piltz [rpiltz@usgcrp.gov]
Sent: Monday, February 23, 2004 11:12 AM
To: rpiltz@usgcrp.gov
Subject: FYI -- NYT editorial: Uses and Abuses of Science

[In case you hadn't seen this yet--]

New York Times editorial
February 23, 2004

Uses and Abuses of Science

Although the Bush administration is hardly the first to politicize science, no administration in recent memory has so shamelessly distorted scientific findings for policy reasons or suppressed them when they conflict with political goals. This is the nub of an indictment delivered last week by more than 60 prominent scientists, including 20 Nobel laureates. Their statement was accompanied by a report published by the Union of Concerned Scientists, listing cases where the administration has manipulated science on environmental and other issues.

President Bush's supporters promptly denounced the statement and the report as an overdrawn and politically motivated work issued in an election year by an advocacy group known for its liberal disposition. Tellingly, however, neither Mr. Bush's friends nor the White House denied that any of the incidents listed in the report - all had been reported before in newspapers, trade magazines and scientific journals - had occurred. The best they could muster was a lame rejoinder from Dr. John Marburger III, Mr. Bush's science adviser, who said that these were disconnected episodes reflecting normal bureaucratic disagreements, none of them adding up to a "a pattern" of distortion or disrespect for science.

We respectfully urge Dr. Marburger to look again. On global warming alone, the administration belittled, misrepresented, altered or quashed multiple reports suggesting a clear link between greenhouse gas emissions and the burning of fossil fuels like coal and oil. A study detailing the impact of mercury emissions from power plants was sanitized to industry specifications. Another study suggesting that a Congressional clean-air bill would achieve greater pollution reductions than Mr. Bush's own plan, at approximately the same cost, was withheld. It does not take much effort to find a pattern of suppressing inconvenient facts that might force Mr. Bush's friends in the oil, gas and coal industries to spend more on pollution control.

The report details similar shenanigans involving other agencies, including Agriculture, Interior and even, on reproductive health issues, the Centers for Disease Control. It also criticizes the administration for stacking advisory committees with industry representatives and disbanding panels that provided unwanted advice. Collected in one place, this material gives a portrait of governmentwide insensitivity to scientific standards that, unless corrected, will further undermine the administration's credibility and the morale of its scientists.

http://www.nytimes.com/2004/02/23/opinion/23MON3.html?ex=1078552289&ei=1&en=09c31989
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RE FYI -- NRC global change metrics committee meeting agenda.txt
From: Hannegan, Bryan J.
Sent: Monday, February 23, 2004 4:43 PM
To: 'Rick Piltz'
Subject: RE: FYI -- NRC global change metrics committee meeting agenda

Rick -- has the NRC Committee contacted anyone at OMB regarding the nuts and bolts of GPRA, PART, etc.? If not, how can we make that contact happen?

Thanks,
bh

-----Original Message-----
From: Rick Piltz [mailto:rpiltz@usgcrp.gov]
Sent: Friday, February 20, 2004 11:56 AM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: FYI -- NRC global change metrics committee meeting agenda

Attached is the agenda for the March 3-4, 2004, meeting of the NRC Committee on Metrics for Documenting Progress in Global Change Research. The first day of the meeting will focus on some possible principles for developing metrics, and case study examples drawn from the CCSP Strategic Plan. On the second day, the committee will talk with science historians on evaluating scientific progress, and with agency representatives on their experience with GPRA, the R&D investment criteria, and the budget assessment tool, PART. Nearly all of the meeting is open and the committee encourages agency representatives to attend.

--

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II. M.19

U.S. GREENHOUSE GAS EMISSIONS BY SECTOR
(Million Metric Tons of Carbon Dioxide Equivalent)

All Greenhouse Gas Emissions by Sector

Sector	*1990*	*2000*	*2010*
Residential	357	387	427
Commercial	216	228	260
Industrial and Agricultural	2020	2072	2278
Transportation	1534	1848	2275
Electric Utilities	1894	2275	2504
Total	**6021**	**6810**	**7743**

Carbon Dioxide Emissions By Sector

Sector	*1990*	*2000*	*2010*
Residential	338	366	404
Commercial	216	228	260
Industrial and Agricultural	993	1007	1111
Transportation	1475	1781	2204
Electric Utilities	1862	2258	2490
Total	**4885**	**5640**	**6469**

See Page 2 for emissions disaggregated by source.

Notes:

1990 fossil combustion emissions derived from U.S. EPA data. 2000 fossil combustion emi derived from 1999 U.S. EPA data and adjusted by EPA estimates of growth from 1999 - 2C fossil combustion emissions projected using growth rates derived from "Annual Energy Ou 2001."

Emissions from natural gas production, cement production, other industrial and gas flaring derived from 1990 and 1998 reported figures in "Emission of Greenhouse Gases in the Un States." The growth to 2000 and 2010 was assumed to be linear.

Emissions and growth rates for other categories derived from U.S. EPA data.

U.S. EPA calculates industrial emissions from fossil fuel combustion by subtracting other s emissions from the total emissions from fossil fuel combustion.

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II. M.

In 2000, state actions and demonstration projects resulted in emission reductions of 1.5 MMTCE.

Thirty-six states and Puerto Rico have initiated state GHG inventories (35 and PR completed). These states represent approximately 70% of 1990 US emissions.

Twenty-five states and Puerto Rico have initiated state GHG mitigation plans (18 and PR completed).

11 of the 19 plans completed identify potential GHG savings of 50 to 70 MMTCE by 2010 from low-cost or no-cost actions. According to the states, these reductions would save them a total of $7.8 billion in 2010.

82 cities representing more than 10% of the US population have joined ICLEI's Cities for Climate Protection Campaign, committing to inventory and reduce their GHGs.
In 2000, the participating cities reduced about 1.9 million metric tons of carbon equivalent, saved $70 million in energy and fuel costs, and cut 28,000 tons of air pollution.

In April 2001, the State and Local program issued a Request for Proposals to award $250,000 to states to initiate state GHG inventories and action plans. We will award up to $25,000 for each inventory and up to $75,000 for each greenhouse gas action plan.

methodologies vary between
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improving
refinements.

global warming
sites

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The U.S. Domestic Response to Climate Change: Key Elements of a Prospective Program

To date, efforts to reduce U.S. emissions have been limited almost exclusively to voluntary activities at the federal, state, local, and corporate level. Many of these efforts were spurred by the United Nations Framework Convention on Climate Change, which set a non-binding target of reducing emissions from industrialized countries to 1990 levels by 2000. While some voluntary efforts have resulted in significant emission reductions – some companies, for instance, have cut emissions 10 percent or more – in the aggregate, they have not succeeded in curbing the overall growth in U.S. emissions.[1] While technology has enabled the energy intensity of products and processes to decrease over the last 50 years, the increased efficiency has been outpaced by increased demand driven by economic expansion, population growth, and changing consumer preferences. U.S. emissions rose roughly 12 percent over the past decade, and are projected to continue rising for the foreseeable future.[2] Voluntary programs can make an important contribution to a domestic climate change program, and can provide valuable experience for designing future efforts, but cannot stimulate the broad engagement that will be necessary to achieve the level of emissions reduction that will ultimately be required.

Climate change is a long-term challenge that will require sustained action and investment over many decades. Ideally, a national strategy would be guided by a specific long-term emissions goal established either nationally or by international agreement. With or without a quantified target, however, an effective domestic strategy must couple short- and long-term measures – and both supply and demand elements – to signal markets to begin the transition and provide guidance on the ultimate objective. More specifically, short-term measures are needed to improve energy efficiency and encourage the use of lower-carbon fuels; long-term measures are needed to encourage sustained investment in development of the technology and infrastructure needed to facilitate the transition to a low-carbon economy. Further, because energy consumption is an important component of GHG emissions, any domestic energy policy program must be informed by an understanding of the impacts of such policy on climate.

While a domestic strategy will ultimately need to reflect any international commitments made by the United States, its design and implementation should not be deterred by delays in the international process. It is, however, important to coordinate domestic and international programs where possible. Such a coordinated approach is especially important for multinational companies that operate both domestically and abroad, and even for U.S. based companies that

Excellent discussion of current policy

[1] A significant investment has been made in a variety of federal programs to encourage voluntary reductions. Such programs include: the U.S. DOE's Climate Challenge Program for electric utilities; U.S. EPA programs such as Climate Wise, the Landfill Methane Outreach Program, the Coalbed Methane Outreach Program, Energy Star, and the Green Lights Program, as well as the U.S. Initiative on Joint Implementation. In addition, DOE's Voluntary Reporting of Greenhouse Gas Program required by Section 1605(b) of the Energy Policy Act of 1992 records the results of voluntary measures to reduce, avoid, or sequester carbon. During 1999, a total of 201 U.S. companies and other organizations reported on 1,715 projects that achieved reductions and sequestration equivalent to 226 million metric tons of carbon dioxide, or about 3.4 percent of total 1999 greenhouse gas emissions. (Voluntary Reporting of Greenhouse Gases, 1999, DOE/EIA – 0608(99), February 2001).

[2] In the U.S., the transportation, industry, and combined residential/commercial sectors are each responsible for roughly one third of overall emissions.

sell products abroad, as they will be subject to rules dealing with climate change in other countries.

As with an international strategy, a domestic policy program should be environmentally sound, fair, and cost-effective. The cost of meeting a given emissions target can vary by orders of magnitude depending on the approach taken. In general, the most cost-effective approaches allow emitters flexibility in deciding how to meet a target or performance level; provide early direction so targets can be anticipated and factored into major capital and investment decisions; and employ market-based mechanisms such as emissions trading to achieve reductions where they cost the least. To ease the transition and enlist the broadest possible participation, early targets should be realistic – i.e., economically achievable. These could be followed by more stringent constraints over time if scientific certainty increases, incorporating the benefit of experience and increasing scientific understanding.

This paper outlines possible elements of a comprehensive domestic strategy that couples short- and long-term measures. The proposed elements – some voluntary, others mandatory – aim to:

- improve the tracking and reporting of greenhouse gas emissions;
- promote development and deployment of new technologies; and,
- provide a foundation upon which to secure long-term emission reductions.

While each of these objectives can be pursued in a number of different ways (several options for securing emission reductions are proposed), an effective strategy must address all three.

Tracking and Reporting Greenhouse Gas Emissions

No effort to reduce greenhouse gas emissions can succeed without the accurate measuring and tracking of emissions. Improved tracking and reporting of emissions reductions could provide the basis for government assurances that companies will not be penalized for their early reductions. Public disclosure of emissions data can also serve as a powerful incentive for voluntary reductions.

A first step is establishment of a registration program to more accurately and reliably measure, report, and track voluntary GHG mitigation efforts. This could be done through legislation that builds on current efforts such as the Department of Energy's 1605(b) program. The current program has limited value due to the lack of rigor in its reporting standards and the absence of any verification requirements. In an improved registry program, a company would establish a baseline consisting of current aggregate emissions from all major GHG sources under its control in the United States. Gross emissions on an annual basis could be compared to this established baseline.

A reliable registry would make it possible to provide "baseline protection" for companies taking action now to reduce their emissions. These entities could be assured that – in the event of future controls involving the allocation of emissions allowances or requiring emissions reductions – they would not be penalized for reductions already achieved voluntarily. The

improved registry program could also ensure that GHG reductions and sequestration offsets (such as efforts to store carbon in soils or forests) are of sufficient integrity that they can be traded and sustain their value in future years. This registry would include reductions and offsets achieved outside of the United States, in both developed and developing countries. In this manner, both gross and net (of reductions and offsets) emissions would be recorded.

An additional step would be to require public disclosure of GHG emissions data for facilities or companies whose emissions exceed a given threshold – as now required for other emissions under the federal Toxics Release Inventory (TRI) program. Disclosure reports would be subject to verification and reporting entities would face enforcement action if emissions were misrepresented. As with TRI, public availability of the data would encourage companies to assess potential mitigation opportunities and reduce emissions voluntarily. Gross emissions from an entity's U.S. sources as well as net emissions (after considering sequestration activities and trading) would be reported.

Promoting Clean Technologies and Practices

The ultimate success of a climate change strategy will hinge on the timely development and deployment of technologies that over time can substantially reduce the carbon intensity of the overall U.S. economy (including industry, the transportation sector, and residential/commercial activity). In the short term, improved technologies can significantly enhance energy efficiency, provide opportunities to store – or sequester – carbon in forests and soils, and expand use of lower-carbon fuels (such as natural gas). In the long term, new technologies will be needed to tap non-fossil fuels such as biofuels and hydrogen and provide opportunities for more permanent forms of sequestration.

A variety of incentives and direct investment tools can be used to promote technological innovation, from basic research to deployment:

- Targeted tax credits or low-interest loans can encourage the development and adoption of energy-efficient technologies (such as combined heat and power, and state-of-the-art lighting); clean fuel technologies (including advanced fossil fuel technology, hydrogen, fuel cells, and biofuels); and carbon storage in forests and agricultural soils, using innovative management techniques.

- Investment in basic research may be especially critical in inventing breakthrough technologies that will facilitate the transition to a low-carbon economy.

- Public-private partnerships, such as Industries for the Future and the Partnership for a New Generation of Vehicles, can team government and corporate researchers to accelerate technology gains.

- Basic research and tax credits could accelerate the development and diffusion of climate-friendly alternatives to non-CO_2 greenhouse gases or technologies and practices that reduce their emissions.

- Investment in training to improve agricultural practices can decrease the release of methane (CH_4) and nitrous oxide (N_2O).

- Public education through the use of labeling and other means can help consumers reduce their contribution to climate change.

- Incentives to builders and landlords can encourage the use of energy efficient appliances in new construction and rental units.

Finally, improved product efficiency standards – coupled with incentives to exceed minimum requirements – can achieve significant emission reductions. Under the traditional command-and-control approach, the incentive is to meet, but not exceed, a government-set standard. A hybrid standard/incentive approach (e.g., one that combines a minimum standard with a sliding tax credit for those who go beyond the standard) provides incentive to exceed minimum regulatory requirements. This approach should be added to existing product standards as they come up for review and employed for additional products for which standards have not yet been set.

Securing Emission Reductions

An especially critical element of a domestic climate change program will be the design of a market-based GHG emissions management framework to ensure significant long-term reductions in emissions. The approaches that follow include voluntary activities that could be implemented in advance of, or alongside, mandatory emissions reductions. As stated above, however, an effective program ultimately will entail some form of mandatory requirements.

1. Enter into agreements with companies willing to make significant, enforceable commitments to achieve net GHG emissions reductions in lieu of other GHG control requirements.

Securing regulatory certainty may be a powerful incentive for those willing to undertake substantial GHG reduction commitments. By committing to take action yielding specified reductions over an established period of time, a firm could receive a commitment from the government that (as long as its contractual obligations are met) it would not be bound by subsequently developed GHG controls over the same time period. For example, if a company were to commit to significant reductions over a 20-year period (e.g., a 20% reduction achieved either through steady declines of 1%/year or through a major capital investment at some point during this timeframe), the company could avoid additional mandatory GHG control obligations during the same 20-year period. This approach would allow companies to move forward with substantial capital investments that will secure significant emission reductions.

Under this approach, companies would enter into agreements that establish enforceable commitments to achieve specified net reductions below company baseline levels (e.g., year 2000 GHG emissions). These commitments would provide baseline protection, and shelter firms from additional requirements developed during the term, in exchange for legally binding agreements containing measurement, verification, and reporting requirements. Such an approach would require enabling legislation authorizing the Executive Branch to enter into these agreements. This legislation should include provisions for public notice and comment.

Additional features could include providing emissions trading opportunities for program participants and allowing credit for reductions achieved through sequestration projects and offsets. In other words, companies that reduce their emissions beyond the levels specified in the agreement will be able to trade these additional emissions reductions with firms that were unable to meet their reduction targets. Similarly, credit for real, quantifiable, and verifiable sequestration activities could also be granted towards the obligations and, when in excess of specified targets, can be sold in an emissions trading market.

2. Enter into agreements with sectors willing to make significant, enforceable commitments to achieve net GHG emissions reductions in lieu of other GHG control obligations. For sectors (or companies within a sector) electing not to participate, a triggering mechanism will require mandatory reductions once a certain target emissions level is exceeded.

Rather than soliciting individual companies to undertake reduction commitments on a voluntary basis, this approach would promote binding agreements across sectors. For example, in the utility sector, mandatory agreements that provide certainty over a period of time could enable companies to coordinate their emissions control strategy for conventional air pollutants with carbon dioxide reductions in the most efficient manner possible. Similar benefits could accrue to other sectors – for example, the transportation sector, iron and steel industry, petroleum refineries, and cement manufacturers. While mandatory, the terms and privileges under these agreements would be similar to those involving company agreements detailed above.

- great idea - multi-pollutant w/ opt-in

3. Allow an opt-in for coverage of carbon dioxide emissions in conjunction with a 3-P program.

Many companies – particularly utilities – are interested in considering their CO_2 emissions in conjunction with other obligations or new requirements under the Clean Air Act. Many studies have found that such a harmonized approach would be beneficial.[3] An "opt-in" approach would permit these sources to consider reduction obligations and goals comprehensively, thereby minimizing the chance of stranding pollution control investments aimed at conventional pollutants without regard for CO_2. By providing an opt-in strategy, overall emissions (including GHGs) could be considered simultaneously – avoiding the now-common scenario that control strategies devised for reductions in traditional pollutants have little or no beneficial impact on GHG emissions. (In fact, post-combustion controls aimed at reducing conventional pollutants in many cases increase GHG emissions. In contrast, all GHG reduction strategies that affect fuel consumption – the largest GHG emissions source – also reduce criteria air pollutants.)

appropriate

At the same time, streamlining the existing New Source Review (NSR) program for changes in facilities can also be helpful in enabling power plants to improve their generation efficiencies, resulting in lower CO_2 emissions. Companies participating in this "opt-in" could receive limited relief from EPA's current application of the NSR modification rules where they are found to create barriers to efficiency improvements and similarly beneficial projects.

NSR would never

[3] STAPPA/ALAPCO, *Reducing Greenhouse Gases and Air Pollution: A Menu of Harmonized Options* (October 1999); EIA, *Analysis of Strategies for Reducing Multiple Emissions from Power Plants: Sulfur Dioxide, Nitrogen Oxides, and Carbon Dioxide* (December 2000).

4. Design and implement an economy-wide mandatory domestic cap and trade program.

Ultimately, the ability of the United States to achieve significant long-term GHG reductions depends on our success in the design and implementation of a mandatory program to reduce emissions. Since such a program will take time to design and administer, the near-term approaches discussed above should be developed in such a way that they are consistent with important design elements of a future mandatory program. The most cost-effective means of obtaining such reductions is likely to come in the form of a domestic emissions trading program that could be integrated with an international trading regime.

Elements of an effective domestic trading program could include:

- allocation of permits to existing sources through grandfathering, auction, or – preferably – some combination thereof;
- creation of an independent authority to oversee the GHG registry and trading activity;
- providing for a declining cap in permitted GHG levels over time;
- including credit for other GHG emissions on a CO_2-equivalent basis; and,
- recycling revenues from auctioned permits to reduce other tax burdens, increase R&D, and provide transition assistance to affected workers and communities.

Ideally, a domestic program should be compatible with trading programs in other countries to allow credit for reductions undertaken abroad. Also, with improved confidence in measuring and monitoring sequestration-related activities (both domestically and abroad), credit for carbon storage (e.g., in farms and forests) should be included.

Conclusion

To effectively address global climate change, the United States must be engaged in actively pursuing real reductions in GHG emissions here and abroad. The steps outlined here chart a course for a sound, credible, and cost-effective domestic program. Starting now on a path to reduce these emissions will be necessary both to meet the environmental objective of moderating human interference with the climate system and to avoid the need for more costly measures in the future.

Re Fwd RE Inquiry about Metrics Committee link to OMB.txt
From: Hannegan, Bryan J.
Sent: Tuesday, February 24, 2004 10:38 AM
To: 'rpiltz@usgcrp.gov'
Subject: Re: Fwd: RE: Inquiry about Metrics Committee link to OMB

If you could follow up with OMB and make sure they are involved, that would improve the treatment of their process and improve the quality of the NRC report.

Thanks,

Bryan Hannegan
Associate Director for Energy and Transportation Council on Environmental Quality

-----Original Message-----
From: Rick Piltz <rpiltz@usgcrp.gov>
To: Hannegan, Bryan J. <Bryan_J._Hannegan@ceq.eop.gov>
Sent: Tue Feb 24 10:23:31 2004
Subject: Fwd: RE: Inquiry about Metrics Committee link to OMB

Bryan--

The NRC staff director for the Committee on Metrics for Global Change Research replied to your inquiry as follows. I can follow up with OMB if the NRC committee needs some help with this. Do you have a suggestion?

--RP

>We've invited David Trinkle (OMB) to give such an overview at the next
>meeting, but haven't heard back yet. Ideally, he would go in the 10:00
>am slot on March 4. I would welcome suggestions for alternates if
>Trinkle can't make it.

>-----Original Message-----
>From: Rick Piltz [mailto:rpiltz@usgcrp.gov]
>Sent: Monday, February 23, 2004 5:02 PM
>
>I have received the following inquiry about the Metrics Committee from
>an individual at CEQ:
>
>"Has the NRC Committee contacted anyone at OMB regarding the nuts and
>bolts of GPRA, PART, etc.? If not, how can we make that contact
>happen?"

--

Rick Piltz
Senior Associate
U.S. Global Change Research Program
Climate Change Science Program Office
1717 Pennsylvania Ave., NW, Suite 250
Washington, DC 20006
Tel (direct): 202-419-3468 Fax: 202-223-3064 Tel (main #): 202-223-6262
www.usgcrp.gov, www.climatescience.gov

From: William Holbrook [wfholbrook@att.net]
Sent: Wednesday, February 25, 2004 7:11 AM
To: Perino, Dana M.; Peel, Kenneth L.; Hannegan, Bryan J.; Cooney, Phil; Connaughton, James; Onley, Kameran L.
Cc: Holbrook, William F.
Subject: 2 Energy Daily stories - cc

The Energy Daily

February 25, 2004, Wednesday

SECTION: Volume 32, Number 36

LENGTH: 831 words

HEADLINE: **Sea-Level Rise Seen As Key Global Warming Threat**

BYLINE: BY CHRIS HOLLY

BODY:
An increase in sea levels poses the biggest threat from rising global temperatures, a leading U.S. global warming researcher said, adding that the scale of the threat is grave enough that global warming responses should be aimed at mitigating the risk rather than at adapting to rising sea levels.

In an article published in the March edition of the journal Scientific American, James Hansen, director of the NASA Goddard Institute for Space Studies, warns that catastrophic sea-level increases could come much sooner than predicted by the Intergovernmental Panel on Climate Change (IPCC), the leading scientific body charged with analyzing global warming by the United Nations and the World Meteorological Organization.

Hansen is best known for his testimony to congressional committees in the mid-1980s that helped raise U.S. awareness of the global warming threat.

"The dominant issue of global warming, in my opinion, is sea-level change and the question of how fast [glaciers] can disintegrate," Hansen wrote. "A large portion of the world's people live within a few meters of sea level, with trillions of dollars of infrastructure. The need to preserve global coastlines sets a low ceiling on the level of global warming that would constitute dangerous anthropogenic interference."

Global average surface temperatures have increased about 3/4° Celsius (1.35° Fahrenheit) since the late 1800s, with most of the warming, about 1/2°C (0.9°F), occurring after 1950.

The IPCC has estimated sea level increases of roughly half a meter over the next century if global warming reaches several degrees Celsius above temperatures seen in the late 1800s. Most of the sea level increases predicted by the IPCC were attributed to thermal expansion of the oceans, with little change in the volume of the world's glaciers.

"These moderate climate effects, even with rapidly increasing greenhouse gases, leave the impression that we are not close to dangerous anthropomorphic interference," Hansen wrote. "I will argue, however, that we are much closer than generally realized, and thus the emphasis should be on mitigating the changes rather than just adapting to them."

The IPCC has calculated only a modest change in polar ice sheets over the next century, in part because its calculations have include only the gradual effects of changes in snowfall, evaporation and melting, Hansen noted.

But he said: "In the real world, ice-sheet disintegration is driven by highly non-linear processes and feedbacks."

For example, higher sea levels can physically lift marine ice shelves that prevent land ice sheets from sliding into the ocean. This effect accelerates the breakup of the land ice.

In addition, melting glacier water flows downward through holes in the ice to the bottom of the ice mass, where it serves as a lubricant that further speeds the disintegration of the land ice and its flow into the sea.

Hansen warned that if recent growth rates of emissions of carbon dioxide (CO2) and other greenhouse gases continue during the next 50 years, the resulting temperature increases could result in large increases in sea level, with potentially catastrophic effects.

On the brighter side, however, Hansen said policymakers have a relatively cost-effective option that could prevent such a dire outcome. His two-pronged plan calls first for halting or reversing emissions of black carbon (soot), methane and atmospheric ozone over the next half-century.

The role in global warming of soot, a product of inefficient combustion of fossil fuels, biofuels and outdoor burning of forests and other biomass, is complicated even in the dizzyingly complex world of climate change science.

In areas where soot emissions are heaviest, such as India and China, sunlight at the Earth's surface is reduced, causing a local surface cooling. But higher in the atmosphere, soot's primary constituent, black carbon, absorbs heat and warms the atmosphere, resulting in a net surface warming.

In addition, Hansen recently reported that soot accelerates ice sheet disintegration when it falls in snow onto ice fields and absorbs solar radiation.

Soot also carries enormous adverse health risks; tiny soot particles can carry toxic metals and organic compounds deep into the lungs, leading to respiratory illness and resulting losses of life and economic productivity.

Reducing methane by capturing emissions from landfills and coalmines would partially pay for itself, because methane can be used to generate electricity, Hansen said.

Secondly, Hansen called for limiting emissions of CO2, the principal greenhouse gas, at current levels over the next 50 years, primarily through substantially increased use of renewable and nuclear generation.

"The [CO2] and [non-CO2] portions of the scenario are equally important," Hansen said. "I argue that they are feasible and at the same time protect human health and agricultural productivity."

The Energy Daily

February 25, 2004, Wednesday

SECTION: Volume 32, Number 36

LENGTH: 454 words

HEADLINE: **Technology Breakthrough Claimed On Emissions-Free Fossil Generation**

BYLINE: BY CHRIS HOLLY

BODY:
In an intriguing announcement made in New Zealand last month, a Vanderbilt University professor claimed he has made a technology breakthrough that will allow the continued use of fossil fuels for producing energy with no emissions of

carbon dioxide, one of several greenhouse gases many scientists say causes global warming.

Robert Holcomb, an assistant professor at Vanderbilt's School of Medicine, said the new technology-Electron Stream Carbon Dioxide Reduction, also called the carbon dioxide converter-would allow combustion of coal and other fossil fuels with no emissions of carbon dioxide (CO2).

"The scientific community has been focusing its attention on chemistry-based solutions to the overwhelming problem of global warming," Holcomb said. "The unique technology of the carbon dioxide converter permanently splits the molecular structure of [CO2] into its basic elements-carbon and oxygen."

The proprietary technology uses a closed-loop system that allows the combustion of any carbon-based fuel, including oil, coal, natural gas and biomass fuel, with zero harmful emissions, Holcomb said. The process also produces carbon black as a byproduct, a substance that is used in the production of tires, printing ink and as a pigment for plastics.

The global engineering firm Black and Veatch Corp., in a separate report, verified the results of Holcomb's technology, finding that "the demonstration observed provided convincing data that indicated carbon dioxide generated during the combustion of...coal was converted back into carbon and oxygen by the CO2 converter. This was clearly indicated by calibrated, reliable gas analysis equipment."

The new technology also can be used to eliminate emissions of sulfur dioxide, Holcomb said.

John Small, head of the Economics Department at Auckland (N.Z.) University, released an analysis of the technology's impact on global economies. Small found that costs of the new Holcomb technology would be "considerably lower" than those projected for integrated gasification combined cycle plants, the most likely competing low-emission technology for coal-fired generation.

Small also found the Holcomb technology would cost much less than combined cycle gas turbine generation as well as new nuclear generation, noting that his calculations did not include costs associated with nuclear waste disposal.

Small concluded that the global net economic benefits from 2011 to 2030 would range between $134 billion and $347 billion, depending on how broadly the technology is deployed.

Emission savings also would be significant, with mid-range projections estimated at a 25 percent reduction in CO2 emissions worldwide by 2020, Small said.

RECORD TYPE: FEDERAL (NOTES MAIL) CREATOR:"Card, Robert" ("Card, Robert" [UNKNOWN]) CREATION DATE/TIME:26-JAN-2004 11:55:33.00 SUBJECT:: Sec Evans At IAWGCCS&T Tues TO:"Simmons, Emmy" ("Simmons, Emmy" [UNKNOWN]) READ: UNKNOWN TO:Gary Martin (Gary Martin [UNKNOWN]) READ:UNKNOWN TO:"Dr. James E. Andrews (DOD)" ("Dr. James E. Andrews (DOD)" [UNKNOWN]) READ:UNKNOWN TO: Christina Beato (Christina Beato [UNKNOWN]) READ:UNKNOWN TO:Stephen Johnson (Stephen Johnson [UNKNOWN]) READ:UNKNOWN TO:"Rita Colwell (rcolwell@nsf.gov)" ("Rita Colwell (rcolwell@nsf.gov)" [UNKNOWN]) READ:UNKNOWN TO:Marcus Peacock (CN=Marcus Peacock/ OU=OMB/O=EOP@EOP [OMB]) READ:UNKNOWN TO:"Jim Moseley (jrm@usda.gov)" ("Jim Moseley (jrm@usda.gov)" [UNKNOWN]) READ:UNKNOWN TO:"Ghassem Asrar (gasrar@hq.nasa. gov)" ("Ghassem Asrar (gasrar@hq.nasa.gov)" [UNKNOWN]) READ:UNKNOWN TO:"Conrad Lautenbacher (conrad.c.lautenbacher@noaa.gov)" ("Conrad Lautenbacher (conrad.c. lautenbacher@noaa.gov)" [UNKNOWN]) READ:UNKNOWN TO:Harlan Watson (Harlan Watson [UNKNOWN]) READ:UNKNOWN TO:Kathie L. Olsen (CN=Kathie L. Olsen/OU=OSTP/ O=EOP@EOP [OSTP]) READ:UNKNOWN TO:"Conover, David" ("Conover, David" [UNKNOWN]) READ:UNKNOWN TO:"Anderson, Margot" ("Anderson, Margot" [UNKNOWN]) READ:UNKNOWN TO:"Sam Bodman (sbodman@doc.gov)" ("Sam Bodman (sbodman@doc.gov)" [UNKNOWN]) READ:UNKNOWN TO:"Paula Dobriansky (nelsondj2@state.gov)" ("Paula Dobriansky (nelsondj2@state.gov)" [UNKNOWN]) READ: UNKNOWN TO:John H. Marburger (CN=John H. Marburger/OU=OSTP/O=EOP@EOP [OSTP]) READ:UNKNOWN TO:James Connaughton (CN=James Connaughton/OU=CEQ/O=EOP@EOP [CEQ]) READ:UNKNOWN TO:"Emil Frankel (emil.frankel@ost.dot.gov)" ("Emil Frankel (emil. frankel@ost.dot.gov)" [UNKNOWN]) READ:UNKNOWN TO:"Steve Griles (steven_griles@ios.doi. gov)" ("Steve Griles (steven_griles@ios.doi.gov)" [UNKNOWN]) READ:UNKNOWN CC:"Viars, Joy" ("Viars, Joy" [UNKNOWN]) READ:UNKNOWN CC:Sue Stendebach (Sue Stendebach [UNKNOWN]) READ:UNKNOWN CC:Ron Bonjean (Ron Bonjean [UNKNOWN]) READ: UNKNOWN CC:Robert Sandoli (CN=Robert Sandoli/OU=OMB/O=EOP@EOP [OMB]) READ: UNKNOWN CC:Patrice Kortuem (Patrice Kortuem [UNKNOWN]) READ:UNKNOWN CC: Melinda Moore (Melinda Moore [UNKNOWN]) READ:UNKNOWN CC:Margarita Conkright Gregg (Margarita Conkright Gregg [UNKNOWN]) READ:UNKNOWN CC:Lu-ann Kleibacker (Lu-ann Kleibacker [UNKNOWN]) READ:UNKNOWN CC:Ko Barrett (Ko Barrett [UNKNOWN]) READ: UNKNOWN CC:Jobi A. Parrish (CN=Jobi A. Parrish/OU=OSTP/O=EOP@EOP [OSTP]) READ: UNKNOWN CC:"Dobriansky, Larisa" ("Dobriansky, Larisa" [UNKNOWN]) READ:UNKNOWN CC:Christine A. McDonald (CN=Christine A. McDonald/OU=OMB/O=EOP@EOP [OMB]) READ: UNKNOWN CC:Barbara Diehl (Barbara Diehl [UNKNOWN]) READ:UNKNOWN CC:Violanda Botet (Violanda Botet [UNKNOWN]) READ:UNKNOWN CC:Phil Cooney (CN=Phil Cooney/ OU=CEQ/O=EOP@EOP [CEQ]) READ:UNKNOWN CC:"Margaret Leinen (Mleinen@nsf. gov)" ("Margaret Leinen (Mleinen@nsf.gov)" [UNKNOWN]) READ:UNKNOWN CC:"John Beale (Beale.john@epa.gov)" ("John Beale (Beale.john@epa.gov)" [UNKNOWN]) READ:UNKNOWN CC:"Granville Paules (gpaules@hq.nasa.gov)" ("Granville Paules (gpaules@hq.nasa. gov)" [UNKNOWN]) READ:UNKNOWN CC:"Ann Klee (ann_klee@ios.doi.gov)" ("Ann Klee (ann_klee@ios.doi.gov)" [UNKNOWN]) READ:UNKNOWN CC:Vicki Horton (Vicki Horton [UNKNOWN]) READ:UNKNOWN CC:Vaughn Turekian (Vaughn Turekian [UNKNOWN])

READ:UNKNOWN CC:Sherron R. White (CN=Sherron R. White/OU=OMB/O=EOP@EOP [OMB]) READ:UNKNOWN CC:Roberta L. Conde (CN=Roberta L. Conde/OU=CEQ/O=EOP@EOP [CEQ]) READ:UNKNOWN CC:"Reifsynder, Daniel A. " ("Reifsynder, Daniel A. " [UNKNOWN]) READ:UNKNOWN CC:Pat Simms (Pat Simms [UNKNOWN]) READ:UNKNOWN CC:"Marlay, Robert" ("Marlay, Robert" [UNKNOWN]) READ:UNKNOWN CC:Lynn Scarlett (Lynn Scarlett [UNKNOWN]) READ:UNKNOWN CC:Linda Catlett (Linda Catlett [UNKNOWN]) READ: UNKNOWN CC:Joy Viars (Joy Viars [UNKNOWN]) READ:UNKNOWN CC:Jacqueline Schafer (Jacqueline Schafer [UNKNOWN]) READ:UNKNOWN CC:Debra White (Debra White [UNKNOWN]) READ:UNKNOWN CC:Betty James (Betty James [UNKNOWN]) READ: UNKNOWN CC:"Anderson, Margot" ("Anderson, Margot" [UNKNOWN]) READ:UNKNOWN CC:"Scott Rayder (Scott.Rayder@noaa.gov)" ("Scott Rayder (Scott.Rayder@noaa. gov)" [UNKNOWN]) READ:UNKNOWN CC:"Mary Cleave (Mcleave@hq.nasa.gov)" ("Mary Cleave (Mcleave@hq.nasa.gov)" [UNKNOWN]) READ:UNKNOWN CC:"Linda Lawson (linda. lawson@ost.dot.gov)" ("Linda Lawson (linda.lawson@ost.dot.gov)" [UNKNOWN]) READ: UNKNOWN CC:"James Mahoney (James.R.Mahoney@noaa.gov)" ("James Mahoney (James.R. Mahoney@noaa.gov)" [UNKNOWN]) READ:UNKNOWN CC:"Bill Hohenstein (whohenst@OCE. USDA.gov)" ("Bill Hohenstein (whohenst@OCE.USDA.gov)" [UNKNOWN]) READ:UNKNOWN CC:"Yvonne Brown (yvonne.brown@ost.dot.gov)" ("Yvonne Brown (yvonne.brown@ost.dot. gov)" [UNKNOWN]) READ:UNKNOWN TEXT: I wanted you to know that Secretary Evans is planning on briefly addressing the meeting tomorrow in his role as the incoming chair of the Cabinet Committee on Climate Change Science and Technology Integration (purple box). He is currently scheduled to speak at the beginning of the meeting. See you there. Bob - att1. htm========== ATTACHMENT 1 ========== ATT CREATION TIME/DATE: 0 00:00:00.00 TEXT:

I wanted you to know that Secretary Evans is plannin g on briefly addressing the meeting tomorrow in his role as the incoming chair of the Cabinet Committee on Climate Chan ge Science and Technology Integration (purple box). He is currently sched uled to speak at the beginning of the meeting. See you there. Bob

========== END ATTACHMENT 1 ==========

02/26/2004 16:50 FAX

CEQ
633 PC

U.S. Depar
Office of E
Research,
19901 Ger
[redacted]

facsimile transmittal

To: Phil Cooney Fax: 202-456-2710

From: Ari Patrinos Date: Feb 26, 2004

Re: Pages: 15

CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycl

[redacted]

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

June 15, 1989

MEMORANDUM FOR DISTRIBUTION

FROM: Robert E. Grady
Associate Director
Natural Resources, Energy, and Science

SUBJECT: Terms of Reference

The OMB has not received any specific recommendation to change the Terms of Reference (TOR) distributed at the May 24th Committee on Earth Sciences (CES) Principals meeting. Thus, the activities and responsibilities outlined in the TOR will govern the FY 1991 U.S. Global Change Research Program (USGCRP) budget process.

However, there were several CES member agency questions concerning the TOR that need further clarification, including:

- July 15th Submittal Date. The OMB recognizes that it may be difficult for several agencies to meet this deadline. However, the CES member agencies have agreed to retain this date since a later date would not allow sufficient time to prepare meaningful budget scenarios by September 1st. Although some agencies may not have formally approved budget submissions, CES member agencies are expected to submit program proposals by July 15th with the understanding that, if necessary, they may make adjustments before the CES recommendations are made to the OMB.

- Participation During July 15-September 1 CES Decisionmaking Process. There were some questions about sufficient agency representation during this process. As far as the OMB is concerned, this is a CES process controlled by the CES member agencies. The OMB will make itself available if needed, but the actual process and agency representation will be dictated by the CES agency members.

- Budget Negotiations. There is some confusion over whether the CES or member agencies will negotiate budgets with the OMB. The OMB anticipates receiving recommended budget scenarios from the CES and maintaining dialogues with the CES concerning those recommendations. However, the OMB will negotiate budgets with agencies only, not the CES.

- Non-U.S. Global Change Research Program Requests. Several agencies voiced concern that the CES should not be expected to evaluate programs outside the purview of the USGCRP. That is clearly the OMB understanding. Contributing programs will be submitted to the CES, but these and other related programs that are outside the USGCRP (non-focused programs) will be subject to the conventional OMB budget review process.

- Joint CES-OMB Budget Hearing. This will be similar to last year, although the CES member agency presentations will be made in the context of the research plan and priority framework. All CES member agencies will participate.

- Sensitivity of Budget Data. The FY 1991 budget data is embargoed from the public until after the release of the President's Budget to the Congress. Thus, it is incumbent on the CES member agencies to properly control budget information.

- Outyear Budget Information. The CES recommendations to the OMB must include budget estimates for FY 1990, FY 1991, and the outyears (FY 1992 through FY 1995).

- Future Years. Clearly, this process breaks with many aspects of the traditional budget process. The OMB expects that at the end of the FY 1991 process that the OMB and CES member agencies will review the effectiveness of this process and make any necessary and acceptable changes.

Distribution
Dallas Peck, DOI
Richard G. Johnson, OSTP
A. Alan Hill, CEQ
Frederick M. Bernthal, DOS
Beverly J. Berger, OSTP
Charles E. Hess, DOA
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Richard H. Truly, NASA
George Millburn, DOD
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Thomas P. Dungan, DOT
Erich Bloch, NSF
Harlan L. Watson, DOI

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

August 18, 1989

Dr. Dallas Peck
Chairman
Committee on Earth Sciences
U.S. Geological Survey
104 National Center
Reston, VA 22092

Dear Dr. Peck:

The purpose of this letter is to provide additional guidance on the development of options for the U.S. Global Change Research Program (USGCRP) FY 1991 budget, in accordance with the OMB-CES FY 1991 budget process Terms of Reference.

First, I would like to commend both you and all the CES member agency staff for the publishing of the research plan and the continuing FY 1991 budget review. I know that these efforts have been very challenging and labor intensive. The success of the CES is very important, not only for the U.S. Global Change Research Program but also as a model for interagency cooperation. We have received comments from a wide variety of communities, some that were originally very skeptical, that have come to realize the remarkable achievements of the CES. All of the CES member agency staff should be proud of these accomplishments. You can be sure that you have our full support for this important initiative.

As you know, we informally transmitted some budget options guidance roughly a week ago and have had a chance to receive some feedback from the CES on these possible options. This informal and iterative format has been very valuable, yet it is important at this point to provide a little more formal guidance.

Because of the large uncertainties surrounding the FY 1991 Federal budget, it is extremely important that the CES develop several possible funding options for the USGCRP. It is critical, no matter what the eventual funding profile, that the President can propose an effective program which can withstand the most rigorous external scientific review. The enclosure to this letter outlines four proposed funding options for FY 1991.

I understand that these options may be difficult to meet because of the two large research initiatives proposed by NASA and DOE for FY 1991. Conceptually, both of these programs can make important contributions to the USGCRP research effort. However, I believe that the CES should carefully consider alternative funding and scheduling options for both initiatives. In particular, I request that the CES work with NASA to develop intermediate options with lower FY 1991 costs and less technical risk. I also request that the CES carefully consider both the scientific merit and the readiness of the DOE proposal and work with DOE to develop intermediate options to defer a full commitment to the project until more detailed planning can be completed and the proposal subjected to a full external science review.

Thus, four budget options should be submitted to OMB on September 1, consistent with those outlined in the enclosure. The suggestions I have made regarding the two new initiatives should, if implemented, allow the CES to meet the intermediate budget option levels.

Again, I realize this is a difficult process. Please keep in mind that we will have additional opportunities to make further adjustments during the budget process. However, we need these options to understand what can be accomplished scientifically for a given spectrum of possible budget scenarios. Dr. Bromley concurs with this position. Although time is short, we stand ready to work with you in anyway possible to make this process a success.

Sincerely,

Robert E. Grady
Associate Director, Natural Resources, Energy, and Science

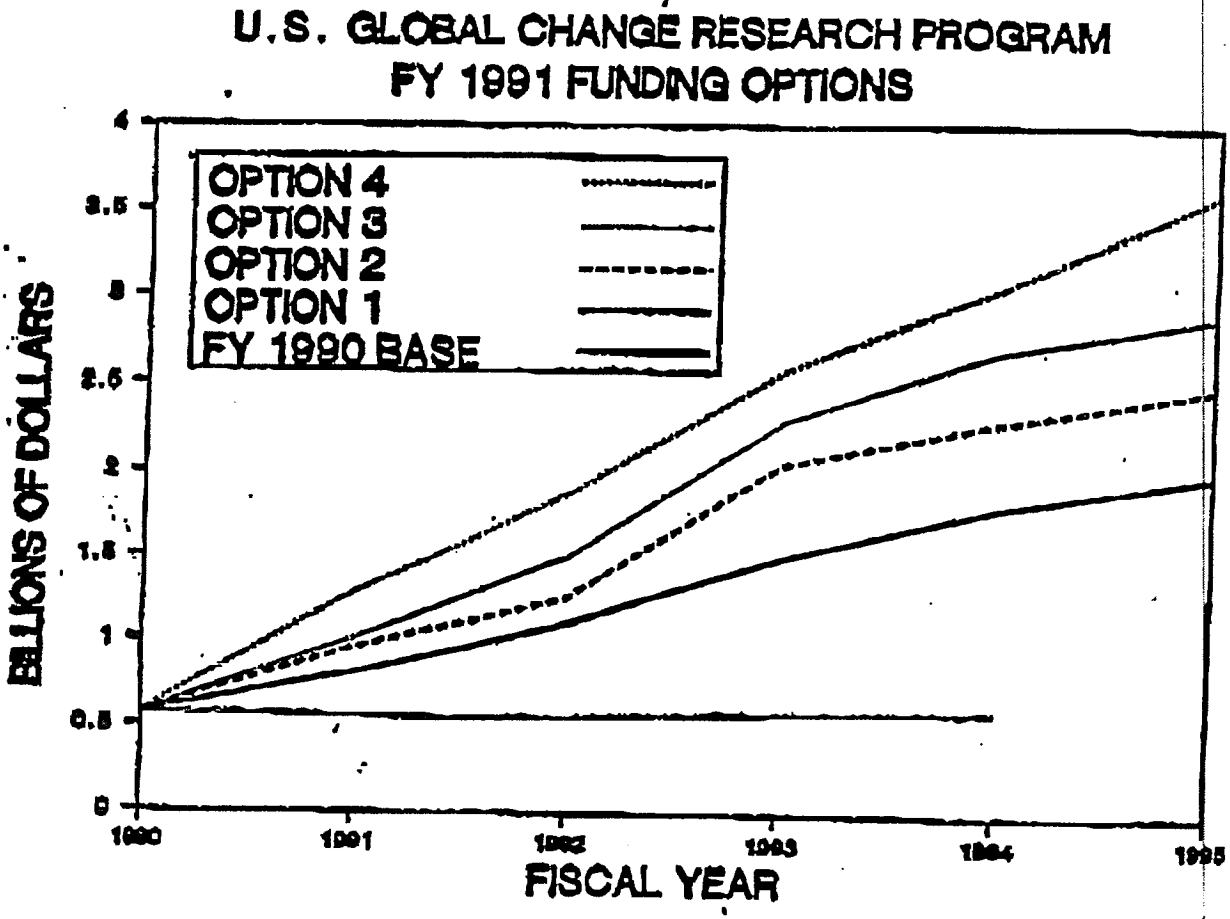
Enclosure

cc:
D. Allan Bromley
Richard G. Johnson
Frederick M. Bernthal
Erich Bloch
Erich Bretthauer
Travis P. Dungan
Charles E. Kess
A. Alan Hill
Robert O. Hunter, Jr.
George Millburn
Melvin N.A. Peterson
Richard Truly
Harlan Watson

ENCLOSURE

U.S. GLOBAL CHANGE RESEARCH PROGRAM
FY 1991 FUNDING OPTIONS
(DOLLARS IN MILLIONS)

	1990	1991	1992	1993	1994	1994
FY 1990 BASE	573	555	558	586	601	
OPTION ONE	573	600	1100	1500	1800	2000
OPTION TWO	573	950	1250	2050	2300	2500
OPTION THREE	573	1000	1500	2300	2700	2900
OPTION FOUR	573	1272	1877	2588	3060	3610



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

JUN 18 1990

MEMORANDUM FOR DISTRIBUTION

FROM: ROBERT E. GRADY
ASSOCIATE DIRECTOR
NATURAL RESOURCES, ENERGY, AND SCIENCE

SUBJECT: FY 1992 U.S. GLOBAL CHANGE RESEARCH PROGRAM

As the Committee on Earth and Environmental Sciences (CEES) begins its interagency planning process for the FY 1992 U.S. Global Change Research Program (USGCRP), I thought it would be appropriate to let you know that the OMB continues to support the review of global change research budgets on a comprehensive, interagency basis. At the recent OMB-CEES review of last year's USGCRP planning and budget process, it was clear that your agency also continues to support the USGCRP planning process and I want to thank you for this commitment.

Attached to this memorandum is the proposed Terms of Reference (TOR) for the FY 1992 budget process. I want to call to your attention several principal features of the TOR:

- Agency budget requests should clearly and directly support the goals, objective, and research priorities outlined in the USGCRP.

- Agencies are requested to submit their budget proposals to the CEES by July 2, 1990, to permit an early review and integration of the budget proposals by the CEES.

- The CEES will develop a series of options for OMB review in the FY 1992 budget process.

I also want to call to your attention a modification to this year's TOR designed to improve the crosswalk between USGCRP budget recommendations and the traditional agency submissions to the OMB.

As we begin the FY 1992 planning cycle, I want to again thank you for your participation in this important interagency research program and underscore the importance of your immediate attention to the planning process outlined in the TOR. Please provide any comments on the TOR to Jack Fellows by June 22, 1990 (395-3935/ FAX 395-4817).

Enclosure

U.S. Global Change Research Program
FY 1992 Budget Process Terms of Reference

The purpose of this terms of reference (TOR) is to outline the roles and responsibilities of the participants in the U.S. Global Change Research Program FY 1992 budget process.

Agency Responsibilities

- Agency budget requests for FY 1992 should be described and justified relative to the goals, objectives, and research priorities outlined in the U.S. Global Change Research Program (USGCRP).
- The agencies should submit to the Committee on Earth and Environmental Sciences (CEES) their budget requests and supporting documentation, as reviewed by their respective departments, no later than July 2, 1990.
- The agencies should also develop 5-year budget projections (FY 1992-1996) consistent with the FY 1992 budget proposals.
- Each agency must provide their agency's OMB Budget Examiner with an effective crosswalk between their agency's budget submission to the OMB and the CEES USGCRP recommendations to the OMB September 4, 1990.

CEES Responsibilities

- The CEES will review and integrate the agency requests into a unified budget that reflects the goals, objectives, and research priorities outlined in the USGCRP.
- The CEES will prepare a series of incremental budget options from the current FY 1991 funding level of $1034 million up to the full FY 1992 CEES member agency request in increments to be negotiated between the CEES and OMB.
- The CEES will advise the agencies of the budget options and the CEES recommendation by August 17, 1990, for final consideration by the agencies prior to submission of the agency's budget request to OMB.
- The CEES will present the budget options and recommendations for the FY 1992 USGCRP on September 4, 1990.
- Upon completion of the budget process, the CEES will prepare a special report to Congress and the public on the FY 1992 budget for the USGCRP, to be released concurrently with the President's FY 1992 budget.

OMB Responsibilities

- The OMB will not support any USGCRP budget requests that are not responsive to the goals, objectives, and research priorities outlined in the USGCRP.

- The OMB will hold a joint CEES-OMB budget hearing to review the USGCRP FY 1992 budget and proposals and priorities.

- OMB staff will prepare a consolidated USGCRP budget review presentation for senior OMB officials, and obtain a decision on an overall Government-wide funding level for the USGCRP. Funding decisions on the USGCRP will be independent of any other program and budget issues in the CEES member agency budget requests.

- The USGCRP passback and reclama process will be concurrent with both the CEES and individual agency members.

- The OMB will highlight the USGCRP in the FY 1992 President's budget documents.

DISTRIBUTION

CEES Principals
Dallas Peck
Robert Corell
Nancy Maynard
Erich Bloch
Erich W. Bretthauer
Mark Dowis
Charles E. Hess
Michael Deland
David B. Nelson
George Millburn
John Knauss
J.R. Thompson
Lennard A. Fisk
Harlan L. Watson
Peter Jon de Vos
Robert Hoffman

Agency Budget officers
Tom Campbell
Andy Moxan
Sandra Toye
Del Mayhew
Terry Grindstaff
Anthony Ittelag
Mike Young
David Hoehn

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

AUG 2- 1990

Dr. Dallas Peck
Chairman
Committee on Earth Sciences
U.S. Geological Survey
104 National Center
Reston, VA 22092

Dear Dr. Peck:

The purpose of this letter is to provide FY 1992 budget option guidance for the U.S. Global Change Research Program (USGCRP), in accordance with the USGCRP FY 1992 Terms of Reference.

First, I would like to commend both you and all the CES member agency staff for the publishing of the FY 1992 USGCRP document in January and the continuing FY 1992 budget review. I know that these efforts have been very intensive and time consuming. As I mentioned last year, the success of the USGCRP is very important, not only as a mechanism to support the scientific research and policy issues related to global change, but also as a model of interagency cooperation. You should be proud of your efforts and know that you have our full support.

As you know, we have been working informally with the CES on budget option guidance over the last several weeks. This discussion has resulted in five options we would like the CES to develop and analyze for the FY 1992 budget (see Figure 1 and 2). In addition, the CES must identify a recommended option but is also free to create other options as deemed appropriate. However, it is our sense that it would be better to focus on a small number of well-defined and thoroughly-analyzed options.

Because of the current deficit situation and the uncertainty surrounding the outcome of the Budget Summit process, it is important that the CES carefully analyze a broad range of options, including several that would only maintain or reduce current funding levels. Please do not interpret the need to analyze these lower options as a loss of support for the USGCRP. As you know, the Administration strongly supports the USGCRP and would be very reluctant to take such actions. Yet, such action may be necessary if major budget cutbacks were being experienced across all Federal programs.

Careful analysis of these options is needed to more fully understand what can be accomplished scientifically for a given spectrum of possible budget scenarios. Dr. Bromley concurs with this position and the need for a broad range of options. I realize this is a difficult process for the CES, but please keep in mind that we will have opportunities to make adjustments during the budget process. Although time is short, we stand ready to work with you in anyway possible to make this process a success.

Thank you for your assistance.

Sincerely,

Robert E. Grady
Associate Director
Natural Resources,
Energy, and Science

Enclosures

cc: CES Principals

Figure 1
FY 1992 USGCRP Budget Option Descriptions

- Option 1: Ten percent Decrease. This option would recognize a long-term, constrained budget environment. The program goals, objectives, and projects would have to be reexamined to address only the highest priority policy and scientific needs. Funding would likely remain below the billion level for the rest of the USGCRP lifetime.

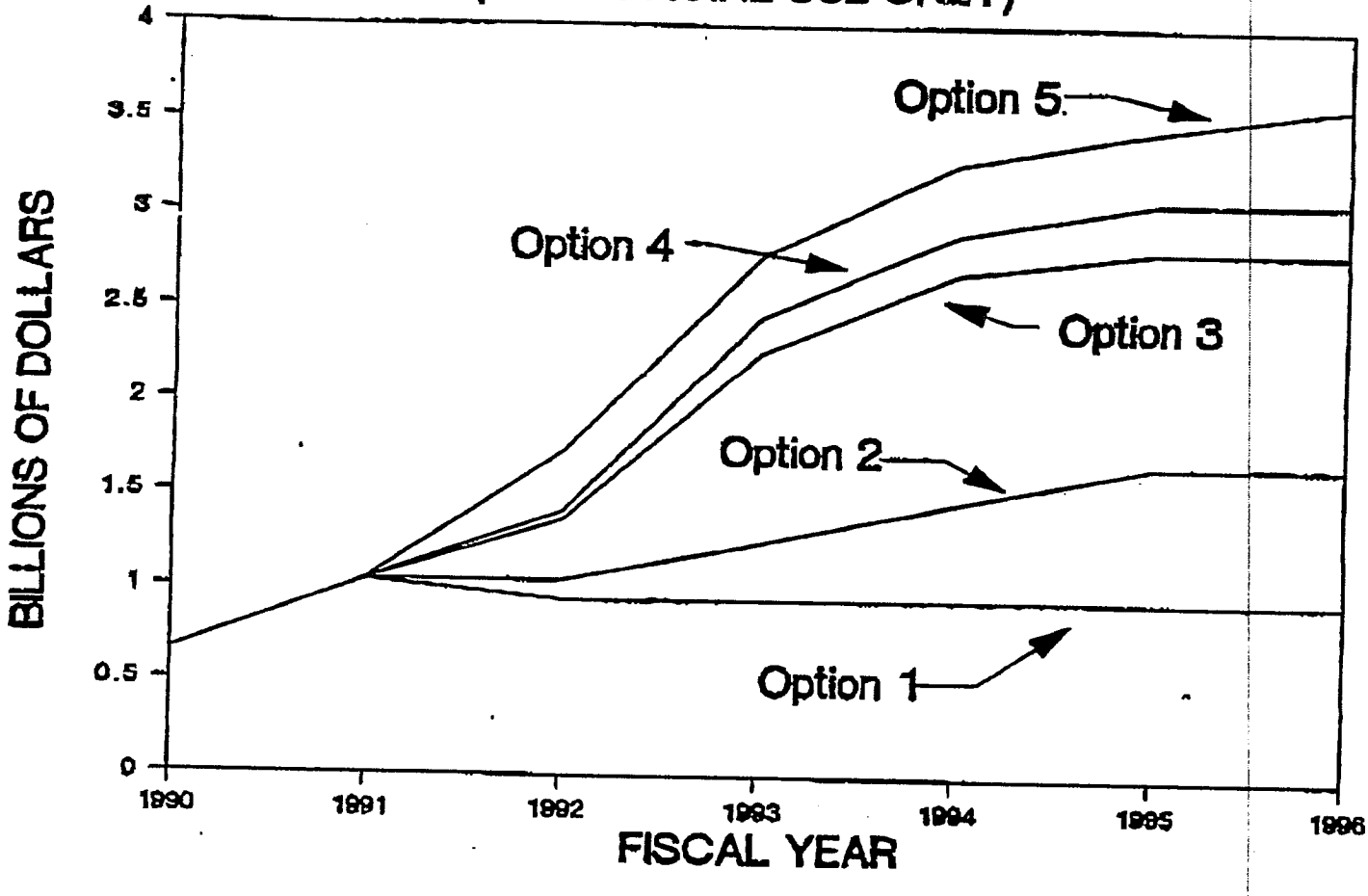
- Option 2: FY 1991 Freeze. Some programs may need to be terminated or deferred. For FY 1992, funds would be frozen at the FY 1991 level with increases in the outyears. The FY 1992 funding level would include $794 million for non-EOS activities, plus enhancements to Earth Probes and ground-based activities. The balance between space and ground-based activities would be maintained. Under this option, EOS would need to be restructured into a program consisting of a series of smaller satellites (i.e., an enhanced Earth Probes series).

- Option 3: FY 1991 President's Budget. Funding targets would be consistent with those planned in the FY 1991 President's Budget.

- Option 4: FY 1991 Option 3. Funding targets would be consistent with the outyear projections in FY 1991 USGCRP Option 3.

- Option 5: Full FY 1992 Request. This option would reflect the full CES member agency requests.

US GLOBAL CHANGE RESEARCH PROGRAM
FY 1992 BUDGET OPTIONS
(FOR OFFICIAL USE ONLY)



(Dollars in Millions)

	1990	1991	1992	1993	1994	1995	1996
1	659	1,034	931	931	931	931	931
2	659	1,034	1,034	1,237	1,453	1,664	1,666
3	659	1,034	1,358	2,257	2,675	2,800	2,800
4	659	1,034	1,402	2,442	2,886	3,065	3,065
5	659	1,034	1,726	2,770	3,270	3,452	3,600

1 10% cut from FY 1991 PB
2 Freeze (EarthProbes/Ground Based Enhancement, no EOS)
3 FY 1991 President's Budget
4 FY 1991 Option 3
5 Full FY 1992 Request

Figure 2

Spent CEQ 451 PC

Issues for Discussion
IWG Climate Communications Group

I. Calendar

March

- 2 Atlantic Monthly Forum, "The Future of Science Journalism: Challenges in the Public's Understanding and Acceptance of Scientific Achievements" – DOE Dep Sec McSlarrow, OSTP Dir. Marburger are panelists
- 3, 4, 11, 17, 24 House and Senate DOE Appropriations hearings - climate change technology discussion possible
- 8 Aspen Institute (closed)
- 22-?? - Senate energy bill floor debate – climate change discussion possible

April

- 22 "Earth Day"
- 30 Climate Change Technology Program Strategic Plan Draft release

May

- 28 Movie release: The Day After Tomorrow. "This movie takes a big-budget, special-effects-filled look at what the world would look like if the greenhouse effect and global warming continued at such levels that they resulted in worldwide catastrophe and disaster, including multiple hurricanes, tornadoes, earthquakes, tidal waves, floods and the beginning of the next Ice Age. At the center of the story is paleoclimatologist Professor Adrian Hall (Dennis Quaid), who tries to save the world from the effects of global warming."

U.S. UK G-8

June

- 1-4 German Renewable Energy Conference
- 16-25 UNFCCC Subsidiary Body meetings (Bonn)
- TBD Earth Observation System Framework draft released
- [redacted]
- Spring & Fall 2004: Arctic Climate Impact Assessment (ACIA)

II. Likely news generators – no specific date

- 1605(b) process
- Science plan execution
- Barton Clear Skies hearings
- Litigation on carbon dioxide
- New Institute

III. Possible announcements/events

- Climate VISION
- Methane →
- Solar
- Wind
- Eqip

Future GEN Contract Award
Initiative Against Illegal
Hydrogen contract

2/27/2004

000953

CEQ 005939

II. M. 19

Cooney, Phil

From: Hannegan, Bryan J.
Sent: Saturday, February 28, 2004 11:28 PM
To: Perino, Dana M.; Holbrook, William F.; Cooney, Phil
Subject: Fw: Revised Talking Poins and Advisory for GHG Inventory

Will be released on Monday. FYI.

Bryan Hannegan
Associate Director for Energy and Transportation
Council on Environmental Quality

-----Original Message-----
From: Krieger.Jackie@epamail.epa.gov <Krieger.Jackie@epamail.epa.gov>
To: Hannegan, Bryan J. <Bryan_J._Hannegan@ceq.eop.gov>
Sent: Fri Feb 27 17:01:02 2004
Subject: Revised Talking Poins and Advisory for GHG Inventory

2002BY Public Comment Press Ad..

Bryan - Here are the talking points and press advisory. Phil had reviewed them a couple of weeks ago and his comments were incorporated.

(See attached file: 2002BY Public Comment GHG Talking Points (final).doc)(See attached file: 2002BY Public Comment Press Advisory (final).doc)

001874

U.S. GREENHOUSE GAS INVENTORY RELEASED FOR PUBLIC COMMENT

February 25, 2004

The U.S. Environmental Protection Agency (U.S. EPA) has released a draft version of the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2002* for a 30-day public comment period. The major finding in this year's report is that overall emissions increased slightly by 0.7 percent from 2001 to 2002. This increase was due primarily to moderate economic growth in 2002 that increased demand for electricity and fossil fuels. A secondary contributor included hot summer conditions in 2002, which also increased demand for electricity and fossil fuels. Overall, total U.S. emissions have risen by 13 percent from 1990 to 2002, while the U.S. economy has grown by 43 percent over the same period.

Total emissions of the six main greenhouse gases were 6,934 million metric tons of carbon dioxide equivalent in 2002. These gases include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Fossil fuel combustion was the largest source of emissions, accounting for 81 percent of the total.

The *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2002* is prepared annually by the EPA, in collaboration with experts from a dozen other federal agencies, and is one of the most comprehensive analyses of greenhouse gases in the world. After EPA completes a final version of the document, the Department of State will submit the *Inventory* to the United Nations Framework Convention on Climate Change (UNFCCC).

A Federal Register notice announcing a 30-day public comment period on the report was published on February 25, 2004. The report is available at:
www.epa.gov/globalwarming/publications/emissions

For technical information, please contact Leif Hockstad at 202-343-9432 or Lisa Hanle at 202-343-9434.

Sec.

Cond

Cooney, Phil

I.M. 24

From: Perino, Dana M.

Sent: Friday, March 05, 2004 8:03 AM

To: Connaughton, James; Cooney, Phil; Hannegan, Bryan J.; Peel, Kenneth L.; Holbrook, William F.; Boyd, Allison

Subject: WSJ: Bush's Potential Policy Switch on CO2 Credits is Drawing Fire

March 5, 2004

Mou

ECONOMY

Bush's Potential Policy Switch On C(O2) Credits Is Drawing Fire

By JEFFREY BALL
Staff Reporter of THE WALL STREET JOURNAL

The Bush administration and some big companies are at odds over the terms of a voluntary system for cutting greenhouse-gas emissions amid concerns that too aggressive an approach could open the door to mandatory emission rules down the road.

At issue is whether companies should be rewarded for past cleanup efforts with credits that could be traded with other companies. Opponents of mandatory emissions rules have warned that such a system would lead inexorably to limits under future administrations.

Two years ago, the Bush administration promised the system of credits to reward companies for past and present efforts to curb their emissions of carbon dioxide, the chief suspected global-warming gas. But now the administration appears to be retreating from that position, saying it no longer believes it has the legal authority to create the system of credits. Companies that had been counting on receiving tradable credits are irate.

The apparent policy switch highlights the political tightrope walk the administration is attempting on global warming. Although virtually no U.S. companies support mandatory global-warming restrictions, some -- especially the electric-utility industry, which relies largely on C(O2)-emitting coal to power businesses and homes -- are convinced they will be hit with them eventually. So they have been making voluntary C(O2)-emission cuts for several years, from planting C(O2)-eating trees as emissions "offsets," to trying to make their plants more fuel-efficient.

"These companies have, in good faith, made these voluntary efforts in some cases for as many as 10 years" to curb their emissions, said William Fang, climate-issue director for the Edison Electric Institute, whose members own most private U.S. power plants. "If they don't get something for their past efforts, what's the incentive going forward to continue these actions?"

Those opposed to credits argue that companies that could most easily reduce their emissions, and generate extra credits, would start lobbying for mandatory limits that would boost the market value of their credits. Tradable credits would "divide and conquer the business community," said Marlo Lewis, senior fellow in environmental policy for the Competitive Enterprise Institute, a conservative Washington think tank.

In the European Union, which is preparing for the emissions-restricting Kyoto Protocol, a nascent market in global-warming permits already is operating, with a license to emit one ton of C(O2) fetching about €13, or about $16. A U.S. market in global-warming credits opened last year, but because there is little chance of federal limits in the next few years, prices in that market, the Chicago Climate Exchange, are only about $1 a ton.

The dispute over U.S. credits centers on a Department of Energy database created to encourage companies to make and register voluntary C(O2) cuts. Launched during the Clinton administration, when negotiations were heating up over the international treaty that later became the Kyoto Protocol, the registry came under criticism from environmentalists who said its rules were so lax that it amounted to little more than a platform for companies wanting to project a green image. So in 2002, even as President Bush announced his voluntary approach to global warming, he vowed to make the registry's rules more rigorous.

But in January, at a workshop on the administration's proposed changes to the registry, an Energy Department official said the department's attorneys had concluded that they lacked "explicit authority" to set up tradable credits. Following the criticism that announcement sparked, an Energy Department spokeswoman said last week that the department hasn't made an official decision on the matter.

Write to Jeffrey Ball at jeffrey.ball@wsj.com[1]

URL for this article:
http://online.wsj.com/article/0,,SB107844478708947107,00.html

Hyperlinks in this Article:
(1) mailto:jeffrey.ball@wsj.com

Updated March 5, 2004

From: William Holbrook [wfholbrook@att.net]
Sent: Sunday, March 07, 2004 8:17 AM
To: Perino, Dana M.; Connaughton, James; Hopkins, Robert; Cooney, Phil; Hannegan, Bryan J.; Peel, Kenneth L.; Onley, Kameran L.; Boyd, Allison
Cc: Holbrook, William F.
Subject: Abraham letter - The Washington Post

The Washington Post

'Sound Science,' Climate Change and Policy Choices

Sunday, March 7, 2004; Page B06

In "Beware 'Sound Science.' It's Doublespeak for Trouble" [Outlook, Feb. 29], Chris Mooney engages in more than a little doublespeak himself and does what he accuses the Bush administration of doing -- twisting reality to fit his preferred hypothesis.

Mr. Mooney claims that the 2001 National Academy of Sciences (NAS) report on climate change embarrassed the administration that commissioned it. This is nonsense. The administration is well aware of the scientific consensus that temperatures have warmed partly due to human activity.

But acknowledging consensus is a far cry from implying, as Mr. Mooney does, that our understanding of climate change is complete. Indeed, the same report also noted that "a causal linkage between the buildup of greenhouse gases in the atmosphere and the observed climate changes during the 20th century cannot be unequivocally established," and it identified a number of scientific areas that need further study to advance our understanding of climate change and support policy decisions.

The administration's Climate Change Science Program strategic plan, released in July 2003, addresses many recommendations from the NAS report and is designed to accelerate research on the most important uncertainties in climate science. An extensive review of the plan just published by the NAS, and ignored by Mr. Mooney, commends the program for seeking input from a broad array of scientists and stakeholders and concludes that "advancing science on all fronts identified by the program will be of vital importance to the nation."

SPENCER ABRAHAM

Secretary of Energy

Washington

From: William Holbrook [wfholbrook@att.net]
Sent: Thursday, March 11, 2004 7:00 AM
To: Hopkins, Robert; Perino, Dana M.; Connaughton, James; Cooney, Phil; Boyd, Allison; Silverberg, Kristen; Peel, Kenneth L.; Hannegan, Bryan J.; Onley, Kameran L.
Cc: Holbrook, William F.
Subject: NYT: Marburger letter

The New York Times

March 11, 2004, Thursday, Late Edition - Final

SECTION: Section A; Page 28; Column 4; Editorial Desk

LENGTH: 214 words

HEADLINE: Bush's Science Policy

BODY:

To the Editor:

"Uses and Abuses of Science" (editorial, Feb. 23) portrays the management of science in this administration even more unfairly than the overheated document from the Union of Concerned Scientists that prompted it.

Contrary to your editorial, President Bush clearly articulated the relationship between greenhouse gases and human activity in June 2001, stating that concentration of greenhouse gases, especially carbon dioxide, has increased substantially since the beginning of the Industrial Revolution.

That speech launched programs to accelerate **climate change** science and technology to address remaining uncertainties in the science, develop adaptation and mitigation mechanisms and invest in clean energy technologies to reduce more emissions in the future. In 2004, the United States will spend approximately $4 billion in **climate change** science and technology research.

This administration has a strong record of seeking scientific advice from competent and unbiased sources.

We welcome sincere efforts to make the advisory process even stronger.

JOHN H. MARBURGER III
Washington, March 4, 2004

The writer is science adviser to the president and director of the Office of Science and Technology Policy.

http://www.nytimes.com

003358

Robert.Stein@do.treas.gov

Mark.Warshawsky@ [illegible] 622-2200

Office of Econ. Policy

622 2584

To: Bryan
here's the Treasury
contact for 1605(b)
program meeting
3/11/04

#1 Go ahead & Simple message keep working case by case

#2 ~~Wait~~

Find a way to wait → back them off

Hannegan, Bryan J.

From: Towcimak, Natalie
Sent: Thursday, March 11, 2004 12:49 PM
To: Cooney, Phil; Hannegan, Bryan J.
Subject: Agency attendees for meeting....

EPA: ✓ ✓
Johnson and A. Farrell will attend

USDA: ✓
Mark Rey will attend (Phil--Did he work out his "plus 1" situation?)

STATE: ✓
Dobrianksy & Watson will attend

DOT: Shane ✓
Emil Frankel will attend only

DOI: Griles (out of town) ✓
Jim Cason and Chris Kearney will attend

TREAS: Bodman ✓
No one will attend from Treasury

Deal NSC
Gayer CEA
Noe OMB → + new examiner
Burgeson CAB AFF
O'Donovan OVP
Stidvent CEQ
Boyd DPC

Greenhouse Effects/1605(b)
Public Workshop 3/11/03

004268

Robert.Stein@do.treas.gov

Mark.Warshawsky@ [illegible] 622-2200

Office of Econ. Policy

622 2584

To: Bryan
here's the Treasury
contact for 1605(b)
program meeting
3/11/04

Hannegan, Bryan J.

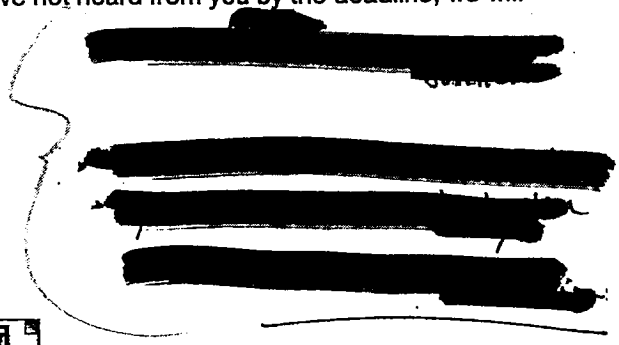
From: Towcimak, Natalie
Sent: Monday, March 15, 2004 5:30 PM
To: Hannegan, Bryan J.
Cc: Peel, Kenneth L.; Cooney, Phil
Subject: FW: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Bryan--Comments due by 3 pm on Thursday, 3/18. Thanks!

-----Original Message-----
From: Weinberg, Jeffrey A.
Sent: Monday, March 15, 2004 4:28 PM
To: usdaobpaleg@obpa.usda.gov; Ceq Lrm; dodlrs@dodgc.osd.mil; epalrm@epamail.epa.gov; ocl@ios.doi.gov; NASA_LRM@hq.nasa.gov; lrm@nsf.gov; Ostp Lrm; state-lrm@state.gov; dot.legislation@ost.dot.gov
Cc: Whgc Lrm; Ovp Lrm; Nec Lrm; Peacock, Marcus; White, Sherron R.; Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Woglom, Emily; Sandoli, Robert; Robinson, Donovan O.; Rossman, Elizabeth L.; Petrosino, Nicole; Lobrano, Lauren C.; Cooney, Phil; Joseffer, Daryl L.; Sell, Clay; O'Donovan, Kevin M.; Miers, Harriet; Stidvent, Veronica V.; Elyse H. Fitter/OMB/EOP@EOP; Green, Richard E.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

S. 1164 has been ordered reported by the Senate Commerce Committee.



S 1164 views to omb 3-15-04.wp...

- S 1164 views to omb 3-15-04.wpd

S 1164 Letter Enclosure - Abru...

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
OMB CONTACT: Jeffrey A. Weinberg
E-Mail: Jeffrey_A._Weinberg@omb.eop.gov
PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: **COMMERCE Letter on S1164 Abrupt Climate Change Research Act**

DEADLINE: **3PM Thursday, March 18, 2004**
In accordance with OMB Circular A-19, OMB requests the views of your agency on the above subject before advising on its relationship to the program of the President. Please advise us if this item will affect direct spending or receipts.

004224

CEQ 005957
Climate Change Research Act

COMMENTS:

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032-ENERGY - Al Beer - (202) 586-4312
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Elyse H. Fitter
Richard E. Green

LRM ID: JAW192 SUBJECT: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

RESPONSE TO
LEGISLATIVE REFERRAL
MEMORANDUM

If your response to this request for views is short (e.g., concur/no comment), we prefer that you respond by e-mail or by faxing us this response sheet.

You may also respond by:
(1) calling the analyst/attorney's direct line (you will be connected to voice mail if the analyst does not answer); or
(2) faxing us a memo or letter.
Please include the LRM number and subject shown above.

TO: Jeffrey A. Weinberg Phone: 395-3457 Fax: 395-3109
Office of Management and Budget

FROM: _____ (Date)

_____ (Name)

_____ (Agency)

_____ (Telephone)

The following is the response of our agency to your request for views on the above-captioned subject:

_____ Concur

_____ No Objection

_____ No Comment

_____ See proposed edits on pages _____

_____ Other: _____

_____ FAX RETURN of _____ pages, attached to this response sheet

Hannegan, Bryan J.

From: Cooney, Phil
Sent: Monday, March 15, 2004 8:59 PM
To: Hannegan, Bryan J.
Subject: Fw: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

-----Original Message-----
From: Joseffer, Daryl L. <djoseffe@OMB.eop.gov>
To: Cooney, Phil <Phil_Cooney@ceq.eop.gov>; Boyd, Allison <Allison_Boyd@opd.eop.gov>
CC: Newstead, Jennifer G. <JNewstea@omb.eop.gov>
Sent: Mon Mar 15 19:45:46 2004
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Phil and Allison,

[redacted]

---------- Forwarded by Daryl L. Joseffer/OMB/EOP on 03/15/2004 07:45 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM
Record Type: Record

To: See the distribution list at the bottom of this message
cc: See the distribution list at the bottom of this message
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

S. 1164 has been ordered reported by the Senate Commerce Committee.

S 1164 views to omb 3-15-04.wp...

- S 1164 views to omb 3-15-04.wpd <<S 116 views to omb 3-15-04.wpd>>

Climate Change Research Act

004223

CEQ 005961

Hannegan, Bryan J.

From: Cooney, Phil
Sent: Monday, March 15, 2004 8:59 PM
To: Hannegan, Bryan J.
Subject: Fw: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 385

-----Original Message-----
From: Joseffer, Daryl L. <djoseffe@OMB.eop.gov>
To: Cooney, Phil <Phil_Cooney@ceq.eop.gov>; Boyd, Allison <Allison_Boyd@opd.eop.gov>
CC: Newstead, Jennifer G. <JNewstea@omb.eop.gov>
Sent: Mon Mar 15 19:45:46 2004
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Phil and Allison,

[redacted]

---------- Forwarded by Daryl L. Joseffer/OMB/EOP on 03/15/2004 07:45 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM
Record Type: Record

To: See the distribution list at the bottom of this message
cc: See the distribution list at the bottom of this message
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

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S 1164 views to omb 3-15-04.wp...

- S 1164 views to omb 3-15-04.wpd <<S 116 views to omb 3-15-04.wpd>>

Climate Change Research Act

004237

CEQ 005963

Hannegan, Bryan J.

From: Hannegan, Bryan J.
Sent: Tuesday, March 16, 2004 6:11 PM
To: Weinberg, Jeffrey A.
Cc: Peel, Kenneth L.; Cooney, Phil; Towcimak, Natalie; Stidvent, Veronica V.; Boyd, Allison; Sell, Clay; O'Donovan, Kevin M.; Halpern, David; Gayer, Ted; Joseffer, Daryl L.; Peacock, Marcus; Green, Richard E.
Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Bryan Hannegan
CEQ

-----Original Message-----
From: Weinberg, Jeffrey A.
Sent: Monday, March 15, 2004 4:28 PM
To: usdaobpaleg@obpa.usda.gov; Ceq Lrm; dodlrs@dodgc.osd.mil; epalrm@epamail.epa.gov; od@ios.doi.gov; NASA_LRM@hq.nasa.gov; lrm@nsf.gov; Ostp Lrm; state-lrm@state.gov; dot.legislation@ost.dot.gov
Cc: Whgc Lrm; Ovp Lrm; Nec Lrm; Peacock, Marcus; White, Sherron R.; Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Woglom, Emily; Sandoli, Robert; Robinson, Donovan O.; Rossman, Elizabeth L.; Petrosino, Nicole; Lobrano, Lauren C.; Cooney, Phil; Joseffer, Daryl L.; Sell, Clay; O'Donovan, Kevin M.; Miers, Harriet; Stidvent, Veronica V.; Elyse H. Fitter/OMB/EOP@EOP; Green, Richard E.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

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- S 1164 views to omb 3-15-04.wpd << File: S 1164 views to omb 3-15-04.wpd >>

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc << File: S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc >>

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
OMB CONTACT: Jeffrey A. Weinberg

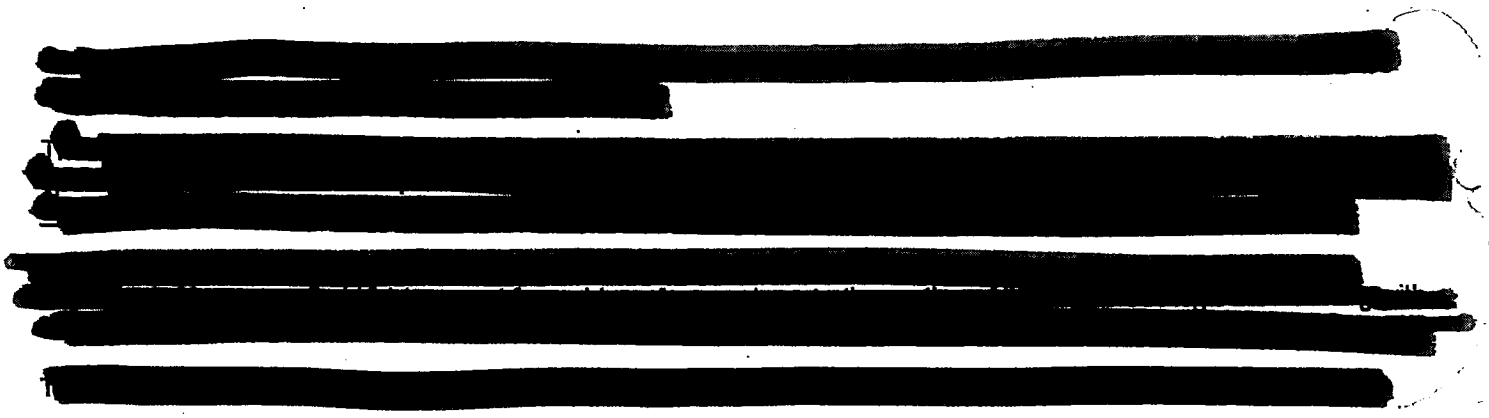
004239

Climate Change Research Act

CEQ 005965

Hannegan, Bryan J.

From: Hannegan, Bryan J.
Sent: Tuesday, March 16, 2004 6:11 PM
To: Weinberg, Jeffrey A.
Cc: Peel, Kenneth L.; Cooney, Phil; Towcimak, Natalie; Stidvent, Veronica V.; Boyd, Allison; Sell, Clay; O'Donovan, Kevin M.; Halpern, David; Gayer, Ted; Joseffer, Daryl L.; Peacock, Marcus; Green, Richard E.
Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act



Bryan Hannegan
CEQ

-----Original Message-----
From: Weinberg, Jeffrey A.
Sent: Monday, March 15, 2004 4:28 PM
To: usdaobpaleg@obpa.usda.gov; Ceq Lrm; dodlrs@dodgc.osd.mil; epalrm@epamail.epa.gov; od@ios.doi.gov; NASA_LRM@hq.nasa.gov; lrm@nsf.gov; Ostp Lrm; state-lrm@state.gov; dot.legislation@ost.dot.gov
Cc: Whgc Lrm; Ovp Lrm; Nec Lrm; Peacock, Marcus; White, Sherron R.; Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Woglom, Emily; Sandoli, Robert; Robinson, Donovan O.; Rossman, Elizabeth L.; Petrosino, Nicole; Lobrano, Lauren C.; Cooney, Phil; Joseffer, Daryl L.; Sell, Clay; O'Donovan, Kevin M.; Miers, Harriet; Stidvent, Veronica V.; Elyse H. Fitter/OMB/EOP@EOP; Green, Richard E.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

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- S 1164 views to omb 3-15-04.wpd << File: S 1164 views to omb 3-15-04.wpd >>

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc << File: S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc >>

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
OMB CONTACT: Jeffrey A. Weinberg

Hannegan, Bryan J.

From: Weinberg, Jeffrey A.
Sent: Thursday, March 18, 2004 9:41 AM
To: Hannegan, Bryan J.
Cc: Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Joseffer, Daryl L.; Green, Richard E.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Bryan,

Thank you for your comments on the Commerce letter on S. 1164

[redacted]

Climate Change Research Act

004218

Hannegan, Bryan J.

From: Weinberg, Jeffrey A.
Sent: Thursday, March 18, 2004 9:41 AM
To: Hannegan, Bryan J.
Cc: Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Joseffer, Daryl L.; Green, Richard E.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Bryan,

Thank you for your comments on the Commerce letter on S. 1164

[redacted]

Rationale:

[redacted]

B5

Revision to first paragraph:

[redacted]

Climate Change Research Act

214

004233

Hannegan, Bryan J.

From: Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Thursday, March 18, 2004 10:48 AM
To: Hannegan, Bryan J.
Subject: Re: abrupt climate change bill

[redacted]

"Hannegan, Bryan J." wrote:

[redacted]

Climate Change Research Act

004217

Hannegan, Bryan J.

From: Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Thursday, March 18, 2004 10:48 AM
To: Hannegan, Bryan J.
Subject: Re: abrupt climate change bill

[redacted]

"Hannegan, Bryan J." wrote:

[redacted]

Climate Change Research Act

004232

Hannegan, Bryan J.

From: Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Thursday, March 18, 2004 11:01 AM
To: Hannegan, Bryan J.
Subject: Re: abrupt climate change bill

I had ot seen this one. Can you fax to me? Is it from Mahoney?

"Hannegan, Bryan J." wrote:

[redacted] B5

-----Original Message-----
From: Scott Rayder [mailto:Scott.Rayder@noaa.gov]
Sent: Thursday, March 18, 2004 10:48 AM
To: Hannegan, Bryan J.
Subject: Re: abrupt climate change bill

[redacted]

"Hannegan, Bryan J." wrote:

[redacted]

Climate Change Research Act

004216

CEQ 005977

3/19/2004

Hannegan, Bryan J.

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 12:38 PM
To: Hannegan, Bryan J.
Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

From: Bryan J. Hannegan/CEQ/EOP@Exchange on 03/18/2004 10:56:26 AM

Record Type: Record

To: Daryl L. Joseffer/OMB/EOP@EOP

cc:

Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

bh

----Original Message----

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 9:54 AM
To: Weinberg, Jeffrey A.
Cc: Hannegan, Bryan J.; Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Green, Richard E.
Subject: Re: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]ng

From: Jeffrey A. Weinberg on 03/18/2004 09:41:06 AM

Record Type: Record

To: Bryan J. Hannegan/CEQ/EOP@Exchange

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act << OLE Object: StdOleLink >>

SUBJECT: COMMERCE Report on Climate Chagne Science Program Strategic Plan

DEADLINE: 10:00 AM Tuesday, June 10, 2003

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032-ENERGY - Al Beer - (202) 586-4312
033-Environmental Protection Agency - Edward Krenik - (202) 564-5200
025-COMMERCE - Michael A. Levitt - (202) 482-3151
052-HEALTH & HUMAN SERVICES - Sondra S. Wallace - (202) 690-7773
059-INTERIOR - Jane Lyder - (202) 208-4371
007-AGRICULTURE - Jacquelyn Chandler - (202) 720-1272
084-National Science Foundation - Lawrence Rudolph - (703) 292-8060
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(202) 358-1948
114-STATE - VACANT - (202) 647-4463
117 & 340-TRANSPORTATION - Tom Herlihy - (202) 366-4687
008-US Agency for International Development - Jan W. Miller - (202) 712-4174
109-Smithsonian Institution - Nell Payne - (202) 357-2962
095-Office of Science and Technology Policy - Maureen O'Brien - (202) 456-6037

Hannegan, Bryan J.

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 12:38 PM
To: Hannegan, Bryan J.
Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

From: Bryan J. Hannegan/CEQ/EOP@Exchange on 03/18/2004 10:56:26 AM

Record Type: Record

To: Daryl L. Joseffer/OMB/EOP@EOP

cc:

Subject: RE: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

bh

----Original Message----

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 9:54 AM
To: Weinberg, Jeffrey A.
Cc: Hannegan, Bryan J.; Rhinesmith, Alan B.; Lyon, Randolph M.; Wuchte, Erin; Green, Richard E.
Subject: Re: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

From: Jeffrey A. Weinberg on 03/18/2004 09:41:06 AM

Record Type: Record

To: Bryan J. Hannegan/CEQ/EOP@Exchange

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act << OLE Object: StdOleLink >>

Bryan,

[redacted]

Message Copied To:

Alan B. Rhinesmith/OMB/EOP@EOP

Randolph M. Lyon/OMB/EOP@EOP

Erin Wuchte/OMB/EOP@EOP

Daryl L. Joseffer/OMB/EOP@EOP

Richard E. Green/OMB/EOP@EOP

Hannegan, Bryan J.

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 12:50 PM
To: Fiddelke, Debbie S.
Cc: Hannegan, Bryan J.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

---------- Forwarded by Daryl L. Joseffer/OMB/EOP on 03/18/2004 12:50 PM ----------

[redacted]

Randolph M. Lyon

03/18/2004 12:33:49 PM

Record Type: Record

To: Bryan J. Hannegan/CEQ/EOP@Exchange@EOP

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Many thanks.

[redacted]

ces.

[redacted]

Climate Change Research Act

[redacted]

---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

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S 1164 views to omb 3-15-04.wp...

- S 1164 views to omb 3-15-04.wpd

S 1164 Letter Enclosure - Abru...

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
OMB CONTACT: Jeffrey A. Weinberg
E-Mail: Jeffrey_A._Weinberg@omb.eop.gov
PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Hannegan, Bryan J.

From: Joseffer, Daryl L.
Sent: Thursday, March 18, 2004 12:50 PM
To: Fiddelke, Debbie S.
Cc: Hannegan, Bryan J.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

---------- Forwarded by Daryl L. Joseffer/OMB/EOP on 03/18/2004 12:50 PM ----------

[redacted]

Randolph M. Lyon

03/18/2004 12:33:49 PM

Record Type: Record

To: Bryan J. Hannegan/CEQ/EOP@Exchange@EOP

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Many thanks.

[redacted]

Climate Change Research Act

The Strategic Plan and the associated budget request were developed to enhance ongoing climate science

[redacted]

---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

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E-Mail: Jeffrey_A._Weinberg@omb.eop.gov
PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: **COMMERCE Letter on S1164 Abrupt Climate Change Research Act**

Hannegan, Bryan J.

From: Hannegan, Bryan J.
Sent: Thursday, March 18, 2004 2:26 PM
To: Lyon, Randolph M.; McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Cc: Cooney, Phil; Fiddelke, Debbie S.; 'scott.rayder@noaa.gov'
Subject: RE: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Bryan Hannegan
CEQ

-----Original Message-----
From: Lyon, Randolph M.
Sent: Thursday, March 18, 2004 12:28 PM
To: Hannegan, Bryan J.
Cc: McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Many thanks.

[redacted]

[redacted]

---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc: See the distribution list at the bottom of this message

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- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc << File: S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc >>

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Monday, March 15, 2004

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PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

DEADLINE: **3PM Thursday, March 18, 2004**
In accordance with OMB Circular A-19, OMB requests the views of your agency on the above subject before advising on its relationship to the program of the President. Please advise us if this item will affect direct spending or receipts.

COMMENTS:

Hannegan, Bryan J.

From: Cooney, Phil
Sent: Thursday, March 18, 2004 6:01 PM
To: Weinberg, Jeffrey A.
Cc: Lyon, Randolph M.; Hannegan, Bryan J.; Boyd, Allison
Subject: FW: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 E5

-----Original Message-----
From: Sokul, Stanley S.
Sent: Thursday, March 18, 2004 5:46 PM
To: Olsen, Kathie L.; Cooney, Phil; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

I spoke to Scott Rayder and he also concurs with Phil and is indeed looking into what is going on including calling over to OMB.

-----Original Message-----
From: Olsen, Kathie L.
Sent: Thursday, March 18, 2004 5:34 PM
To: Cooney, Phil; Sokul, Stanley S.; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 E5

Dr. Kathie L. Olsen
Associate Director
Office of Science & Technology Policy
(202) 456-6130 [Phone]
(202) 456-6073 [Fax]

-----Original Message-----
From: Cooney, Phil
Sent: Thursday, March 18, 2004 3:43 PM
To: Olsen, Kathie L.; Sokul, Stanley S.; Halpern, David
Subject: FYI: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

-----Original Message-----
From: Hannegan, Bryan J.
Sent: Thursday, March 18, 2004 2:26 PM
To: Lyon, Randolph M.; McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Cc: Cooney, Phil; Fiddelke, Debbie S.; 'scott.rayder@noaa.gov'
Subject: RE: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

[redacted]

Bryan Hannegan
CEQ

-----Original Message-----
From: Lyon, Randolph M.
Sent: Thursday, March 18, 2004 12:28 PM
To: Hannegan, Bryan J.
Cc: McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc: See the distribution list at the bottom of this message
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

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---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------
LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

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TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
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E-Mail: Jeffrey_A._Weinberg@omb.eop.gov
PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

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COMMENTS:

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032-ENERGY - Al Beer - (202) 586-4312
033-Environmental Protection Agency - Dona H. Deleon - (202) 564-5200
059-INTERIOR - Jane Lyder - (202) 208-4371
069-National Aeronautics and Space Administration - D. Lee Forsgren - (202) 358-1948
084-National Science Foundation - Lawrence Rudolph - (703) 292-8060
095-Office of Science and Technology Policy - Maureen O'Brien - (202) 456-6037
114-STATE - VACANT - (202) 647-4463
117 & 340-TRANSPORTATION - Tom Herlihy - (202) 366-4687

Hannegan, Bryan J.

From: Cooney, Phil
Sent: Thursday, March 18, 2004 6:01 PM
To: Weinberg, Jeffrey A.
Cc: Lyon, Randolph M.; Hannegan, Bryan J.; Boyd, Allison
Subject: FW: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3B

-----Original Message-----
From: Sokul, Stanley S.
Sent: Thursday, March 18, 2004 5:46 PM
To: Olsen, Kathie L.; Cooney, Phil; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

-----Original Message-----
From: Olsen, Kathie L.
Sent: Thursday, March 18, 2004 5:34 PM
To: Cooney, Phil; Sokul, Stanley S.; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3B5

Dr. Kathie L. Olsen
Associate Director
Office of Science & Technology Policy
(202) 456-6130 [Phone]
(202) 456-6073 [Fax]

-----Original Message-----
From: Cooney, Phil
Sent: Thursday, March 18, 2004 3:43 PM
To: Olsen, Kathie L.; Sokul, Stanley S.; Halpern, David
Subject: FYI: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

-----Original Message-----
From: Hannegan, Bryan J.
Sent: Thursday, March 18, 2004 2:26 PM
To: Lyon, Randolph M.; McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Cc: Cooney, Phil; Fiddelke, Debbie S.; 'scott.rayder@noaa.gov'
Subject: RE: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

shares this view.

Bryan Hannegan
CEQ

-----Original Message-----
From: Lyon, Randolph M.
Sent: Thursday, March 18, 2004 12:28 PM
To: Hannegan, Bryan J.
Cc: McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Many thanks.

[redacted]

---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

S. 1164 has been ordered reported by the Senate Commerce Committee.

- S 1164 views to omb 3-15-04.wpd << File: S 1164 views to omb 3-15-04.wpd >>

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc << File: S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc >>

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below
FROM: Richard E. Green (for) Assistant Director for Legislative Reference
OMB CONTACT: Jeffrey A. Weinberg
E-Mail: Jeffrey_A._Weinberg@omb.eop.gov
PHONE: (202)395-3457 FAX: (202)395-3109
SUBJECT: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

DEADLINE: **3PM Thursday, March 18, 2004**
In accordance with OMB Circular A-19, OMB requests the views of your agency on the above subject before advising on its relationship to the program of the President. Please advise us if this item will affect direct spending or receipts.

COMMENTS:

DISTRIBUTION LIST

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032-ENERGY - Al Beer - (202) 586-4312
033-Environmental Protection Agency - Dona H. Deleon - (202) 564-5200
059-INTERIOR - Jane Lyder - (202) 208-4371
069-National Aeronautics and Space Administration - D. Lee Forsgren - (202) 358-1948
084-National Science Foundation - Lawrence Rudolph - (703) 292-8060
095-Office of Science and Technology Policy - Maureen O'Brien - (202) 456-6037
114-STATE - VACANT - (202) 647-4463
117 & 340-TRANSPORTATION - Tom Herlihy - (202) 366-4687

Hannegan, Bryan J.

From: Lyon, Randolph M.
Sent: Thursday, March 18, 2004 6:47 PM
To: Cooney, Phil
Cc: Weinberg, Jeffrey A.; Hannegan, Bryan J.; Boyd, Allison; Wuchte, Erin
Subject: Re: FW: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 B5

From: Phil Cooney/CEQ/EOP@Exchange on 03/18/2004 06:01:12 PM

Record Type: Record

To: Jeffrey A. Weinberg/OMB/EOP@EOP

cc: Randolph M. Lyon/OMB/EOP@EOP, Bryan J. Hannegan/CEQ/EOP@Exchange, Allison Boyd/OPD/EOP@Exchange
Subject: FW: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 B5

-----Original Message-----
From: Sokul, Stanley S.
Sent: Thursday, March 18, 2004 5:46 PM
To: Olsen, Kathie L.; Cooney, Phil; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 B5

-----Original Message-----
From: Olsen, Kathie L.
Sent: Thursday, March 18, 2004 5:34 PM
To: Cooney, Phil; Sokul, Stanley S.; Halpern, David
Subject: RE: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted] 3 B5

Dr. Kathie L. Olsen
Associate Director
Office of Science & Technology Policy
(202) 456-6130 [Phone]
(202) 456-6073 [Fax]

Climate Change Research Act

-----Original Message-----
From: Cooney, Phil
Sent: Thursday, March 18, 2004 3:43 PM
To: Olsen, Kathie L.; Sokul, Stanley S.; Halpern, David

004215

Subject: FYI: CEQ Views on COMMERCE Letter on S1164 Abrupt Climate Change Research Act

-----Original Message-----

From: Hannegan, Bryan J.

Sent: Thursday, March 18, 2004 2:26 PM

To: Lyon, Randolph M.; McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.

Cc: Cooney, Phil; Fiddelke, Debbie S.; 'scott.rayder@noaa.gov'

Subject: RE: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

[redacted] as a

[redacted] ve

Bryan Hannegan
CEQ

-----Original Message-----

From: Lyon, Randolph M.

Sent: Thursday, March 18, 2004 12:28 PM

To: Hannegan, Bryan J.

Cc: McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.

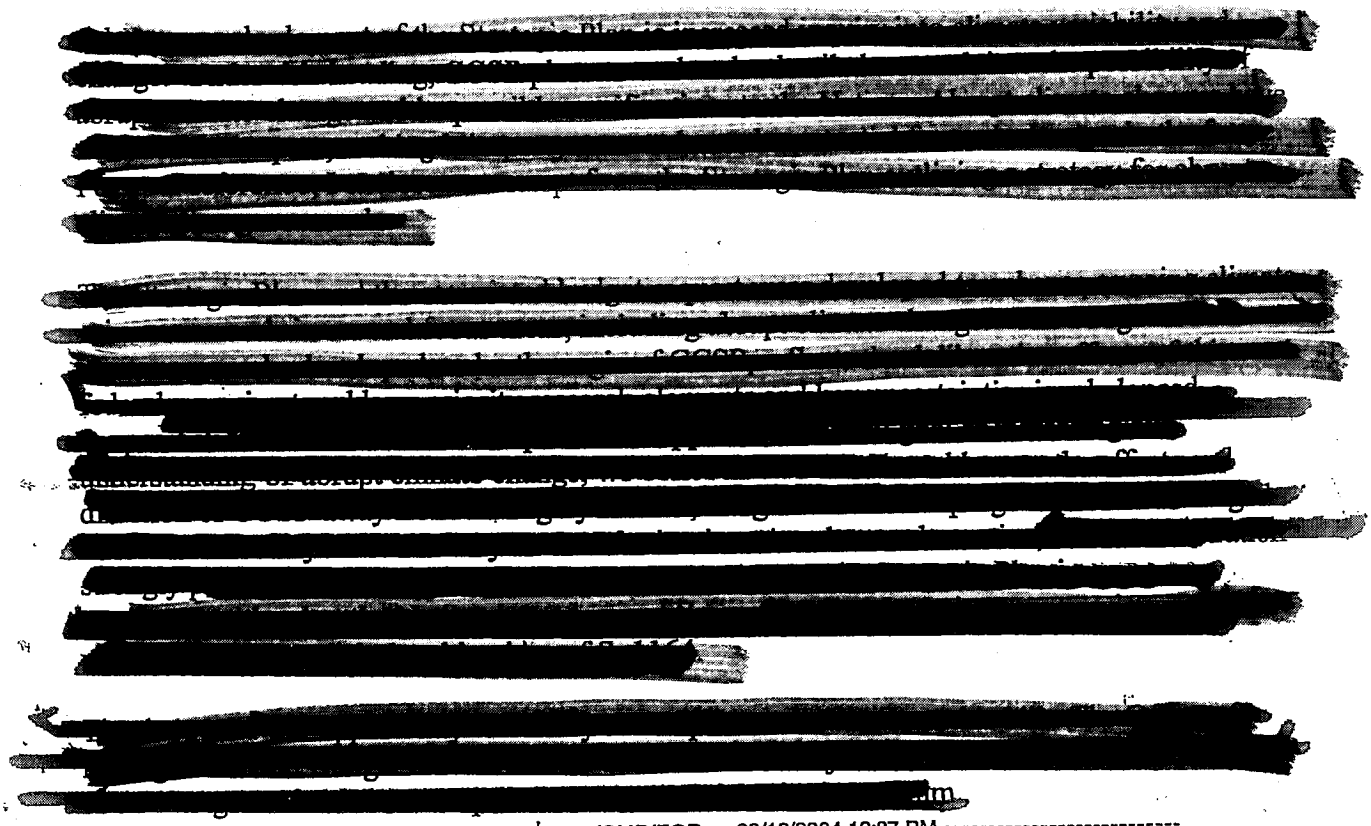
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Many thanks.

[redacted]

[redacted]



---------- Forwarded by Randolph M. Lyon/OMB/EOP on 03/18/2004 12:27 PM ----------

From: Jeffrey A. Weinberg on 03/15/2004 04:38:14 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc: See the distribution list at the bottom of this message

Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

Please provide signoff/specific changes by 3PM March 18, 2004. If we have not heard from you by the deadline, we will proceed on the basis that you have no comment.

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- S 1164 views to omb 3-15-04.wpd << File: S 1164 views to omb 3-15-04.wpd >>

- S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc << File: S 1164 Letter Enclosure - Abrupt CC Research in Strat Plan.doc >>

---------- Forwarded by Jeffrey A. Weinberg/OMB/EOP on 03/15/2004 04:28 PM ----------

LRM ID: JAW192

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503-0001

Monday, March 15, 2004

LEGISLATIVE REFERRAL MEMORANDUM

TO: Legislative Liaison Officer - See Distribution below

Hannegan, Bryan J.

From: Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Thursday, March 18, 2004 7:01 PM
To: Hannegan, Bryan J.
Cc: Lyon, Randolph M.; McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.; Cooney, Phil; Fiddelke, Debbie S.
Subject: Re: COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Scott

"Hannegan, Bryan J." wrote:

[redacted]

Bryan Hannegan
CEQ

-----Original Message-----
From: Lyon, Randolph M.
Sent: Thursday, March 18, 2004 12:28 PM
To: Hannegan, Bryan J.
Cc: McMillin, Stephen S.; Rhinesmith, Alan B.; Joseffer, Daryl L.; Wuchte, Erin; Green, Richard E.; Weinberg, Jeffrey A.
Subject: Time sensitive - LRM JAW192 - - COMMERCE Letter on S1164 Abrupt Climate Change Research Act

[redacted]

Climate Change Research Act

004214

From: David Allen [dallen@usgcrp.gov]
Sent: Tuesday, March 23, 2004 5:56 PM
To: CCSP@usgcrp.gov; ipo@usgcrp.gov; WG_IRC@usgcrp.gov; WGCC@usgcrp.gov
Subject: Draft GECAFS Science Plan and Implementation Strategy for your review

Attachments: GECAFS Science Plan #119267.pdf
Dear All,
Attached for your review and comments, please find a copy of the Earth System Science Partnership (ESSP) project Global Environmental Change and Food Systems (GECAFS) Draft Science Plan and Implementation Strategy (GECAFS expects to update this draft on Friday 26 March 2004). The GECAFS program (The plan and other information may be found at: http://www.gecafs.org) is the first of the new joint projects of the four global environmental change programs under the ESSP and is currently under consideration for core funding through CCSP interagency distributed costs.

This document describes the program's science plans including timelines and potential deliverables for the next six years and beyond. Please review this document for your own information about this program. GECAFS is currently seeking input on the Draft plan so if you have comments on this document of a general or specific nature, please contact John Ingram (jsii@ceh.ac.uk) the Executive Officer of GECAFS.

Thank you,
David Allen, CCSP IWG-IRC

--

David Allen
Climate Change Science Program
(Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006 USA
Email: dallen@usgcrp.gov
Telephone: 1 (202) 419-3486
Fax: 1 (202) 223-3064

From: Hannegan, Bryan J.
Sent: Wednesday, March 24, 2004 1:12 PM
To: 'Craig, Rachael G.'
Subject: RE: NSF Talk Friday: Carbon Cycle Research in North America

Rachel, thanks. Unfortunately due to a previous appointment I won't be able to make it, but would appreciate future opportunities to visit NSF for briefings/seminars on climate change research.

Bryan Hannegan
CEQ

-----Original Message-----
From: Craig, Rachael G. [mailto:rcraig@nsf.gov]
Sent: Wednesday, March 24, 2004 12:28 PM
To: 'James.R.Mahoney@noaa.gov'; 'gasrar@hq.nasa.gov'; 'andrewj@onr.navy.mil'; 'david.conover@hq.doe.gov'; 'mary.glackin@noaa.gov'; 'cgroat@usgs.gov'; 'WHohenst@oce.usda.gov'; 'Linda.Lawson@ost.dot.gov'; 'mmoore@osophs.dhhs.gov'; 'neale@serc.si.edu'; 'ari.patrinos@science.doe.gov'; 'emsimmons@usaid.gov'; 'slimak.michael@epa.gov'; 'watsonhl@state.gov'; Hannegan, Bryan J.; Halpern, David; 'Margaret.McCalla@noaa.gov'; Rothenberg, Jason; Wuchte, Erin
Cc: Leinen, Margaret
Subject: NSF Talk Friday: Carbon Cycle Research in North America

Dear CCSP SGCR members,

Margaret Leinen has asked me to send this information to keep you aware of ongoing carbon cycle activities at NSF. If you wish to attend any of these sessions please let me know and I'll arrange a badge.

Rachael

Rachael Craig, Ph.D.
Program Director
Carbon Cycle and Biogeosciences
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230
703-292-8233 v
703-292-9025 f
rcraig@nsf.gov

Friday, 26 March 9am, Room 110

Carbon Cycle Research in North America:
A Strategy for Implementing Community Priorities

Scott Denning, Chair
NACP Implementation Strategy Subcommittee
of the
Carbon Cycle Science Steering Group

You are invited to learn more about research on the carbon cycle and community recommendations for improving our ability to understand processes and reduce uncertainties about the future behavior of the climate system.

Six leaders of the carbon cycle research community (list attached) will participate in a day-long discussion of the recommendations.

Additional details and opportunities for extended Q&A will be provided at the

various topical meetings listed on the attached schedule. Contact Rachael Craig (x8233, rcraig@nsf.gov <mailto:rcraig@nsf.gov>) for more information.

Scott Denning will present the general overview talk at 9am in room 110.

ABSTRACT:

Poorly understood "sink" processes currently remove about half of global CO2 emissions arising from the combustion of fossil fuels, but there is little reason to expect these sinks to continue to operate unchanged over the coming decades. Uncertainties in the future behavior of the carbon cycle are currently among the greatest sources of uncertainty in climate over the next century, ranking with anthropogenic emissions and imperfect understanding of the physical climate system. The study of the carbon cycle involves scientists from many disciplines: terrestrial ecologists, oceanographers, energy economists, and atmospheric scientists. A broad community of scientists involved in the study of the carbon cycle has conducted a multiyear process of scoping, prioritizing, and planning for a comprehensive and rationalized program of interdisciplinary research in this area. The Strategic Plan for the Climate Change Science Program envisions six research program elements to address carbon cycle questions. The North American Carbon Program (NACP) is one of the first of these six major elements targeted for implementation planning and has been identified as a near-term priority under the Climate Change Research Initiative. Here we present an Implementation Strategy for the NACP, building on the already published NACP Science Plan.

The NACP is organized around four questions:

1. What is the carbon balance of North America and adjacent oceans? What are the geographic patterns of fluxes of CO2, CH4, and CO? How is the balance changing over time?("Diagnosis")
2. What processes control the sources and sinks of CO2, CH4, and CO, and how do the controls change with time?("Attribution/Process")
3. Are there potential surprises (could sources increase or sinks disappear)?("Prediction")
4. How can we enhance and manage long-lived carbon sinks ("sequestration"), and provide resources to support decision makers?("Decision support")

Research activities are recommended and prioritized within each major area to contribute to an integrated and well-tested system for understanding, monitoring, and predicting carbon fluxes over North America and adjacent ocean regions, and for providing timely and useful information to policymakers based on the results.

The NACP will involve systematic observations, intensive field campaigns, manipulative experiments, diagnostic numerical modeling of carbon sources and sinks, and syntheses of existing data sets. These activities are intended to support each other through a rational strategy for integration to answer the four questions listed above. The strategy is based on the premise that spatial and temporal heterogeneity of carbon sources and sinks, and the need to attribute processes and develop useful predictive tools precludes satisfactory closure through observations alone. Rather, observations, experiments, and simulation models of the processes that regulate the North American carbon budget must be used in tandem. The strategy adopted under NACP is to structure modeling efforts and observations so as to test every aspect of the models as thoroughly as possible. This entails making sure that models predict relevant observable quantities, and that observations are made of the parameters and variables that are most uncertain in models. Three separate methods will be applied to synthesize models and data for estimating continental scale carbon budgets under NACP: (1) "bottom-up" synthesis of surface, in-situ, and remotely sensed data using models of source/sink processes; (2) "top-down" synthesis of atmospheric carbon trace-gas data using numerical weather analyses and inversion of transport models; and (3) model-data fusion of all available data (surface, remotely sensed, and atmospheric) into process-based diagnostic models.

<<NACP SIS.ppt>> <<Denning abstract.doc>> <<NACP SIS Meeting at NSF, 3-26-04 agenda and goals.doc>> <<NACP SIS Meeting at NSF, 3-26-04 participants.doc>>

NORTH AMERICAN CARBON PROGRAM
SCIENCE IMPLEMENTATION STRATEGY

NSF Open Discussions

Agenda

March 26, 2004

Time	Topic	Lead	Room	Participants
8 am	Inter-Agency Cooperation and Implementation	Chris Field	310	Agency representatives
9 am	Talk - "Carbon Cycle Research in North America: A Strategy for Implementing Community Priorities"	Scott Denning	110	General admission, including agency reps.
10 am	Ocean Sciences component	Chris Sabine	~~350~~ 830	OCE PDs and others as interested
11 am	Atmospheric Sciences component	Steve Wofsy	~~350~~ 770	ATM PDs and others as interested
Noon	Lunch			
1 pm	Earth Sciences and Ecosystems components	Bev Law and Ram Oren	770	EAR and DEB PDs and others as interested
2 pm	Meeting with Division Directors	All	770	Jarvis Moyers, ATM; Herm Zimmerman, EAR; Jim Yoder, OCE; Penny Firth, DEB Karl Erb, OPP
3 pm	International and Arctic Science components	Chris Field.	770	OPP; INT; State
4 pm	Meeting with Assistant Director	All	705	Margaret Leinen

GOALS OF THIS EVENT:

1. Understand NACP in the larger context of global carbon cycle research.
2. Overview major subcomponents of the NACP SIS
3. Present the notion of intensive field campaigns, rationale and need, method.
4. Demonstrate the importance of programmatic cooperation within NSF.
5. Illustrate the opportunities for cooperation with other agencies
6. Provide enough detail on timing, priorities, dependencies and logistics to allow agency managers to prioritize funding recommendations.

NORTH AMERICAN CARBON PROGRAM
SCIENCE IMPLEMETATION STRATEGY

NSF PRESENTATION AND DISCUSSION
MARCH 26, 2004
PARTICIPANT LIST

Dr. Scott Denning
Assistant Professor
Colorado State University
Dept. Atmospheric Science
Fort Collins, CO 80523-1371
Phone: (970)491-6936
Email: denning@atmos.colostate.edu

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Department of Global Ecology
Carnegie Institution
260 Panama Street
Stanford, CA 94022
Phone: (650)325-1521, 213
Fax: (650)325-3748
Email: cfield@globalecology.stanford.edu

Dr. Christopher L. Sabine
Oceanographer
NOAA Pacific Marine Environmental Laboratory
7600 Sand Point Way NE
Seattle, WA 98115
Phone: (206)526-4809
Fax: (206)526-6744
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Dr. Beverly E. Law
Associate Professor
Oregon State University
328 Richardson Hall
College of Forestry
Corvallis, OR 97331
Phone: (541)737-6111
Fax: (541)737-1393
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Dr. Ram Oren
Professor
Duke University
Nicholas School of the Environment & Earth Science
Durham, NC 27708-0328
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Dr. Steven C. Wofsy
Professor
Harvard University
29 Oxford Street
Cambridge, MA 02138
Phone: (617)495-4566
Fax: (617)495-4551
Email: wofsy@fas.harvard.edu

denning@atmos.colostate.edu; cfield@globalecology.stanford.edu; chris.sabine@noaa.gov; bev.law@oregonstate.edu; ramoren@duke.edu; wofsy@fas.harvard.edu

Scott Denning, Chair, NACP Implementation Strategy Subcommittee of the Carbon Cycle Science Steering Group

Carbon Cycle Research in North America: A Strategy for Implementing Community Priorities

9am, March 26, 2004

Room 110

For information and schedule contact:

Rachael Craig, x8233, rcraig@nsf.gov

From: Rick Piltz [rpiltz@usgcrp.gov]
Sent: Thursday, March 25, 2004 12:34 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Subject: Fwd: FYI -- NRC Panel on Public Participation - Meeting April 7-8, 2004

Attachments: Public_Participation_Agenda.doc
FYI--

The National Research Council's Panel on Public Participation in Environmental Assessment and Decision Making will hold it's second panel meeting on April 7-8, 2004 at the National Academies' Building, 2100 C Street in Washington, DC.

Please go to the Panel's Quickplace Website (http://qp.nas.edu/publicparticipation) for additional information. For your convenience, the agenda is also attached here.

If you would like to attend this meeting, please let me know.

Deborah Johnson

Senior Project Assistant

The National Academies

500 5th Street, N.W., Rm. W1106

Washington, DC 20001

(202) 334-2751

(202) 334-3584 fax

djohnson@nas.edu

--

Rick Piltz
Senior Associate
U.S. Global Change Research Program
Climate Change Science Program Office

1717 Pennsylvania Ave., NW, Suite 250
Washington, DC 20006
Tel (direct): 202-419-3468 Fax: 202-223-3064
Tel (main #): 202-223-6262
www.usgcrp.gov, www.climatescience.gov

From: Symmes, Gregory [GSymmes@nas.edu]
Sent: Tuesday, March 30, 2004 5:31 PM
To: Hannegan, Bryan J.
Cc: Staudt, Amanda; tonyb@essic.umd.edu; Mason, Byron
Subject: RE: NRC workshop

Bryan-

Thanks again for agreeing to attend our workshop next week. I'm writing to let you know of a change in the agenda for Friday afternoon (when we had originally planned to have you make some remarks about the policy aspects of the new Space Studies Board study on Earth Observations from Space). In particular, we just received word that the co-chairs for the study have been approved (this will be announced shortly), so we are now planning to bring at least one of them in to discuss this study on Friday afternoon. To maximize the time available to interact with the co-chair, we have decided not to have the panel discussion on Friday afternoon. I apologize for this last-minute change in schedule, and hope it hasn't caused you any inconvenience.

Instead, Tony Busalacchi and I were wondering if you would be interested and willing to participate in the panel on advisory bodies that is scheduled for Thursday morning. Given the recent attention to similar issues raised by the February UCS report, we thought it would be very interesting to hear your thoughts on this issue. Other discussants in this session are Warren Washington, Ari Patrinos, and George Hornberger. Of course, we fully understand if you can't do so at such a late date.

I'd be happy to discuss this with you if you have any questions. Feel free to give me a call at 202-334-3607. I look forward to seeing you next week.

Greg Symmes

> -----Original Message-----
> **From:** Hannegan, Bryan J. [mailto:Bryan_J._Hannegan@ceq.eop.gov]
> **Sent:** Friday, March 26, 2004 9:30 AM
> **To:** Symmes, Gregory
> **Subject:** RE: NRC workshop
>
> Thanks, this helps, and I look forward to participating!
>
> > -----Original Message-----
> > **From:** Symmes, Gregory [mailto:GSymmes@nas.edu]
> > **Sent:** Friday, March 26, 2004 9:26 AM
> > **To:** Hannegan, Bryan J.
> > **Cc:** Staudt, Amanda; Mason, Byron
> > **Subject:** RE: NRC workshop
> >
> > Bryan-
> > Thanks for agreeing to participate. I've attached the current draft of the agenda, as well as the letter of request from Ghassem Asrar and the draft work plan for the new study. Other panelists for the discussion of the Observations from Space study are Jim Anderson, Greg Williams from NASA, and a representative from Greg Withee's office at NOAA. NASA and NOAA requested the study, so we've asked them to begin the discussions by explaining what their agencies are looking for from the study. We expect that Jim Anderson will have a lot to say about the scientific aspects of this issue, and thought you could provide more of a policy perspective. In particular, it would be great if you could provide some insights into the key policy issues surrounding Earth observations and how this study might be able to help inform federal policy decisions on these issues.
> >
> > Don't feel like you need to address GEO and CCSP in any detail in your comments. We included GEO and CCSP in some of the discussion questions because we hope that the plenary discussions that follow will build upon some of the presentations on GEO and CCSP's observational activities from earlier in the day. Greg Withee and Ghassem Asrar (or his rep) will be talking about the Earth

Observations Summit and GEO, and Bob Cahalan from the CCSP Observations Working Group will be talking about CCSP's observational activities.

The workshop will be open to the media if any choose to attend, but we wouldn't generally expect any. As far as I know, no media reps have RSVPed. If there is any media interest in the meeting, I'd expect it to be on April 8, when we'll be discussing independent oversight of the CCSP and issues surrounding assessments. I wouldn't expect much media interest on the observation topic.

Greg

-----Original Message-----
From: Hannegan, Bryan J. [mailto:Bryan_J._Hannegan@ceq.eop.gov]
Sent: Thursday, March 25, 2004 7:04 PM
To: Symmes, Gregory
Subject: RE: NRC workshop

Greg -- turns out that you had my work email wrong -- so I had to check the home account to get this, sorry for the delay. I should be able to participate in the workshop as you describe below. Will the workshop be open to the media? Who would the other panelists be? Just curious -- some of them may be more focused on the CCSP and GEO than I might be.

Thanks for any additional info,

Bryan

----- Original Message -----
From: Symmes, Gregory
To: bryan_hannegan@ceq.eop.gov ; bjhanneg@VERIZON.NET
Cc: Staudt, Amanda ; Mason, Byron
Sent: Monday, March 22, 2004 11:18 AM
Subject: NRC workshop

Bryan-
I'm glad to hear that you will be able to attend the April 8&9 workshop of the National Academies' Coordinating Committee on Global Change and Climate Research Committee. I've attached below a brief overview of what we plan to discuss during the two-day workshop (you probably have already seen this).

Amanda Staudt and I were wondering if you would be willing to be a panelist for the discussion of Topic 4 (the new National Academies' study on Earth Observations from Space). We are looking for a brief presentation (10-15 minutes) sharing some thoughts about how this new study could be organized to be most useful, in the context of what is already underway within the observational component of the Climate Change Science Program and the US contributions to the International Group on Earth Observations. We imagine that you probably have some very salient perspectives on this issue. Specific questions we've asked the panelists to consider include:

- How this new study could be organized to be most useful to its sponsors, other federal agencies, and the ongoing activities of the international Group on Earth Observations (GEO)?
- How can the study best involve the scientific community so as to engage the breadth of relevant expertise?
- How can the study engage the user broad community so as to address their

observational needs?

- What are major crosscutting issues that should be a focus of the study?
- What mechanisms might be effective for prioritizing among observational objectives?

Please let us know if you'd be willing to be a panelist in this session. We've scheduled this discussion for 1:20 pm on Friday, April 9. Feel free to give me (202-334-3607) or Amanda (202-334-2995) a call if you'd like to discuss.

Greg

<<global change workshop 03-08-04.doc>>

Gregory H. Symmes, Ph.D.
Associate Executive Director
Division on Earth and Life Studies
National Academies/National Research Council
500 Fifth Street, NW
Washington, DC 20001
phone: 202-334-3607
fax: 202-334-3362
email: gsymmes@nas.edu

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

October 29, 2003

Reply to Attn of: Y

Prof. Lennard A. Fisk
Chair, Space Studies Board
National Research Council
500 Fifth St., NW
Washington, DC 20001

Dear Dr. Fisk:

We are nearing completion of the deployment of the Earth Observing System (EOS) conceived over a decade ago. EOS was designed as the cornerstone of a monumental undertaking to understand the Earth as a system—an effort that brought together the traditional scientific disciplines to advance research in the new interdisciplinary field of Earth system science. In those early years, NASA and its domestic and international partners served as a catalyst for the formation of the Earth system science construct with the help of the discipline-oriented science community. Now, over a decade later, an Earth system science community is using EOS and related data to probe the interconnections among the components of the Earth system.

In light of this progress, and of our recent success in securing continuity of essential EOS measurements through follow-on missions and transitions to operational satellite systems, it is time for the Earth system science community to look afresh into the future and help NASA plot its course ahead. I request that the Space Studies Board take the lead in orchestrating a decadal survey by the community to generate research and observation priorities. The following are some of the questions this decadal survey should address:

- What are the significant advances in Earth system science over the past decade?
- What are the principal science questions that remain to be answered?
- What measurements are most critical to answering those questions?
- What types of next generation observing capabilities and orbital vantage points will best enable progress?

The resulting study will be most useful if it conveys the Earth system science community's priorities for questions and measurements. NASA will use the results of this effort as a starting point for its next round of strategic planning. Thus, it will be ideal if this decadal survey is complete in the Fall of 2005.

Cordially,

Ghassem R. Asrar
Associate Administrator for
Earth Science

cc:
Dr. J. Alexander

Draft December 2003

Earth Observations From Space: A Community Assessment and Strategy for the Future

Space Studies Board

Abbreviated Statement of Task

The Space Studies Board, in consultation with other units of the NRC, will lead a study to generate consensus recommendations from the Earth and environmental science and applications community regarding a systems approach to space-based and ancillary observations that encompasses the research programs of NASA and the related operational programs of NOAA. The study will be conducted in a manner similar to previous NRC "decadal" studies.

Background

The confluence of several factors occasions this study, which will provide the first "decadal survey" for the Earth sciences.

* NASA is nearing completion of the deployment of the Earth Observing System (EOS) and is now considering an appropriate strategy for follow-on exploratory and systematic missions.
* Over the next decade, NASA will transition a number of environmental parameters from research-oriented programs to operationally-oriented ones.
* In the coming decade, NOAA will launch the National Polar-orbiting Operational Environmental Satellite System (NPOESS)-follow-ons to the current generation of civil and military meteorological satellites, which will be used to monitor global environmental conditions and collect and disseminate data related to weather, atmosphere, oceans, land and near-space environment.
* In recent years, the NRC has issued a number of reports that call for NASA to develop a community-based strategic plan.
* Some 31 countries, including the members of the G-8, were represented at the ministerial level at the July 31, 2003 "Earth Observations Summit" in Washington, DC. The proposed decadal survey has numerous connections to the activities contemplated by Summit participants.
* NASA officials have requested that the NRC produce a seminal report on the future of scientific research and observation of the Earth system from space,. It should articulate the science community's priorities for Earth system science-in particular, those priorities that can be substantially advanced by remote sensing of the Earth-and the observational approaches to address those priorities

Earth observation systems are providing valuable data, particularly in the areas of improved weather forecasts, El Nino predictions, earthquake and volcanic eruption precursors, and ecological assessments. However, additional and higher quality observations are needed to address a wide range of priority applications, including climate monitoring and modeling, agriculture and forest management, water and energy resource management, watershed and marine ecosystem management, disaster management support, sustainable development, and meeting the needs of international environmental conventions. Solutions to these challenges will require advancements in both remote sensing capabilities and in observational techniques; for example, the use of constellations of satellites and/or formation flying. Acquisition, quality control, processing, summarization, dissemination, and preservation of the vast array of environmental data that will be generated by national and international sources pose a further technical challenge.

Statement of Task:

The Space Studies Board will organize a study, "Earth Observations from Space: A Community Assessment and Strategy for the Future." The study will generate consensus recommendations from the Earth and environmental science and applications community regarding science priorities, opportunities afforded by new measurement types and new vantage points, and a systems approach to space-based and ancillary observations that encompasses the research programs of NASA and the related operational programs of NOAA.

During this study, the committee will conduct the following tasks.

1. Review the status of the field to assess recent progress in resolving major scientific questions outlined in relevant prior NRC, NASA, and other relevant studies and in realizing desired predictive and applications capabilities via space-based Earth observations;.
2. Develop a consensus of the top-level scientific questions that should provide the focus for Earth and environmental observations in the period 2005-2015;.
3. Take into account the principal federal- and state-level users of these observations and identify opportunities and challenges to the exploitation of the data generated by Earth observations from space.
4. Recommend a prioritized list of measurements, and identify potential new space-based capabilities and supporting activities within NASA ESE and NOAA NESDIS to support national needs for research and monitoring of the dynamic Earth system during the decade 2005-2015. In addition to elucidating the fundamental physical processes that underlie the interconnected issues of climate and global change, these needs include: weather forecasting, seasonal climate prediction, aviation safety, natural resources management, agricultural assessment, homeland security, and infrastructure planning.
5. Identify important directions that should influence planning for the decade beyond 2015. For example, the committee will consider what ground-based and in-situ capabilities are anticipated over the next 10-20 years and how future space-based observing systems might leverage these capabilities. The committee will also give particular attention to strategies for NOAA to evolve current capabilities while meeting operational needs to collect, archive, and disseminate high quality data products related to weather, atmosphere, oceans, land, and the near-space environment.

The committee will address critical technology development requirements and opportunities; needs and opportunities for establishing and capitalizing on partnerships between NASA and NOAA and other public and private entities; and the human resource aspects of the field involving education, career opportunities, and public outreach. A minor but important part of the study will be the review of complementary initiatives of other nations in order to identify potential cooperative programs.

Preliminary Work Plan:

The study will be organized in a manner similar to the 'decadal surveys' that have been conducted by the astronomy and astrophysics, solar and space physics, and solar system exploration communities. An 8-14 person survey committee will carry out the study with input from a set of approximately six interdisciplinary panels. The survey committee may also establish small cross-cutting panels, which will be comprised of members of the survey committee and/or its expert panels, for the purpose of addressing special topics. In conducting its work, the committee will make use of the NASA and NOAA strategic plans and will draw on an extensive history of prior studies performed by the National Research Council. The committee and its panels will also make use of "town meetings" at scientific society meetings (e.g. AGU & AMS) and similar fora to cast a broad net for input from the general scientific community. The survey committee will be responsible for preparing a summary report, which will be published along with the reports of the study panels. A pre-publication version of the Survey report is targeted for late 2005.

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Coordinating Committee on Global Change and Climate Research Committee

DRAFT Agenda
April 8-9, 2004

National Academies
Keck Center Room 100
500 5th Street, NW
Washington, DC, 20001

The objectives of this meeting are:
1. Discuss lessons learned from advisory groups for federal global change science and technology;
2. Discuss global change science and technology assessments;
3. Discuss climate and global change observing systems; and
4. Discuss new National Academies study on Earth Observations from Space.

Thursday, April 8, 2004

OPEN SESSION

8:30 A.M. Welcome and introductions — Peter Raven, *Chair, Coordinating Committee on Global Change*

8:45 A.M. Implementing Climate and Global Change Research — Thomas Graedel, *Chair, Committee to Review the US CCSP Strategic Plan*

TOPIC 1: Lessons Learned from Advisory Groups for Federal Global Change Science and Technology

9:15 A.M. Panel Discussion

What can be learned from the experiences of existing advisory bodies to help inform the Climate Change Science Program's (CCSP's) decisions about how to obtain independent oversight for the program? Panelists are asked to consider the following questions:

- What mechanisms would be best suited to address the challenges of providing independent oversight of interagency programs such as the CCSP and the Climate Change Technology Program (CCTP)?
- What perspectives (i.e., scientific and other stakeholders) should be included in oversight efforts? How can the program ensure that appropriate balance is maintained?
- How to balance the value of "independence" with the need for in-depth knowledge?
- How to provide advice on science (i.e., CCSP) and science and technology (i.e., CCSP + CCTP)?
- How to provide advice on, and to, international climate and global change research programs?

Panelists:

- Warren Washington, National Center for Atmospheric Research
- Ari Patrinos, Department of Energy
- George Hornberger, University of Virginia

10:00 A.M. Discussion in plenary

10:45 A.M. Break

11:00 A.M. Breakout sessions

- Session 1 in Keck ?? (tbd)
  Leader Judith Curry
- Session 2 in Keck ?? (tbd)
  Leader Inez Fung (tentative)
- Session 3 in Keck ?? (tdb)
  Leader Linda Mearns (tentative)
- Session 4 in Keck ?? (tbd)
  Leader William Clark

NOON Lunch reception in room 1024

1:15 P.M. Breakout session summaries

TOPIC 2: Global Change Science and Technology Assessments

2:30 P.M. Guidelines for Preparing CCSP Synthesis and Assessment Products — James Mahoney or Richard Moss, *Climate Change Science Program*

3:00 P.M. Break

3:30 P.M. Panel Discussion

What can be learned from past global change science and technology assessments to ensure that the CCSP's synthesis and assessment products effectively build on past research, are developed with the involvement of scientists and relevant stakeholders, and are reviewed in a transparent manner? Panelists will be asked to consider the following questions:

- What processes have been used to ensure that assessments accurately reflect current scientific understanding?
- What approaches have been used to effectively involve relevant stakeholders?
- What processes have been used to ensure transparent public review of methods and draft results?
- What approaches have been used to effectively coordinate national assessment activities with their international counterparts?
- What strategies have been used to engage the scientific community without unduly affecting the ability to conduct research?

Panelists:

- Bob Corell, American Meteorological Society
- Susan Solomon, NOAA Aeronomy Laboratory
- Michael Kurylo, NASA
- Richard Methot, NOAA

4:30 P.M. Discussion in plenary

5:00 P.M. Adjourn

5:30 P.M. Tour of Koshland Museum (CCGC and CRC members only)

Friday, April 9, 2004

OPEN SESSION

8:30 A.M.	Welcome and introductions	Antonio Busalacchi, Jr. *Chair, Climate Research Committee*

Topic 3: Climate and Global Change Observing Systems

8:45 A.M.	Update on Earth Observing Summit and Group on Earth Observations	Ghassem Asrar (invited) *NASA* and/or Greg Withee *NOAA*
9:15 A.M.	Climate Change Science Program Observations and Data Systems	Robert Cahalan *CCSPO*

9:45 A.M. Break

10:15 A.M. Panel Discussion

A significant challenge in developing climate and global change observing systems is how to integrate biologic, geographic, hydrologic, oceanic, and anthropogenic processes into the system in order to generate the data needed in previously underemphasized areas of the CCSP, such as ecosystems, land use and land cover change, water cycle, human dimensions, economics, impacts, adaptation, and mitigation. Panelists have been asked to consider the following questions:

- What are the most important observational needs for research in your area that are not currently being met?
- Who are (or could be) the most important users of data from outside the research community (e.g., state, local, regional resource managers; private sector) in your area? What types of data are needed by these users?
- How could these observational needs be met more effectively in the context of an integrated climate and global change observing system?

Panelists:

- Dennis Lettenmeier, University of Washington
- Billie Lee Turner, Clark University
- Chris Justice, University of Maryland
- Tom Wilbanks, Oak Ridge National Laboratory
- Cynthia Rosenzweig, NASA Goddard Institute of Space Studies
- Bob Detrick, Woods Hole Oceanographic Institute

11:30 A.M. Discussion in plenary

NOON Lunch

Topic 4: New National Academies Study on Earth Observations from Space

1:00 P.M. NRC Study on Earth Observations from Space — Greg Williams, NASA (tentative) and/or TBD, NOAA

1:20 P.M. Panel Discussion

NASA and NOAA recently asked the National Academies' Space Studies Board to lead an integrated study on Earth Observations from Space. The overall charge to this committee is to "organize a broad assessment of the state of Earth observations from space and prepare a strategy for the future". This new study is in the process of being organized and its task will be refined over the next few months.

- How this new study could be organized to be most useful to its sponsors, other federal agencies, and the ongoing activities of the international Group on Earth Observations (GEO)?
- How can the study best involve the scientific community so as to engage the breadth of relevant expertise?
- How can the study engage the user broad community so as to address their observational needs?
- What are major crosscutting issues that should be a focus of the study?
- What mechanisms might be effective for prioritizing among observational objectives?

Panelists:

- Jim Anderson, Harvard University
- Bryan Hannegan, Council on Environmental Quality (invited)

2:00 P.M. Discussion in plenary: How can the National Academies best contribute to the process of developing strategies for observation systems for global and climate change?

3:00 P.M. Adjourn

From: Symmes, Gregory
To: bryan_hannegan@ceq.eop.gov ; bjhanneg@VERIZON.NET
Cc: Staudt, Amanda ; Mason, Byron
Sent: Monday, March 22, 2004 11:18 AM
Subject: NRC workshop

Bryan-
I'm glad to hear that you will be able to attend the April 8&9 workshop of the National Academies' Coordinating Committee on Global Change and Climate Research Committee. I've attached below a brief overview of what we plan to discuss during the two-day workshop (you probably have already seen this).

Amanda Staudt and I were wondering if you would be willing to be a panelist for the discussion of Topic 4 (the new National Academies' study on Earth Observations from Space). We are looking for a brief presentation (10-15 minutes) sharing some thoughts about how this new study could be organized to be most useful, in the context of what is already underway within the observational component of the Climate Change Science Program and the US contributions to the International Group on Earth Observations. We imagine that you probably have some very salient perspectives on this issue. Specific questions we've asked the panelists to consider include:

- How this new study could be organized to be most useful to its sponsors, other federal agencies, and the ongoing activities of the international Group on Earth Observations (GEO)?
- How can the study best involve the scientific community so as to engage the breadth of relevant expertise?
- How can the study engage the user broad community so as to address their observational needs?
- What are major crosscutting issues that should be a focus of the study?
- What mechanisms might be effective for prioritizing among observational objectives?

Please let us know if you'd be willing to be a panelist in this session. We've scheduled this discussion for 1:20 pm on Friday, April 9. Feel free to give me (202-334-3607) or Amanda (202-334-2995) a call if you'd like to discuss.

Greg

<<global change workshop 03-08-04.doc>>

Gregory H. Symmes, Ph.D.
Associate Executive Director
Division on Earth and Life Studies
National Academies/National Research Council
500 Fifth Street, NW
Washington, DC 20001
phone: 202-334-3607
fax: 202-334-3362
email: gsymmes@nas.edu

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EDISON ELECTRIC INSTITUTE

*A Powerful Partner in a Competitive World*SM

Fax

To: Mr. Philip A. Cooney Esq.

Fax #: (202)-456-6546

From: Bill Fang Date: March 31, 2004

Pages: 11, including this cover sheet

Subject: See Attached

*wer by Association*SM

001892

701 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2696
Telephone 202-508-5000

EEI **EDISON ELECTRIC INSTITUTE**

March 31, 2004

Leif Hockstad
Environmental Protection Agency
Clean Air Markets Division (6204J)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
E-mail: *hockstad.leif@epa.gov.*

Re: Request for Comments on Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks, *69 Fed. Reg. 9623* (March 1, 2004)

Dear Mr. Hockstad:

The Edison Electric Institute (EEI) writes to you in response to the Environmental Protection Agency's (EPA) above-referenced notice concerning the availability of EPA's "Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2002" for public comment. We understand that the inventory is to be finalized by EPA and that it should be submitted by the State Department to the secretariat of the United Nation's Framework Convention on Climate Change (FCCC) by April 15, 2004, in accordance with Articles 4 and 12 of the FCCC and Decisions 3/CP.1 and 3/CP.5 of the Conference of the Parties (COP) to the FCCC.

EEI is the association of U.S. shareholder-owned electric companies, international affiliates and industry associations worldwide. Our U.S. members serve 90 percent of all customers served by the investor-owned segment of the industry. They generate more than 70 percent of all of the electricity generated by the electric utilities in the U.S. and serve nearly 70 percent of all ultimate customers of electricity in the nation. EEI has also been participating as a non-governmental organization in the development of the FCCC and its implementation through decisions of the COP since 1989.

Accordingly, enclosed are EEI's comments. Given the short public comment period afforded by EPA and the sheer size of the draft, our specific comments necessarily focus on the Executive Summary and on the other chapters of primary interest to EEI. If you have any questions, please contact me at (202-508-5617, bfang@eei.org) or Eric Holdsworth (202-508-5103, eholdsworth@eei.org).

Sincerely,

William L. Fang
Deputy General Counsel and
Climate Issue Director

Enclosure
WF:hm

cc (w/ enc):
Paula Dobriansky, Under Secretary of State, U.S. Department of State
Dr. Harlan Watson, Special Climate Negotiator, U.S. Department of State
James Connaughton, Chairman, Council on Environmental Quality
Philip Cooney, Chief of Staff, Council on Environmental Quality
Bryan Hannegan, Associate Director, Council on Environmental Quality

ENCLOSURE

EDISON ELECTRIC INSTITUTE COMMENTS ON ENVIRONMENTAL PROTECTION AGENCY'S DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2002

I. Process

EEI appreciates the opportunity for public comment. However, we are concerned that the maximum time afforded for that purpose by EPA is only 30 days and that the March 31 deadline for comments on this draft leaves only 15 days for EPA to consider and address the comments. While the draft apparently repeats many narrative provisions and other materials found in the prior year's inventory, it is more than 600 pages in length and contains numerous tables, figures, boxes and other materials. Thirty days is an inadequate amount of time for EEI and others in the public to review and digest the draft, compare it with prior year inventories, and provide constructive comments.

In addition, the draft is incomplete. There are numerous examples of materials that are missing or need "to be updated" (*e.g.*, Table ES-11 on p. ES-22; Figures ES-1, -2, -3 and 4 on pp. ES-4, ES-6 and ES-23; Figures 2-1, 2-2 and 2-3 on p. 21; and Figure 3-2 on p. 35). As a result, the public, including EEI, is asked to comment on an incomplete product that is to become an official submission by the U.S. under the FCCC. This is less than satisfactory.

Clearly, EPA should either find ways to shorten the inventory, possibly by eliminating portions that are merely repetitive of information provided in prior inventories and incorporating such

portions by reference to the prior year's inventory, or by ensuring that the draft is complete and available for public comment shortly after the first of the year. The "Preface" to the April 2002 inventory explains that it is EPA's policy to "allow at least 60 days for public review and comment when proposing new regulations or documents supporting regulatory development . . . and 30 days for non-regulatory documents of an informational nature such as the Inventory document." Presumably, this policy assumes that such "informational" documents are complete when made available for review and comment. Even if that were the case, 30 days is too brief for a document of this size and detail. For the next inventory, a longer period of at least 45 days should be applied as an exception to this general policy.

II. Comments

A. Executive Summary

1. P. ES-1. lines 9-17. We have several comments regarding the partially quoted material derived from Article 2 of the FCCC as contained in footnote 2. First, it is unclear why Article 2 of the FCCC, which applies to all Parties to the FCCC (*i.e.*, Annex I and non-Annex I) and has nothing to do with the inventory requirements that apply only to Annex I Parties, has been highlighted, instead of Article 12, titled "Communications of Information Related to Implementation of the FCCC."

Second, the quote is not fully accurate and complete. The word "ultimate," which precedes the use of the word "Objective" in the text of Article 2, should, along with the phrase "in accordance with the relevant provisions of the Convention," be a part of the quote in order to be accurate. If Article 2 is to be referred to in the draft, it should be quoted in full, as the current omissions are significant. However, our recommendation is to delete the reference and substitute the

applicable provisions of Article 12 of the FCCC, which expressly provides for the communication of the inventory to the FCCC's secretariat.

2. P. ES-1, lines 14-16. We suggest the insertion of "Annex I" before the word "Parties" on line 14, and footnote 3 should refer to Decision 3/CP.1 as well as Decision 3/CP.5. We suggest these changes because the quoted material leaves the impression that all Parties to the FCCC are committed to provide inventories on an annual basis. In fact, Decision 3/CP.1 provides in paragraph 2(b) that only Annex I Parties in accordance with Articles 12.1 and 12.2 of the Convention "are to submit [n]ational inventory data on emissions by sources and removals by sinks on an annual basis . . . for the period 1990-1993 by April 15, 1996" and each April 15 thereafter.

3. Pp. ES-4 – ES-6. We realize that the inventory is based on "estimates" of greenhouse gases and not on actual data, and that changes apparently have been made to various data as explained at p. 239 under the heading "**Recalculations and Improvements.**" However, we are concerned that Table ES-3, which appeared in the same format in the EPA April 15, 2002, and April 15, 2003, inventories for the periods 1990-2000 and 1990-2001, shows differing total numbers for 1990 and the subsequent years through 2000 for carbon dioxide (CO_2) as follows, with similar variations for these years for the other listed substances and for the totals for those years in the table:

Inventory	1990	1996	1997	1998	1999	2000
1990-2000	4,998.5	5,483.7	5,568.1	5,575.1	5,665.5	5,840.0
1990-2001	5,003.7	5,514.8	5,595.4	5,614.2	5,680.7	5,883.1
1990-2002	5,002.3	5,498.5	5,577.6	5,602.5	5,676.3	5,859.0

Similarly, there are changing numbers for Land-Use Change and Forestry (Sinks) as follows:

Inventory	1990	1996	1997	1998	1999	2000
1990-2000	(1,097.7)	(1,108.1)	(887.5)	(885.9)	(896.4)	(902.3)
1990-2001	(1,072.8)	(1,061.0)	(840.6)	(830.5)	(841.1)	(834.6)
1990-2002	(957.9)	(1,055.2)	(821.0)	(705.8)	(675.8)	(690.2)

There is no explanation given in the draft inventory as to why these changes in totals from year to year are being made or the basis for them. The discussion of "changes" to the inventory beginning at p. 239 is far too cryptic and does not appear to address this concern. While it can be useful to refine information, we question why the refinement should occur year to year, particularly since these are only estimates. While the differences may not always appear great, they could have significant consequences as future policy choices are made by the COP or by the U.S. At a minimum, there should be an explanation for these differences from inventory to inventory.

4. P. ES-6, lines 7 through 11. We recommend changing the second and fourth sentences to read as follows:

> The primary greenhouse gas emitted by human activities in the United States was CO_2, representing approximately 83 percent of total greenhouse gas emissions, down from 84 percent in 2001.
>
> Methane emissions, which have steadily declined since 1990, resulted primarily from decomposition of wastes in landfills, natural gas systems, and enteric fermentation associated with domestic livestock.

The EPA inventory for 1990-2001 said that CO_2 represented "approximately 84 percent of total greenhouse gas emissions." Thus, the "83 percent" in this inventory is a reduction and should be

so explained in this latest inventory. As to methane, Table ES-3 shows methane gas declining, and this also should be noted.

5. P. ES-7, lines 6-14. At the beginning the paragraph states, "Emissions from combustion resumed a modest growth in 2002, slightly less than the average annual growth rate since 1990." Table ES-3 of the draft shows that in 2001 the emissions were 5,558.8 teragrams of carbon equivalents (Tg CO_2 Eq.), a difference of 52.2 Tg CO_2 Eq. from 2001 to 2002, which is apparently the basis for the statement of "modest growth." However, the EPA inventory for 1990-2001 showed these emissions in 2001 to be 5,704.8 Tg CO_2 Eq., which is 183.8 Tg CO_2 Eq. greater than the amount shown in the draft for 2002 – a rather significant discrepancy between the two EPA inventories for which there appears to be no explanation in the draft. Indeed, if the prior inventory is relied upon, it shows a decline, not a "growth," from 2001 to 2002. This discrepancy needs to be resolved as it calls into question the entire paragraph.

In the case of land use change and forestry, the prior inventory stated that the net "CO_2 flux" decreased by "234 Tg CO_2 Eq. (22 percent) primarily due to a decline in the rate of net carbon accumulation in forest carbon stocks." The current draft changes "CO_2 flux" to "CO_2 sequestration," changes the net decrease to "267.1 Tg CO_2 Eq. (28 percent)" and adds a new explanation that the decline "largely resulted from a decrease in the estimated rate of forest soil sequestration caused by a slowing rate of increase in forest area after 1997," but indicates no source or basis for this new explanation. However, under the heading "Recalculations and Improvements," there is another explanation for "changes" in the draft as follows (p. 239):

> The following emission sources, which are listed in descending order of absolute average annual change in emissions from 1990 through 2001, underwent some of the most important methodological and historical data

changes. A brief summary of the recalculation and/or improvement undertaken is provided for each emission source.

- Land-Use Change and Forestry – The most influential of the changes in the calculation of CO_2 sequestration from land-use change and forestry was a switch in basing the estimates of non-soil forest carbon stocks and fluxes in other pools on state-based assessment rather than regionally-based assessment. Overall, this change, along with several other alterations, resulted in an average annual decrease in the new CO_2 sequestration of 126.8 Tg CO_2 Eq. (13.2 percent) for the period 1990 through 2001.

It appears that these changes are reflected in Chapter 7 "**Land-Use Change and Forestry**" and in related Annexes, which are quite lengthy and detailed. According to this explanation, the decline is less and the basis for the change is provided. However, the above explanation is for 1990-2001, which is the period covered by the prior year's inventory, not the 13-year period of 1990-2002 covered by the draft in the above-referenced table. In addition, it is not clear that this change is reflected in the discussions of trends related to sinks discussed below.

6. P. ES-7, lines 15-42 and P. ES-8, lines 1-5. Much of this discussion of "significant trends" for the 13-year period "from 1990 through 2002" is a repeat of the same items for the 12-year period "from 1990 through 2001" in the EPA inventory for April 15, 2003. In some items, such as bullet four, the material is identical to that in the prior inventory and it is unclear why it is repeated as part of a trend relevant to 2002, particularly since the decline occurred in the 1990s. Other bullets and trend data are repeated with changes largely only in the numbers from the last inventory to this draft. These changes are all derived from Table ES-3, which we questioned in point 3 above. We question whether these are actually trends or just changes in estimates. Moreover, we question the appropriateness of the draft essentially

Energy," much of the narrative is taken almost
ll as many of the statistics. However, the
to evaluate the narrative. The same is true of
ntory, which appears at pp. 38-39 – the
l to but are missing.

n" the inventory preparation process, the draft
planation is misleading because it implies that
ew periods, the "entire document" is available
ticularly the important statistical or data
rposes of this draft. Given the fact that much
ion in the prior inventory, it is difficult to
draft of non-confidential information for
to April 15 is too short, EPA should take the
for these reviews, recognizing that COP
date, provides that the inventory "should" be
ze tardiness.

repeating from inventory to inventory the same
"significant" without at least providing an expl

B. Other Chapters

1. Some of our comments on th
or similar provisions of the chapter titled "Intro
Greenhouse Gas Emissions." Note also that m
"Introduction" is repeated in the Executive Sur

In particular, we are concerned with language
Limitations of Emissions Estimates," which
providing "a solid foundation for the developm
national inventory." We do not understand thi
national inventory." In addition to the FCCC i
1605(a) of the Energy Policy Act of 1992 direc
Information Administration (EIA) to develop "
of each greenhouse gas" and, like EPA, to ann
that the 1605(a) inventory by EIA also provide
However, it is unnecessary in the context of th
based on estimates, to speculate on the possibl
detailed" and "comprehensive" future "nationa
requirements. Therefore, we suggest that the s
purpose of the draft.

From: Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Wednesday, March 31, 2004 9:50 AM
Cc: rmoss@usgcrp.gov
Subject: Guidelines for synthesis and assessment products

We are pleased to inform you that the draft guidelines for preparation of the synthesis and assessment products are available for public comment. They can be downloaded from the CCSP website, www.climatescience.gov, along with instructions for submitting comments.

While the draft guidelines have already received extensive agency review, we welcome additional comments from those within the agencies who are responsible for the synthesis and assessment products.

A notice of the availability of the draft guidelines will appear in the Federal Register in the next few days. We will also email an announcement to those who attended the December 2002 workshop.

Please help us spread the word to those you know who may be interested in reviewing and commenting on the draft guidelines.

Thank you.

Richard Moss

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office
(Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

From: Sandy MacCracken [smaccrac@usgcrp.gov]
Sent: Wednesday, March 31, 2004 11:31 AM
To: Hannegan, Bryan J.
Subject: RE: CCSP Meeting, Friday April 2, 9:00-11:00 am

Thanks, Bryan - Sorry about the terrible phone message - too many things at once!

See you Friday -
Sandy

>Got this message and will attend
>
>-----Original Message-----
>From: Sandy MacCracken [mailto:smaccrac@usgcrp.gov]
>Sent: Wednesday, March 31, 2004 8:18 AM
>To: Cooney, Phil; Hannegan, Bryan J.; Wuchte, Erin
>Subject: Fwd: CCSP Meeting, Friday April 2, 9:00-11:00 am
>
>
>Good Morning!
>
>Margarita sent this message out last Thursday, and she tells me that
>your email addresses bounced. I've checked them in the alias, and they
>seem OK, so I am assuming that you might have had problems with your
>email system that day.
>
>There will be more information regarding the meeting coming out in the
>next day, but I wanted to be sure you were aware of the meeting, and
>what the subject would be. If you'll let me know if you will be
>attending, I would appreciate it!
>
>Have a good day!
>Sandy
>
>>Date: Thu, 25 Mar 2004 17:33:45 -0500
>>From: "Margarita Gregg" <Margarita.Gregg@noaa.gov>
>>X-Accept-Language: en
>>Subject: CCSP Meeting, Friday April 2, 9:00-11:00 am
>>
>>The next meeting of the CCSP will be held Friday, 2 April, 9:00-11:00
>am
>>in the CCSP 1717 Pennsylvania office large conference room. The main
>>purpose of the meeting will be to discuss coordinating the integrated
>>Climate Change Science Program for Fiscal Year 2006. Additional
>>details, an agenda, and call in numbers will be sent prior to the
>>meeting. Please R.S.V.P. to Sandy MacCracken (smaccrac@usgcrp.gov) or
>>call (202)419-3483.
>>
>>
>>Thanks
>>Margarita
>>--
>>PLEASE NOTE NEW ADDRESS
>>
>>M.E. Conkright Gregg, Ph.D.
>>Temporarily at:
>>Climate Change Science Program Office
>>1717 Pennsylvania Avenue
>>Suite 250
>>Washington, D.C. 20006
>>Phone: (202)419-3466 or (301)713-3632
>>Fax: (202)223-3064
>>Email: Margarita.Gregg@noaa.gov

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>
>--
>Sandy MacCracken
>Administrator
>Climate Change Science Program Office
>U.S. Global Change Research Program
>1717 Pennsylvania Avenue NW
>Suite 250
>Washington, DC 20006
>Tel: 202-419-3483
>Fax: 202-223-3065
>Email: smaccrac@usgcrp.gov

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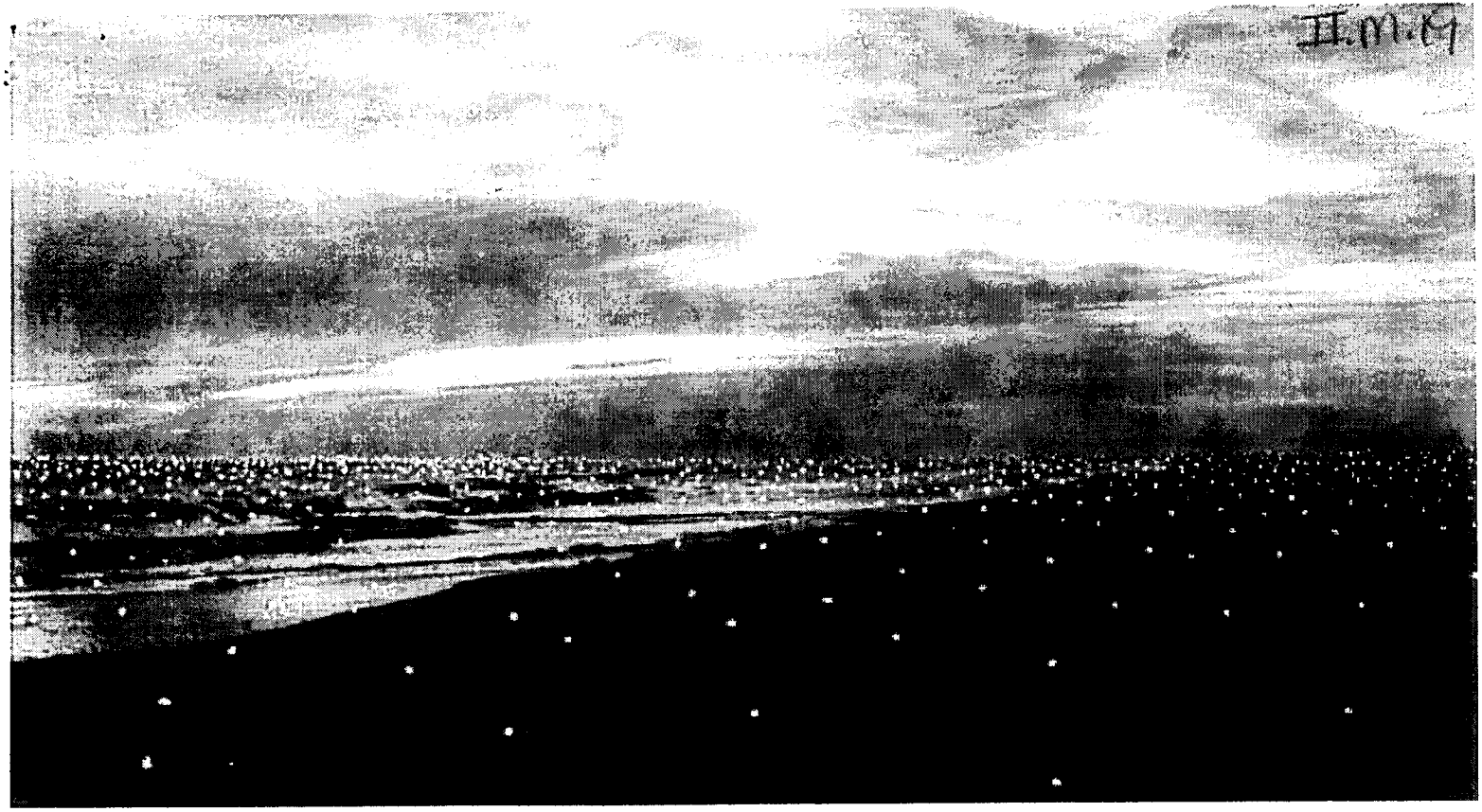


HUMAN-MADE climate forcings, mainly greenhouse gases, heat the earth's surface at a rate of about two watts per square meter—the equivalent of two tiny one-watt bulbs burning over every square meter of the planet. The full effect of the warming is slowed by the ocean, because it can absorb so much heat. The ocean's surface begins to warm, but before it can heat up much, the surface water is mixed down and replaced by colder water from below. Scientists now think it takes about a century for the ocean to approach its new temperature.

achieve that goal in ways that do not disrupt the global economy. Defining the level of warming that constitutes "dangerous anthropogenic interference" is thus a crucial but difficult part of the problem.

The U.N. established an Intergovernmental Panel on Climate Change (IPCC) with responsibility for analysis of global warming. The IPCC has defined climate-forcing scenarios, used these for simulations of 21st-century climate, and estimated the impact of temperature and precipitation changes on agriculture, natural ecosystems, wildlife and other matters. The IPCC estimates sea-level change as large as several tens of centimeters in 100 years, if global warming reaches several degrees Celsius. The group's calculated sea-level change is due mainly to thermal expansion of ocean water, with little change in ice-sheet volume.

These moderate climate effects, even with rapidly increasing greenhouse gases, leave the impression that we are not close to dangerous anthropogenic interference. I will argue, however, that we are much closer than is generally realized, and thus the emphasis should be on mitigating the changes rather than just adapting to them.

The dominant issue in global warming, in my opinion, is sea-level change and the question of how fast ice sheets can disintegrate. A large portion of the world's people live within a few meters of sea level, with trillions of dollars of infrastructure. The need to preserve global coastlines sets a low ceiling on the level of global warming that would constitute dangerous anthropogenic interference.

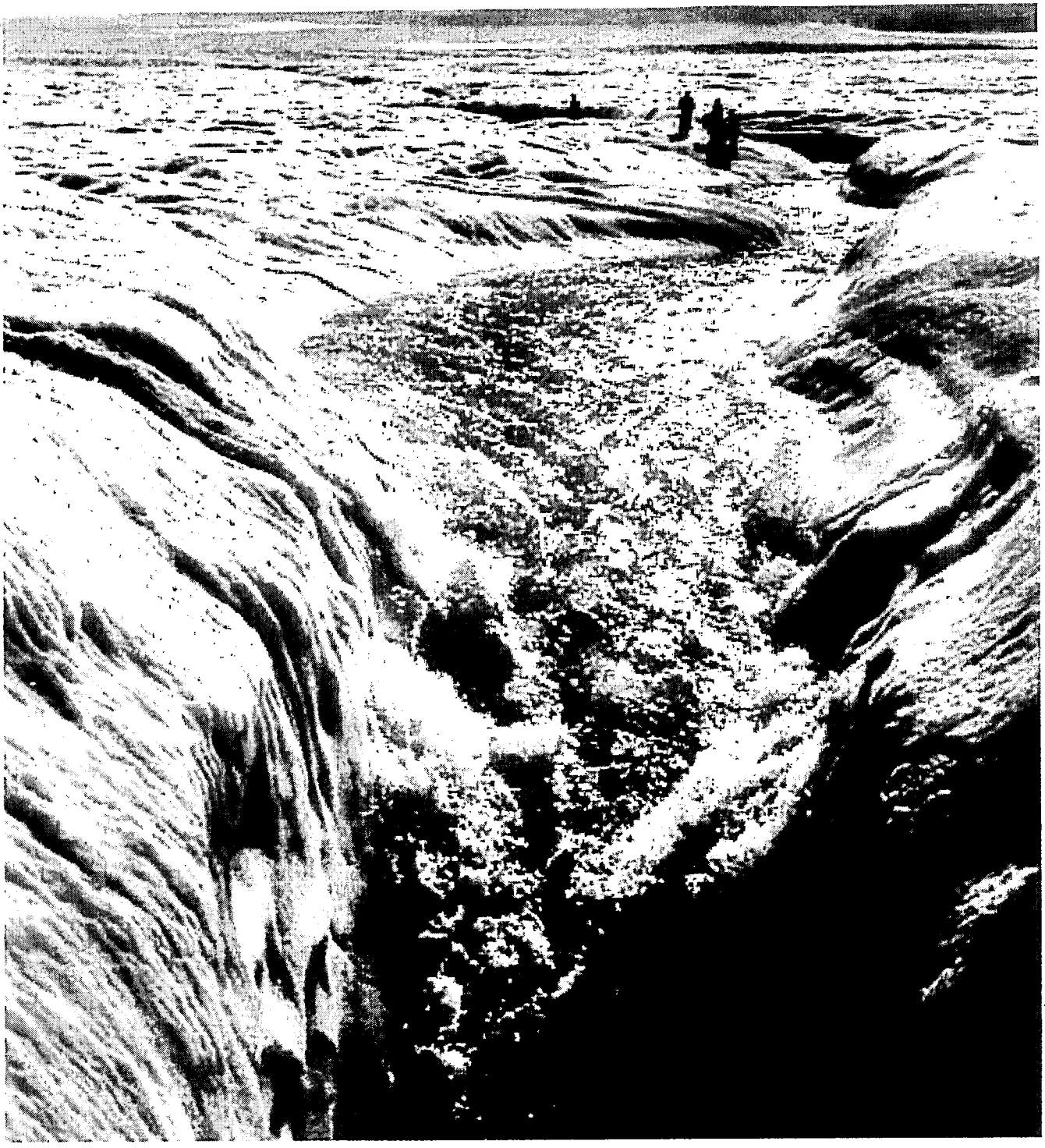
The history of the earth and the present human-made planetary energy imbalance together paint a disturbing picture about prospects for sea-level change. Data from the Antarctic temperature record show that the warming of the past 50 years has taken global temperature back to approximately the peak of the current interglacial (the Holocene). There is some additional warming in the pipeline that will take us about halfway to the highest global temperature level of the previous interglacial (the Eemian), which was warmer than the Holocene, with sea level estimated to have been five to six meters higher. One additional watt per square meter of forcing, over and above that today, will take global temperature approximately to the maximum level of the Eemian.

The main issue is: How fast will ice sheets respond to global warming? The IPCC calculates only a slight change in the ice sheets in 100 years; however, the IPCC calculations include only the gradual effects of changes in snowfall, evaporation and melting. In the real world, ice-sheet disintegration is driven by highly nonlinear processes and feedbacks. The peak rate of deglaciation following the last ice age was a sustained rate of melting of more than 14,000 cubic kilometers a year—about one meter of sea-level rise every 20 years, which was maintained for several centuries. This period of most rapid melt coincided, as well

THE AUTHOR

JAMES HANSEN is director of the NASA Goddard Institute for Space Studies and a researcher at the Columbia University Earth Institute. He received his Ph.D. in physics and astronomy from the University of Iowa, where he studied under James Van Allen. Hansen is best known for his testimony to congressional committees in the 1980s that helped to raise awareness of the global warming issue.

RANDY HARRIS



ON A SLIPPERY SLOPE to disaster, a stream of snowmelt cascades down a moulin on the Greenland ice sheet during a recent summer. The moulin, a near-vertical shaft worn in the ice by surface water, carries water to the base of the ice sheet. There the water is a lubricating fluid that speeds motion and disintegration of the ice sheet. Ice sheet growth is a slow, dry process, inherently limited by the snowfall rate, but disintegration is a wet process, driven by positive feedbacks, and once well under way it can be explosively rapid.

as can be measured, with the time of most rapid warming.

Given the present unusual global warming rate on an already warm planet, we can anticipate that areas with summer melt and rain will expand over larger areas of Greenland and fringes of Antarctica. Rising sea level itself tends to lift marine ice shelves that buttress land ice, unhinging them from anchor points. As ice shelves break up, this accelerates movement of land ice to the ocean. Although building of glaciers is slow, once an ice sheet begins to collapse, its demise can be spectacularly rapid.

The human-induced planetary energy imbalance provides an ample supply of energy for melting ice. Furthermore, this energy source is supplemented by increased absorption of sunlight by ice sheets darkened by black-carbon aerosols, and the positive feedback process as meltwater darkens the ice surface.

These considerations do not mean that we should expect large sea-level change in the next few years. Preconditioning of ice sheets for accelerated breakup may require a long time, perhaps many centuries. (The satellite ICESat, recently launched by NASA, may be able to detect early signs of accelerating ice-sheet breakup.) Yet I suspect that significant sea-level rise could begin much sooner if the planetary energy imbalance continues

we are much closer to **dangerous anthropogenic interference** than is generally realized

to increase. It seems clear that global warming beyond some limit will make a large sea-level change inevitable for future generations. And once large-scale ice-sheet breakup is under way, it will be impractical to stop. Dikes may protect limited regions, such as Manhattan and the Netherlands, but most of the global coastlines will be inundated.

I argue that the level of dangerous anthropogenic influence is likely to be set by the global temperature and planetary radiation imbalance at which substantial deglaciation becomes practically impossible to avoid. Based on the paleoclimate evidence, I suggest that the highest prudent level of additional global warming is not more than about one degree C. This means that additional climate forcing should not exceed about one watt per square meter.

Climate-Forcing Scenarios

THE IPCC defines many climate-forcing scenarios for the 21st century based on multifarious "story lines" for population growth, economic development and energy sources. It estimates that added climate forcing in the next 50 years is one to three watts per square meter for carbon dioxide and two to four watts per square meter with other gases and aerosols included. Even the IPCC's minimum added forcing would cause dangerous anthropogenic interference with the climate system based on our criterion.

The IPCC scenarios may be unduly pessimistic, however. First, they ignore changes in emissions, some already under way, because of concerns about global warming. Second, they assume that true air pollution will continue to get worse, with ozone, methane and black carbon all greater in 2050 than in 2000. Third, they give short shrift to technology advances that can reduce emissions in the next 50 years.

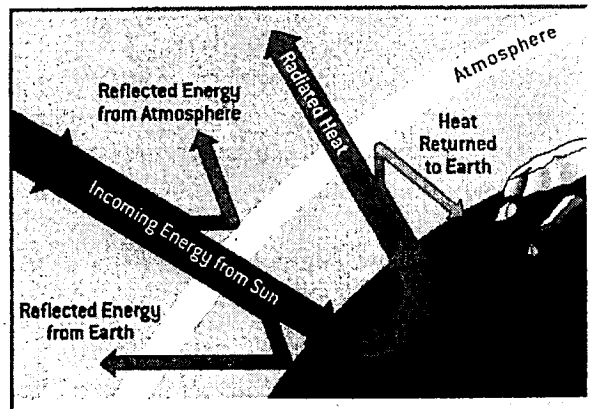
An alternative way to define scenarios is to examine current trends of climate-forcing agents, to ask why they are changing as observed, and to try to understand whether reasonable actions could encourage further changes in the growth rates.

The growth rate of the greenhouse-gas climate forcing peaked in the early 1980s at almost 0.5 watt per square meter per decade but declined by the 1990s to about 0.3 watt per square meter per decade. The primary reason for the decline was reduced emissions of chlorofluorocarbons, whose production was phased out because of their destructive effect on stratospheric ozone.

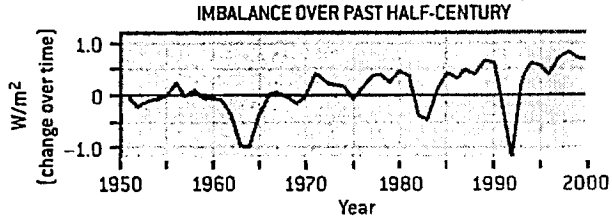
The two most important greenhouse gases, with chlorofluorocarbons on the decline, are carbon dioxide and methane. The growth rate of carbon dioxide surged after World War II, flattened out from the mid-1970s to the mid-1990s, and rose moderately in recent years to the current growth rate of about two parts per million per year. The methane growth rate has declined dramatically in the past 20 years, by at least two thirds.

EARTH'S ENERGY IMBALANCE

THE EARTH'S ENERGY is balanced when the outgoing heat from the earth equals the incoming energy from the sun. At present the energy budget is not balanced (*diagram* and *table*). Human-made aerosols have increased reflection of sunlight by the earth, but this reflection is more than offset by the trapping of heat radiation by greenhouse gases. The excess energy—about one watt per square meter—warms the ocean and melts ice. The simulated planetary energy imbalance (*graph*) is confirmed by measurements of heat stored in the oceans. The planetary energy imbalance is a critical metric, in that it measures the net climate forcing and foretells future global warming already in the pipeline.



TOTAL INCOMING SOLAR ENERGY	340 W/m²
TOTAL OUTGOING ENERGY	339 W/m²
REFLECTED ENERGY (from atmosphere and surface)	101 W/m²
100 W/m² because of natural processes	
1 W/m² because of human-made aerosols	
RADIATED HEAT (from land and ocean sinks)	238 W/m²
240 W/m² because of natural processes	
−2 W/m² because of human-made greenhouse gases, which return heat to the surface	
NET RESULT	1 W/m²
1 W/m² of excess energy, which warms the oceans and melts glaciers and ice sheets	



JEN CHRISTIANSEN; SOURCE: JAMES HANSEN

the emphasis should be on mitigating the changes rather than just adapting to them

These growth rates are related to the rate of global fossil-fuel use. Fossil-fuel emissions increased by more than 4 percent a year from the end of World War II until 1975 but subsequently by only about 1 percent a year. The change in fossil-fuel growth rate occurred after the oil embargo and price increases of the 1970s, with subsequent emphasis on energy efficiency. Methane growth has also been affected by other factors, including changes in rice farming and increased efforts to capture methane at landfills and in mining operations.

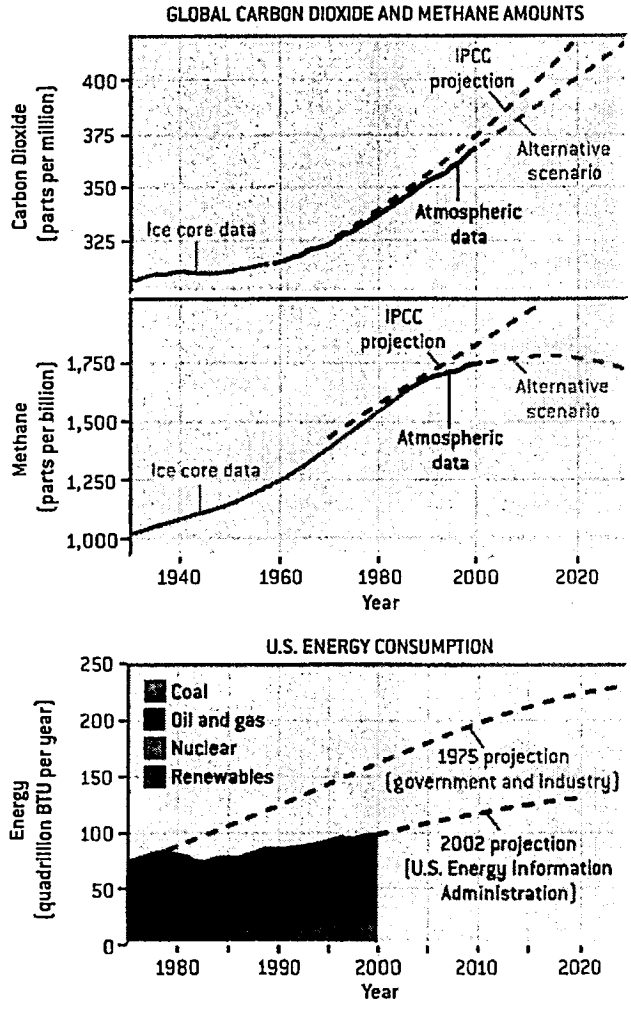
If recent growth rates of these greenhouse gases continued, the added climate forcing in the next 50 years would be about 1.5 watts per square meter. To this must be added the change caused by other forcings, such as atmospheric ozone and aerosols. These forcings are not well monitored globally, but it is known that they are increasing in some countries while decreasing in others. Their net effect should be small, but it could add as much as 0.5 watt per square meter. Thus, if there is no slowing of emission rates, the human-made climate forcing could increase by two watts per square meter in the next 50 years.

This "current trends" growth rate of climate forcings is at the low end of the IPCC range of two to four watts per square meter. The IPCC four watts per square meter scenario requires 4 percent a year exponential growth of carbon dioxide emissions maintained for 50 years and large growth of air pollution; it is implausible.

Nevertheless, the "current trends" scenario is larger than the one watt per square meter level that I suggested as our current best estimate for the level of dangerous anthropogenic in-

REDUCING EMISSIONS

OBSERVED AMOUNTS of carbon dioxide and methane (*top two graphs*) fall below IPCC estimates, which have proved consistently pessimistic. Although the author's alternative scenario agrees better with observations, continuation on that path requires a gradual slowdown in carbon dioxide and methane emissions. Improvements in energy efficiency (*bottom graph*) have allowed energy use in the U.S. to fall below projections in recent decades, but more rapid efficiency gains are needed to achieve the carbon dioxide emissions of the alternative scenario, unless nuclear power and renewable energies grow substantially.



JEN CHRISTIANSEN; SOURCE: JAMES HANSEN (*graphs*); MARK BOULTON *Photo Researchers, Inc.* (*photograph*)

fluence. This raises the question of whether there is a feasible scenario with still lower climate forcing.

A Brighter Future

I HAVE DEVELOPED a specific alternative scenario that keeps added climate forcing in the next 50 years at about one watt per square meter. It has two components: first, halt or reverse growth of air pollutants, specifically soot, atmospheric ozone and methane; second, keep average fossil-fuel carbon dioxide emissions in the next 50 years about the same as today. The carbon dioxide and non–carbon dioxide portions of the scenario are equally important. I argue that they are feasible and at the same time protect human health and increase agricultural productivity.

In addressing air pollution, we should emphasize the constituents that contribute most to global warming. Methane offers a great opportunity. If human sources of methane are reduced, it may even be possible to get the atmospheric methane amount to decline, thus providing a cooling that would partially offset the carbon dioxide increase. Reductions of black-carbon aerosols would help counter the warming effect of reductions in sulfate aerosols. Atmospheric ozone precursors, besides methane, especially nitrogen oxides and volatile organic compounds, must be reduced to decrease low-level atmospheric ozone, the prime component of smog.

Actions needed to reduce methane, such as methane capture at landfills and at waste management facilities and during the mining of fossil fuels, have economic benefits that partially offset the costs. In some cases, methane's value as a fuel entirely pays for the cost of capture. Reducing black carbon would also have economic benefits, both in the decreased loss of life and work-years (minuscule soot particles carry toxic organic compounds and metals deep into lungs) and in increased agricultural productivity in certain parts of the world. Prime sources of black carbon are diesel fuels and biofuels (wood and cow dung, for example). These sources need to be dealt with for health reasons. Diesel could be burned more cleanly with improved technologies; however, there may be even better solutions, such as hydrogen fuel, which would eliminate ozone precursors as well as soot.

Improved energy efficiency and increased use of renewable energies might level carbon dioxide emissions in the near term. Long-term reduction of carbon dioxide emissions is a greater challenge, as energy use will continue to rise. Progress is needed across the board: continued efficiency improvements, more renewable energy, and new technologies that produce little or no carbon dioxide or that capture and sequester it. Next-generation nuclear power, if acceptable to the public, could be an important contributor. There may be new technologies before 2050 that we have not imagined.

Observed global carbon dioxide and methane trends [*see box on opposite page*] for the past several years show that the real world is falling below all IPCC scenarios. It remains to be proved whether the smaller observed growth rates are a fluke, soon to return to IPCC rates, or are a meaningful difference. In contrast, the projections of my alternative scenario and the observed growth rates are in agreement. This is not surprising, because that scenario was defined with observations in mind. And in the three years since the alternative scenario was defined, observations have continued on that path. I am not suggesting, however, that the alternative scenario can be achieved without concerted efforts to reduce anthropogenic climate forcings.

How can I be optimistic if climate is closer to the level of dangerous anthropogenic interference than has been realized? If we compare the situation today with that 10 to 15 years ago, we note that the main elements required to halt climate change have come into being with remarkable rapidity. I realize that it will not be easy to stabilize greenhouse-gas concentrations, but I am optimistic because I expect that empirical evidence for climate change and its impacts will continue to accumulate and that this will influence the public, public-interest groups, industry and governments at various levels. The question is: Will we act soon enough? SA

For an expanded version of this article, including more data and additional sources, see www.sciam.com/ontheweb

BUT WHAT ABOUT . . .

"Last winter was so cold! I don't notice any global warming!"

Global warming is ubiquitous, but its magnitude so far is only about one degree Fahrenheit. Day-to-day weather fluctuations are roughly 10 degrees F. Even averaged over a season this natural year-to-year variability is about two degrees F, so global warming does not make every season warmer than a few decades ago. But global warming already makes the probability of a warmer than "normal" season about 60 percent, rather than the 30 percent that prevailed from 1950 to 1980.

"The warming of the past century is just a natural rebound from the little ice age."

Any rebound from the European little ice age, which peaked in 1650–1750, would have been largely complete by the 20th century. Indeed, the natural long-term climate trend today would be toward a colder climate were it not for human activities.

"Isn't human-made global warming saving us from the next ice age?"

Yes, but the gases that we have added to the atmosphere are already far more than needed for that purpose.

"The surface warming is mainly urban 'heat island' effects near weather stations."

Not so. As predicted, the greatest warming is found in remote regions such as central Asia and Alaska. The largest areas of surface warming are over the ocean, far from urban locations [see maps at www.giss.nasa.gov/data/update/gistemp]. Temperature profiles in the solid earth, at hundreds of boreholes around the world, imply a warming of the continental surfaces between 0.5 and one degree C in the past century.

JAMES HANSEN

USG Climate Calendar, 2002					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
10/1/2002	10/2/2002	Washington, DC	DOT Workshop: Potential Impacts of Climate Change on Transportation.	DOT / DOE, EPA, USGCRP	Joanne Potter, joanne.r.potter@fhwa.dot.gov, 202-366-2067
10/9/2002	10/10/2002	Shepardstown, WV	Foresty and Agriculture Greenhouse Gas Modeling Forum	USDA / EPA	Carol Jones, cjones@ers.usda.gov, 202 596-5505
10/21/2002	10/25/2002	Fairfax, Virginia	Climate Diagnostics Workshop (public meeting)	DOC(NOAA)	Wanye Higgins, wayne.higgins@noaa.gov
10/23/2002	11/3/2002	New Dehli, India	UNFCCC Conference of the Parties 8 (COP 8). Continuation of ongoing climate negotiations	STATE / DOE, EPA,USDA, CEA	
10/28/2002	10/30/2002	Washington, D.C	Climate Prediction Assessments Workshop (public meeting)	DOC(NOAA)	Mike Brewer, michael.j.brewer@noaa.gov
10/29/2002	10/30/2002	Washington, D.C	Climate Leaders GHG Inventory Protocol and Goal Setting Workshop	EPA	Tom Kerr, kerr@epa.gov, 202 564-0047
11/18/2002	11/19/2002	Washington, D.C.	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot.Anderson@hq.doe.gov, 202 586-2589
11/19/2002	11/20/2002	Charleston, South Carolina	Data Access meeting (pulbic meeting)	DOC (NOAA)	Tom Karl, thomas.r.karl@noaa.gov
11/19/2002	11/21/2002	Raleigh, NC	USDA Symposium on Natural Resource Management for GHG Offsets	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
11/20/2002	11/22/2002	Annapolis, MD	5th Annual State and Local Climate Change Partners Conference	EPA / DOE, USDA	Andres Denny, denny.andrea@epa.gov, 202-564-3467
11/22/2002	11/22/2002	Raleigh, NC	Bilateral with Australia on Sinks	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698

USG Climate Calendar, 2002					
Begin	End	Location	Event and Purpose	LEAD/ Other Participants	Point of Contact: Name, e mail and phone number)
12/3/2002	12/5/2002	Washington, D.C.	U.S. Climate Change Science Program. Workshop for Scientists and Stakeholders	DOC / USDA, DOD, DOE, DOI, DOT, EPA, NASA, NSF, SI, USAID, USGS	Dr. James Mahoney, James.R. Mahoney@noaa.gov, 202 482-3567
12/5/2002	12/6/2002	Chicago, Illinois	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/9/2002	12/10/2002	San Francisco	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/10/2002	12/11/2002	Geneva	28th Session IPCC Bureau	DOS	Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
12/12/2002	12/13/2002	Houston, Texas	1605(b) Workshop (public meeting)	DOE/EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/12/2002	12/13/2003	Tokyo	Japan Market-Mechanisms Working Group	Interagency Team	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
12/17/2002	12/17/2002	Washington, D C.	U.S. - Canada Bilateral	DOS, DOE, EPA, NOAA	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-

USG Climate Calendar, 2003					
Begin	End	Location	Event and Purpose	LEAD/ Other Participants	Point of Contact: Name, e-mail and phone number)
1/6/2003	1/9/2003	Pasadena, CA.	ESIP Federation Meeting	NASA	Dave Jones, dave@stormcenter.com
1/9/2003	1/11/2003	Bethesda, MD.	International Global Observing Strategy (IGOS) Water Cycle Workshop	DOC/NOAA	contacts: Jared Entin, jentin@hq.nasa.gov and Rick Lawford,richard.lawford@noaa.gov
1/13/2003	1/16/2003	Beijing	China Interagency Scoping Meeting	DOS, DOE, EPA, NOAA, NSF, USDA, CEA (tentative team)	Cynthia Brady, bradyca@state.gov, 202-647-2425
1/14/2003	1/15/2003	TBD	Agriculture Accounting Rules and Guidelines public meeting	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
1/15/2003	1/18/2003	Moscow	U.S. - Russia bilateral/world climate change conference committee	DOS	Rob Scott, scottrk@state.gov, 202-647-4688
1/16/2003	1/16/2003	Washington, DC	TRB Annual Meeting, Session on Understanding the Impacts of Climate Change on Transportation: A Research Agenda	DOT/NASA	Joanne Potter, joanne.r potter@fhwa.dot.gov, 202-366-2067
1/21/2003	1/23/2003	Panama	CONCAUSA bilateral meeting	interagency team	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
1/23/2003	1/23/2003	Washington, D.C.	Forest Accounting Rules and Guidelines (public meeting)	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
1/31/2003	1/31/2003	Baton Rouge, LA	National Weather Service/Louisiana State University Climate & Extension Workshop	DOC/NOAA	Fiona Horsfall, Climate Services Division, NOAA/National Weather Service, (301) 713-1970 ext 137.
2/5/2003	2/6/2003	Washington	US-EU Research Scoping Meeting	DOS/Interagency	Dr Harlan Watson, watsonhl@state.gov, 202-647-3489

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
2/9/2003	2/13/2003	Long Beach, CA.	American Meteorological Society Annual Meeting		Email: amsinfor@ametsoc.org, URL:ametsoc.org/AMS/.
2/10/2003	2/14/2003	New Delhi	Interagency Scoping Meetings	DOS/Interagency	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
			UNFCCC Workshop on definitions and modalities for including afforestation and		
2/11/2003	2/14/2003	Foz Do Iguacu, Brazil	reforestation project activities under Article 12 of the Kyoto Protocol in the first commitment period		Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
2/13/2003	2/18/2003	Denver, CO.	AAAS Annual Meeting		URL: www.aaas.org/meetings
2/16/2003	2/21/2003	Geneva	IPCC Plenary	Interagency team	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
2/25/2003	2/28/2003	Pasadena, CA.	2003 AVIRIS Earth Science and Applications Workshop	NASA	Robert Green, rog@mail2.jpl.nasa.gov
3/10/2003	3/14/2003	Japan	Nuclear/Sustainable Development Conference		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
3/11/2003	3/13/2003	Boston, MA.	Eleventh Annual Workshop on Adaptive Sensor Array Processing (ASAP 2003)	NASA	James Ward, jward@ll.mit.edu, URL:www.ll.mit.edu/asap.
3/11/2003	3/14/2003	Paris, France	OECD Annex 1 Expert Group		Vaughan Turekian, turekianvc@state.gov, 202-647-4283
3/16/2003	3/18/2003	Mexico	Bilateral Meeting with Mexico	DOS/Interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511

USG Climate Calendar, 2003					
Begin	End	Location	Event and Purpose	LEAD/ Other Participants	Point of Contact: Name, e-mail and phone number)
3/31/2003	4/3/2003	Beijing	International Climate Change Symposium		Cynthia Brady, bradyca@state.gov, 202-647-2425
3/31/2003	4/3/2003	Kuala Lumpur, Malaysia	IPCC GPG on LULUCF Authors meeting	EPA/USDA	William Hohenstein, whohenst@oce usda.gov, 202 720-6698
4/6/2003	4/11/2003	Nice, France	AGU/European Geographical Society (EGS)/European Union of Geosciences (EUG) Joint Spring Meeting		Email:EGS@copernicus.org, URL www.copernicus.org/EGS/egsga/nice03/
4/6/2003	4/12/2003	Mauritius	Non-Annex 1 National Communication		Dr Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
4/9/2003	4/10/2003	Ghent, Belgium	UNFCCC Workshop on Enabling Environments for Technology Transfer		Rob Scott, scottrk@state.gov, 202-647-4688
4/14/2003	4/16/2003	Marrakesh	1st Scoping Meeting for the IPCC Fourth Assessment Report		Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
4/15/2003	4/15/2003	Washington, D.C	ENERGY STAR Awards Ceremony	EPA	Maria Vargas, vargas.maria@epa gov, 202 564-9178
4/22/2003	4/24/2003	Washington, D.C.	Earth Technologies Forum 2003	EPA/DOE, USAID, others	Maria Vargas, vargas.maria@epa.gov, 202 564-9178
5/5/2003	5/8/2003	Alexandria, VA.	Second Annual Conference on Carbon Sequestration	DOE/NETL, USDA; others	John Litynski John Litynski@netl.doe gov; (304) 285-1339
5/6/2003	5/8/2003	Le Gran-Hornu, Belgium	UNFCCC European Regional Workshop on the New Delhi work programme on UNFCCC Article 6		Rob Scott, scottrk@state.gov, 202-647-4688

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
5/7/2003	5/9/2003	TBD	CCAP Dialogue on Future Actions		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
5/7/2003	5/9/2003	Anchorage, AK.	American Society of Photgrammetry and Remote Sensing		Thomas Eidel, teidel@gci.net, URL: www.asprs.org/alaska2003/
5/20/2003	5/20/2003	Brussels	CEPS Conference (Climate Change Conference)		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
6/2/2003	6/4/2003	Raleigh, NC	Anaerobic Digester Technology Applications in Animal Agriculture -- A national summit	USDA, DOE, EPA	Tom Christensen, USDA/NRCS www.wef.org, 301 504 2198
6/2/2003	6/3/2003	Towson University, Baltimore, MD.	16th Annual Geographic Information Sciences Conference		John Morgan, (410) 704-2964, Fax: (410)704-3888, Email: jmorgan@towson.edu, URL: cgis.towson.edu/tugis2003
6/3/2003	6/13/2003	Bonn, Germany	SBSTA/SBI	State and many others	
6/4/2003	6/6/2003	New Orleans, LA.	Oceanology International (OI) Americas		www.oiamericas.com
6/10/2003	6/11/2003	Washington, D.C	Climate Leaders Partners Workshop	EPA	Tom Kerr, kerr.tom@epa.gov, 202-564-0047
6/10/2003	6/13/2003	Vienna, Austria	OECD Workshop on biomass and agriculture	USDA/DOE	Paul Adler USDA/ARS Bill Hohenstein 202 720-6698
6/23/2003	6/25/2003	Washington, D.C.	Carbon Sequestration Leadership Forum	DOS/DOE	Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
6/26/2003	6/27/2003	Washington, D.C	Fourth Meeting of the US-China Working Group on Climate Change	DOS/Interagency	Cynthia Brady, bradyca@state.gov, 202-647-2425

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
6/30/2003	7/11/2003	Saporo, Japan	International Union of Geodesy and Geophysics 2003		Email: IUGG_service@jamstec.go.jp, URL: www.jamstec go.jp/jamstec-e/iugg/index.html
7/13/2003	7/18/2003	New London, New Hampshire	Gordon Conference On "Solar Radiation And Climate"	DOC/NOAA	V. Ramaswamy, NOAA/GFDL, vr@gfdl.noaa.gov
7/21/2003	7/25/2003	Toulouse, France	IGARSS 2003		Email: grss@ieee.org, URL: www.igarss03.com
8/30/2003	9/6/2003	Grindelwald, Switzerland	Second International Swiss NCCR Climate Summer School: "Climate Change - Impacts of Terrestrial Ecosystems."		Kaspar Meuli, Email. nccr-climate@giub.unibe.edu, URL: www.nccr-climate.unibe.ch
4/26/2004	4/27/2004	Geneva, Switzerland	Intergovernmental Panel on Climate Change (IPCC) meeting of Bureau 1 on Science	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
4/28/2004	4/30/2004	Geneva, Switzerland	IPCC Bureau 31st Session	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
5/4/2004	5/5/2004	Selfoss, Iceland	Senior Arctic Officials Meeting - climate issues addressed	DOS and others	Sally Brandel, BrandelSK@state,gov, 202-647-3264
5/18/2004	5/20/2004	Brasilia, Brazil	U.S.-Brazil Bilateral	DOS/interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
5/26/2004	5/27/2004	Beijing, China	International Partnership for the Hydrogen Economy (IPHE) Steering Committee meeting	DOE/DOT/State	Bob Dixon, e-mail. robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov

USG Climate Calendar, 2004					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
4/26/2004	4/27/2004	Geneva, Switzerland	Intergovernmental Panel on Climate Change (IPCC) meeting of Bureau 1 on Science	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
4/28/2004	4/30/2004	Geneva, Switzerland	IPCC Bureau 31st Session	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
5/4/2004	5/5/2004	Selfoss, Iceland	Senior Arctic Officials Meeting - climate issues addressed	DOS and others	Sally Brandel, BrandelSK@state,gov, 202-647-3264
5/18/2004	5/20/2004	Brasilia, Brazil	U.S.-Brazil Bilateral	DOS/interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
5/26/2004	5/27/2004	Beijing, China	International Partnership for the Hydrogen Economy (IPHE) Steering Committee meeting	DOE/DOT/State	Bob Dixon, e-mail: robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov
5/31/2004	6/4/2004	Brazil	Soil Carbon Sequestration Workshop	USDA/DOS	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
6/1/2004	6/4/2004	Bonn, Germany	International Conference on Renewable Energy	DOE/DOS	
6/2/2004	6/5/2004	Mauritius	IPCC GHG Inventory Guidelines Development	EPA/USDA/others	Dina Kruger
6/16/2004	6/25/2004	Bonn, Germany	UN Framework Convention on Climate Change (UNFCCC), 20th Session of Subsidiary Bodies to the UNFCCC	DOS/interagency	Dr. Harlan Watson, Watsonhl@state.gov, 202-647-3489
6/22/2004	6/25/2004	Amsterdam, The Netherlands	Group on Earth Observations (GEO-5)	NOAA/DOS	

USG Climate Calendar, 2004					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
8/30/2004	9/2/2004	Mauritius	Small Island Developing States Review of Barbados Plan of Action	DOS	Shira Yoffe, YoffeSB@state.gov, 202-736-7092
9/13/2004	9/15/2004	Australia	Carbon Sequestration Leadership Forum (CSLF) Ministerial	DOE/DOS	
9/24/2004	9/25/2004	Reykjavik, Iceland	International Partnership for the Hydrogen Econmoy Implementation - Liaison Committee Meeting	DOE/DOT/State	Bob Dixon, e-mail: robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov
10/4/2004	10/8/2004	Paris, France	OECD Annex 1 Expert Group + IEA Emissions Trading Workshop - discuss variety of climate issues with OECD countries	DOS/EPA, DOE	Trigg Talley, talleyt@state.gov, 202-647-4069
10/11/2004	10/15/2004	London, UK	International Maritime Organization - Marine Environment Protection Committee 52 - negotiation of actions on intl maritime emissions	DOS/Coast Guard, EPA, DOD	Christo Artusio, artusiocf@state.gov, 202-647-4295, +others
11/11/2004	11/12/2004	Paris, France	OECD Global Forum on Development and Climate Change	DOS	Dr. Harlan Watson, WatsonHL@state.gov, 202-647-3489
12/6/2004	12/17/2004	Buenos Aires, Argentina	UNFCCC 10th Conference of the Parties	DOS/interagency	Dr. Harlan Watson, WatsonHL@state.gov, 202-647-3489

RECORD TYPE: FEDERAL (NOTES MAIL)

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CREATION DATE/TIME: 6-APR-2004 10:47:33.00

SUBJECT:: Updated & Revised April 8-9 Workshop Agenda

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TEXT:
Dear Friends,

Attached is an updated and revised agenda for the "Issues in Climate and Global Change Workshop" being held at 500 Fifth Street NW Keck Center of the National Academies April 8-9, 2004. You may also view the agenda and download background information at http://dels.nas.edu/ccgc/coord_meet.asp.

<<CCGC-CRC Agenda Apr 8-9, 2004 4-05-04.doc>>

Additionally, please refer to the Draft Guidelines for Preparing CCSP Synthesis and Assessment Products (http://www.climatescience.gov/Library/sap/sap-guidelines-29mar2004.pdf) which will be discussed during the workshop.

Regards,

Byron

Byron Mason
Senior Project Assistant
Division on Earth and Life Studies
The National Academies
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Phone: (202) 334-3511

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THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Coordinating Committee on Global Change and Climate Research Committee

DRAFT Agenda
April 8-9, 2004

National Academies
Keck Center Room 100
500 5th Street, NW
Washington, DC, 20001

The objectives of this meeting are:
1. Discuss lessons learned from advisory groups for federal global change science and technology;
2. Discuss global change science and technology assessments;
3. Discuss climate and global change observing systems; and
4. Discuss new National Academies study on Earth Observations from Space.

Thursday, April 8, 2004

OPEN SESSION

8:30 A.M. Welcome and introductions — Peter Raven, *Chair, Coordinating Committee on Global Change*

8:45 A.M. Implementing Climate and Global Change Research — Thomas Graedel, *Chair, Committee to Review the US CCSP Strategic Plan*

9:15 A.M. Discussion in plenary

10:15 A.M. Break

TOPIC 1: Lessons Learned from Advisory Groups for Federal Global Change Science and Technology

10:30 A.M. Panel Discussion

What can be learned from the experiences of existing advisory bodies to help inform the Climate Change Science Program's (CCSP's) decisions about how to obtain independent oversight for the program? Panelists are asked to consider the following questions:

- What mechanisms would be best suited to address the challenges of providing independent oversight of interagency programs such as the CCSP and the Climate Change Technology Program (CCTP)?
- What perspectives (i.e., scientific and other stakeholders) should be included in oversight efforts? How can the program ensure that appropriate balance is maintained?
- How to balance the value of "independence" with the need for in-depth knowledge?

- How to provide advice on science (i.e., CCSP) and science and technology (i.e., CCSP + CCTP)?
- How to provide advice on, and to, international climate and global change research programs?

Panelists:
- Warren Washington, National Center for Atmospheric Research
- Ari Patrinos, Department of Energy
- George Hornberger, University of Virginia

11:15 A.M. Discussion in plenary

12:15 P.M. Lunch reception in room 1024

TOPIC 2: Global Change Science and Technology Assessments

1:30 P.M. Draft Guidelines for Producing CCSP Synthesis and Assessment Products — James Mahoney or Richard Moss, *Climate Change Science Program*

2:00 P.M. Discussion in plenary

2:30 P.M. Break

3:00 P.M. Panel Discussion

What can be learned from past global change science and technology assessments to ensure that the CCSP's synthesis and assessment products effectively build on past research, are developed with the involvement of scientists and relevant stakeholders, and are reviewed in a transparent manner? Panelists will be asked to consider the following questions:
- What processes have been used to ensure that assessments accurately reflect current scientific understanding?
- What approaches have been used to effectively involve relevant stakeholders?
- What processes have been used to ensure transparent public review of methods and draft results?
- What approaches have been used to effectively coordinate national assessment activities with their international counterparts?
- What strategies have been used to engage the scientific community without unduly affecting the ability to conduct research?

Panelists:
- Bob Corell, American Meteorological Society
- Susan Solomon, NOAA Aeronomy Laboratory
- Michael Kurylo, NASA
- Richard Methot, NOAA

4:00 P.M. Discussion in plenary

5:00 P.M. Adjourn

5:30 P.M. Tour of Koshland Museum (CCGC and CRC members only)

Friday, April 9, 2004

OPEN SESSION

8:30 A.M.	Welcome and introductions	Antonio Busalacchi, Jr. *Chair, Climate Research Committee*

Topic 3: Climate and Global Change Observing Systems

8:45 A.M.	Update on Earth Observing Summit and U.S. Contributions to Intergovernmental Group on Earth Observations	Gregory Withee, *NOAA* Ron Birk, *NASA*
9:15 A.M.	Climate Change Science Program Observations and Data Systems	Robert Cahalan *CCSPO*
9:45 A.M.	Break	

10:15 A.M. Panel Discussion

A significant challenge in developing climate and global change observing systems is how to integrate biologic, geographic, hydrologic, oceanic, and anthropogenic processes into the system in order to generate the data needed in previously underemphasized areas of the CCSP, such as ecosystems, land use and land cover change, water cycle, human dimensions, economics, impacts, adaptation, and mitigation. Panelists have been asked to consider the following questions:

- What are the most important observational needs for research in your area that are not currently being met?
- Who are (or could be) the most important users of data from outside the research community (e.g., state, local, regional resource managers; private sector) in your area? What types of data are needed by these users?
- How could these observational needs be met more effectively in the context of an integrated climate and global change observing system?

Panelists:

- Dennis Lettenmeier, University of Washington
- Billie Lee Turner, Clark University
- Chris Justice, University of Maryland
- Tom Wilbanks, Oak Ridge National Laboratory
- Cynthia Rosenzweig, NASA Goddard Institute of Space Studies
- Bob Detrick, Woods Hole Oceanographic Institute
- James Anderson, Harvard University

12:00 NOON Discussion in plenary

12:30 P.M. Lunch

Topic 4: New National Academies' Study on Earth Observations from Space: A Community Assessment and Strategy for the Future

NASA and NOAA recently asked the National Academies' Space Studies Board to lead an integrated study on Earth Observations from Space. The overall charge for the study is to organize a broad assessment of the state of Earth observations from space and prepare a strategy for the future. This new study is being organized and is expected to get underway soon.

1:30 P.M. Study Request — Gregory Williams, *NASA*

1:45 p.m. Preliminary Work Plan for the Survey — Rick Anthes
Co-chair, Earth Observations from Space Survey Steering Committee

2:00 P.M. Plenary Discussion — Antonio Busalacchi, *discussion leader*

- What are the major issues that the strategy survey should address?
- What are the most important observational needs in the areas of climate and global change that the study committee should consider?
- Where have relevant prior NRC studies succeeded and where are there critical gaps?
- How can the CCGC and CRC, and the National Academies more generally, help to involve the scientific community and engage the breadth of relevant expertise?
- How can the CCGC and CRC, and the National Academies more generally, help to engage the broad user community in the study?

3:00 P.M. Adjourn

Cooney, Phil

From: Watson, Harlan L (OES) [WatsonHL@state.gov]
Sent: Thursday, April 08, 2004 2:03 PM
To: OES Team Climate-DL; Turekian, Vaughan C; Manning, Robert A; Peel, Kenneth L.; Cooney, Phil
Subject: 1-30-04.Illarionov.THE KYOTO PROTOCOL AND RUSSIA-WHAT IS TO BE DONE?

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HE KYOTO P...

Attached FYI is Illarinov's January 30, 2004 PowerPoint presentation "THE KYOTO PROTOCOL AND RUSSIA: WHAT IS TO BE DONE?" at the National Press Club.

<<1-30-04.Illarionov.THE KYOTO PROTOCOL AND RUSSIA-WHAT IS TO BE DONE.ppt>>

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THE KYOTO PROTOCOL AND RUSSIA: WHAT IS TO BE DONE?

A. Illarionov

Adviser to the President of Russia

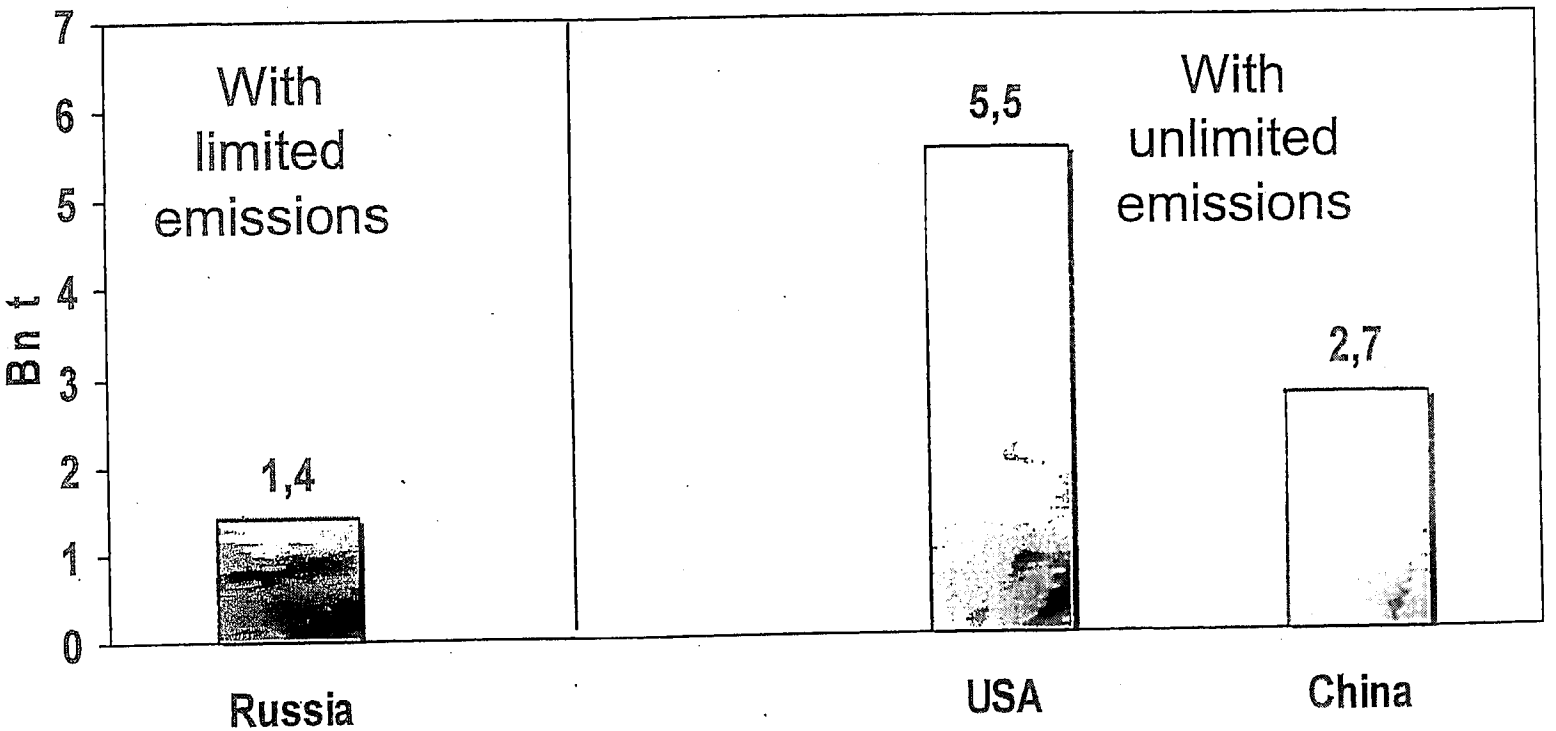
National Press Club, Washington, DC

January 30, 2004

The Kyoto Protocol is discriminatory against Russia

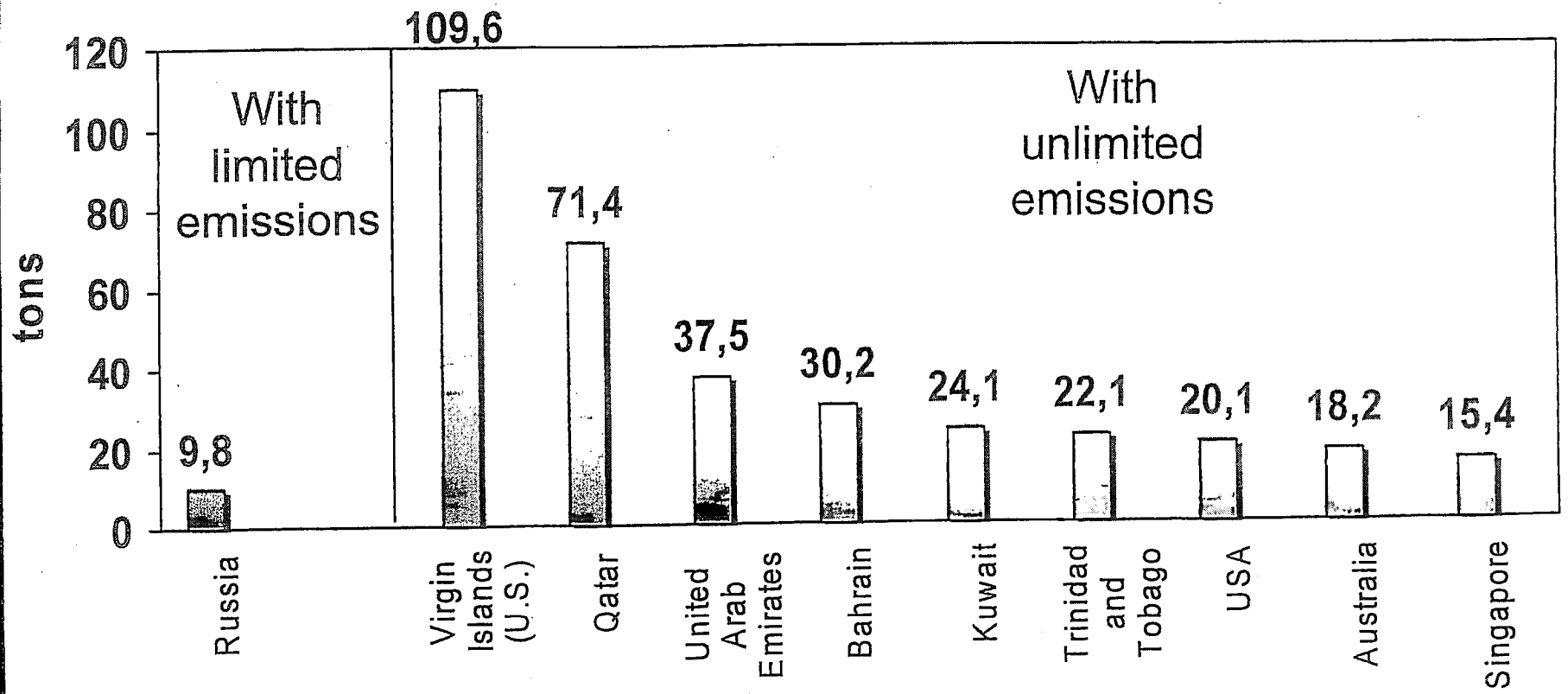
Russia's total CO_2 emissions are lower than those of other countries not adopting emission limits

Total CO_2 emissions in 2000



The Kyoto Protocol is discriminatory against Russia

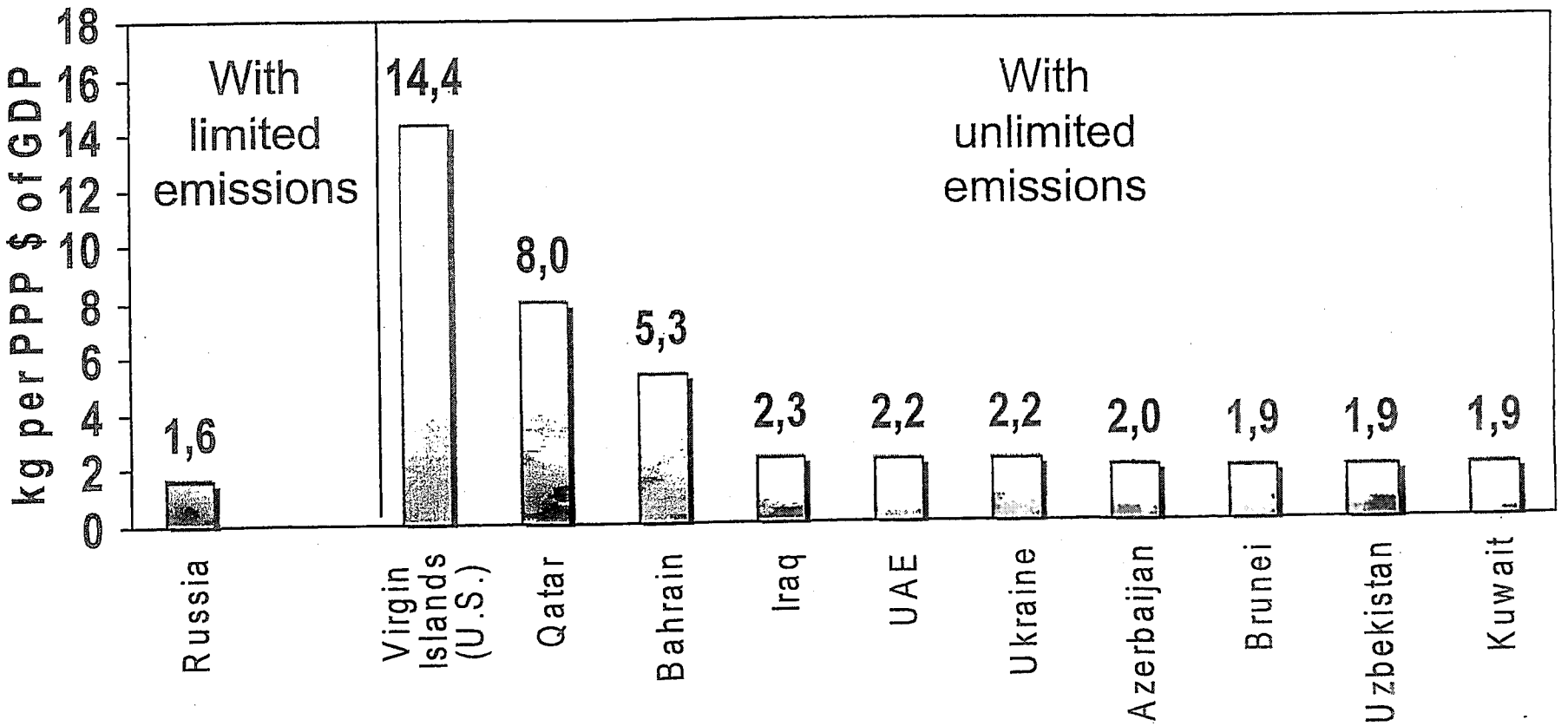
Russia's CO_2 emissions per capita are lower than those of other countries not adopting emission limits



The Kyoto Protocol is discriminatory against Russia

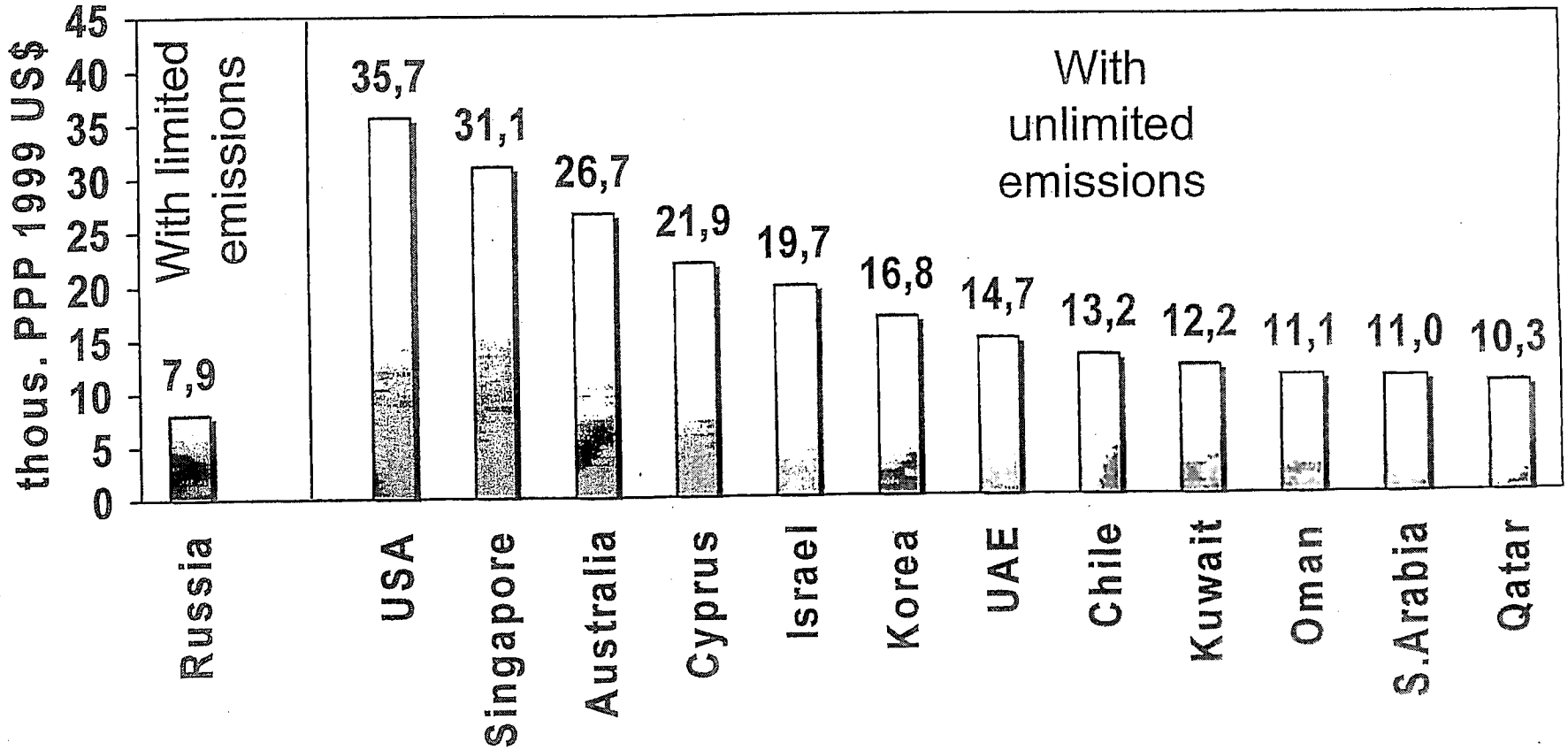
Russia's CO_2 emissions per unit of GDP are lower than those of other countries not adopting emission limits

CO_2 emissions per unit of GDP in 2000



The Kyoto Protocol is discriminatory against Russia

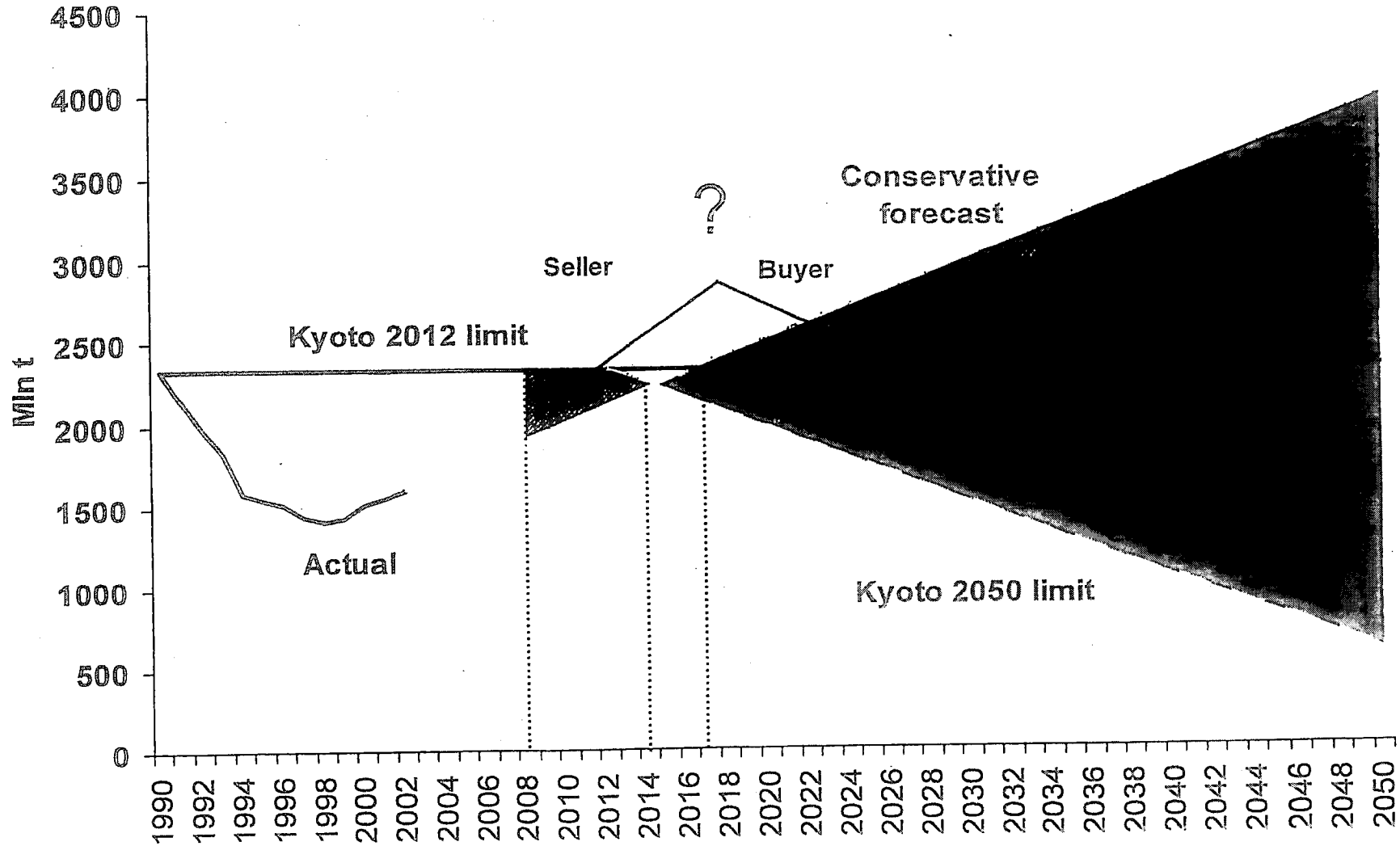
Russia's GDP per capita is lower than those of other countries not adopting emission limits



The Russia's Kyoto Cross.

Under the Kyoto Protocol Russia will be a buyer, not a seller of CO_2 quotas.

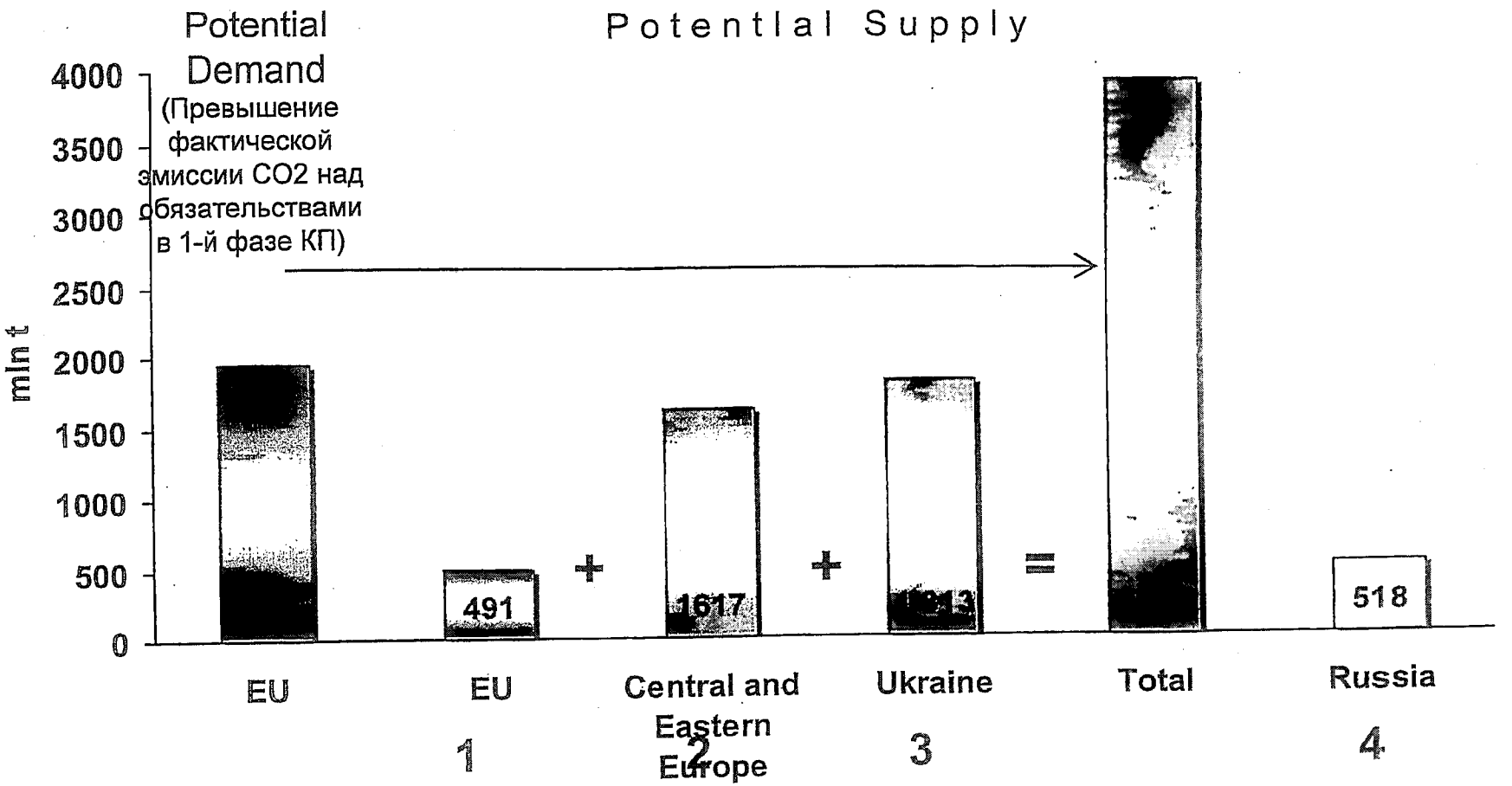
(Actual Russia's CO_2 emissions, conservative forecast and its Kyoto Protocol limits)



The Russia's Kyoto Trap.

Under the Kyoto Protocol Russia won't be able to sell its CO_2 quotas.

(Forecast of CO_2 quotas market in the EU in 2008-2012)

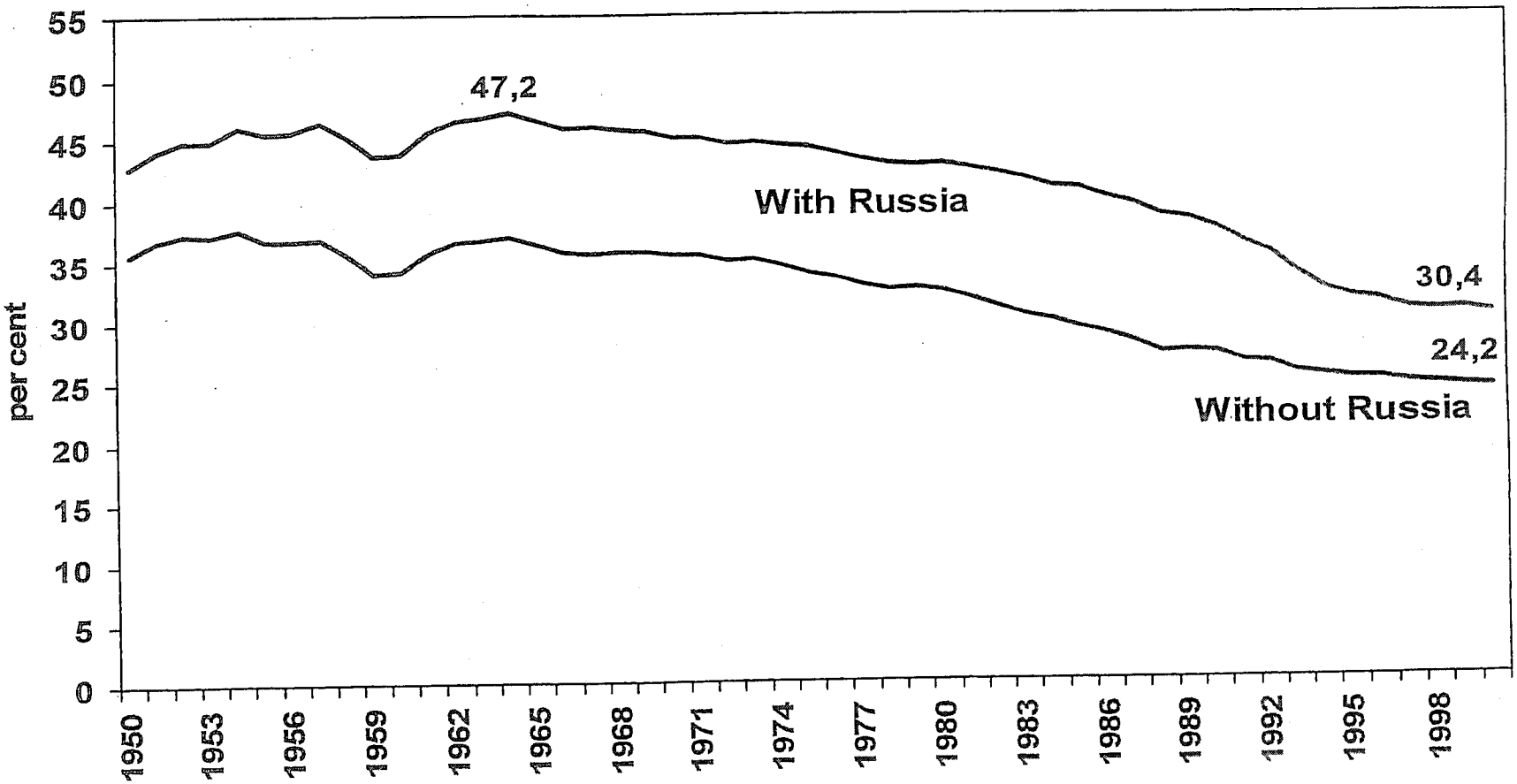


Sequence of purchases according to the EU Directive adopted by the EU Parliament 02.07.03 and accepted by the EU Council 22.07.03

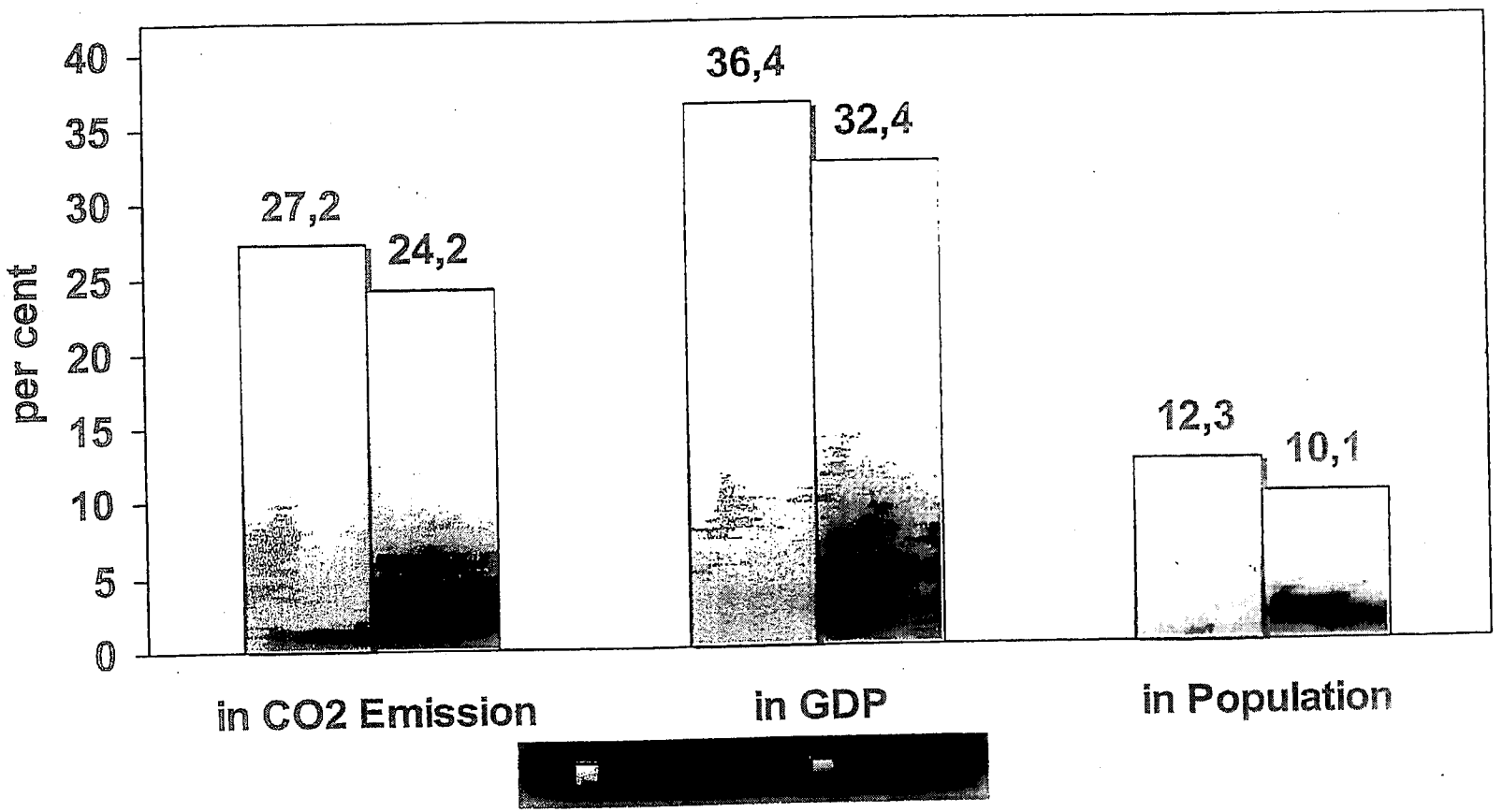
The Kyoto protocol's inefficiency.

The Kyoto Protocol is unable to achieve its proclaimed goals.

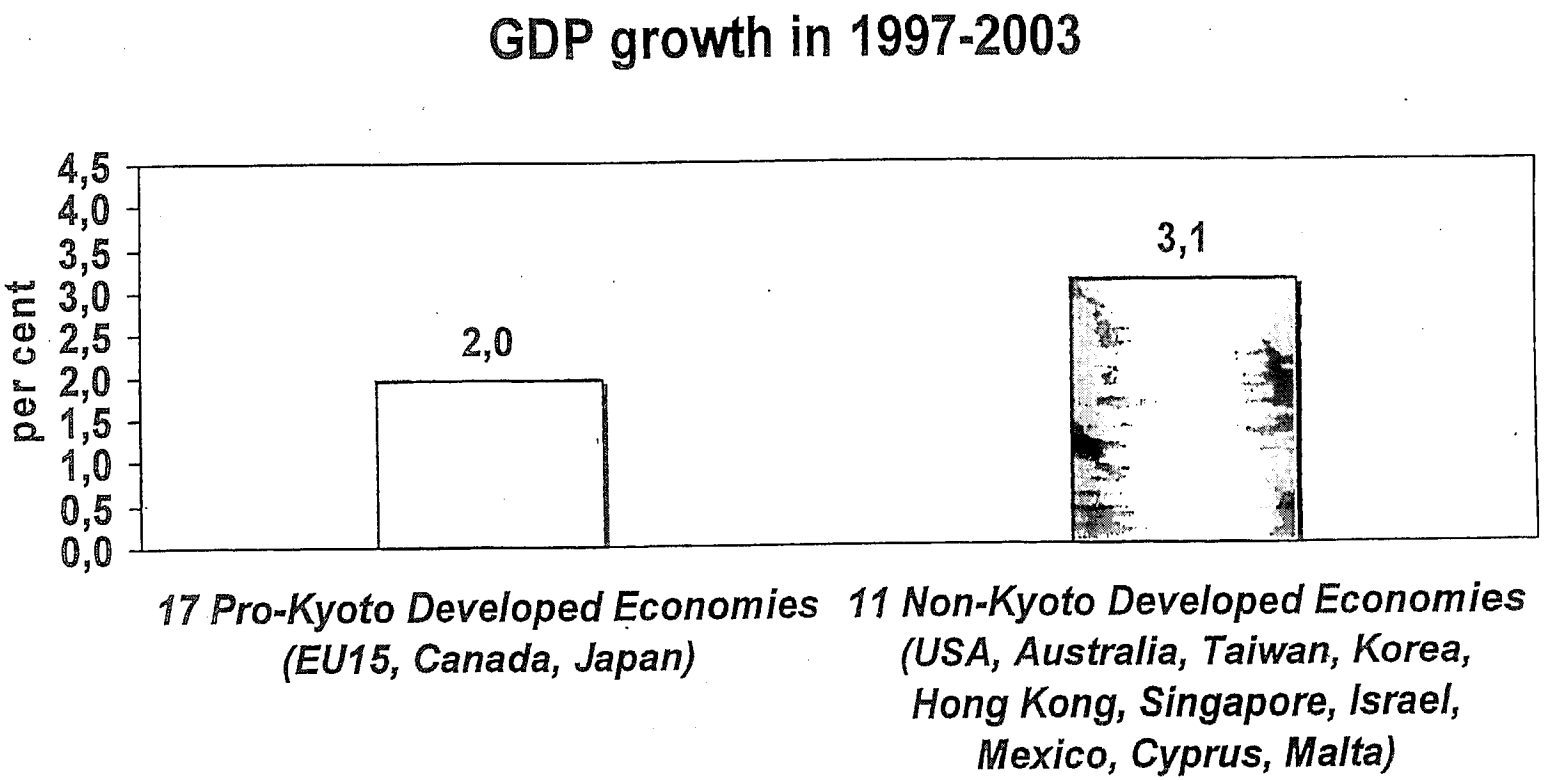
(The share of the KP Annex B countries in the World's CO_2 emissions)



The Kyoto Protocol is not universal.
It is backed by the World minority.
The World majority did not adopt the Kyoto Protocol limits.
(The share of the KP Annex B countries in the World aggregates)

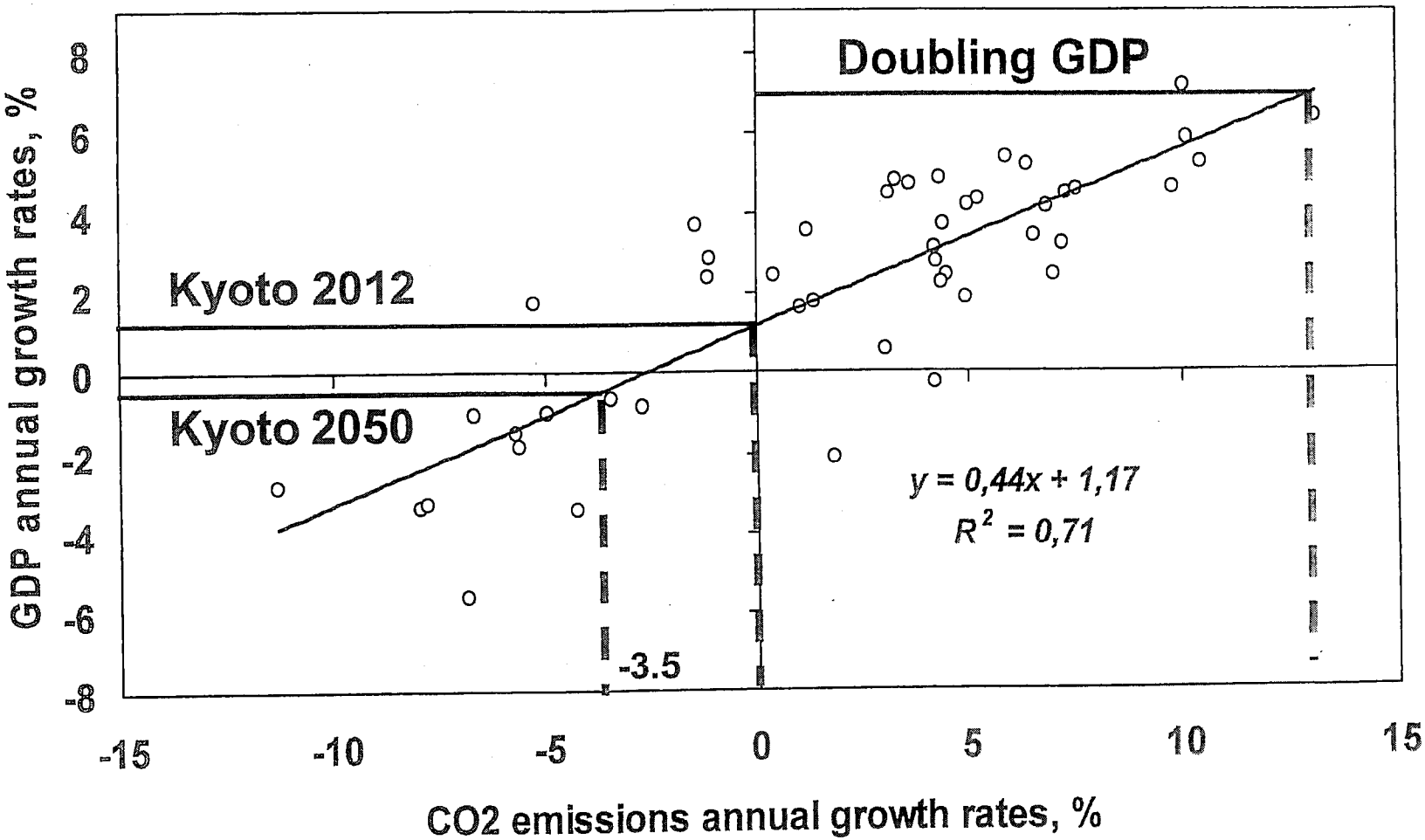


The Kyoto Protocol puts brakes on economic growth



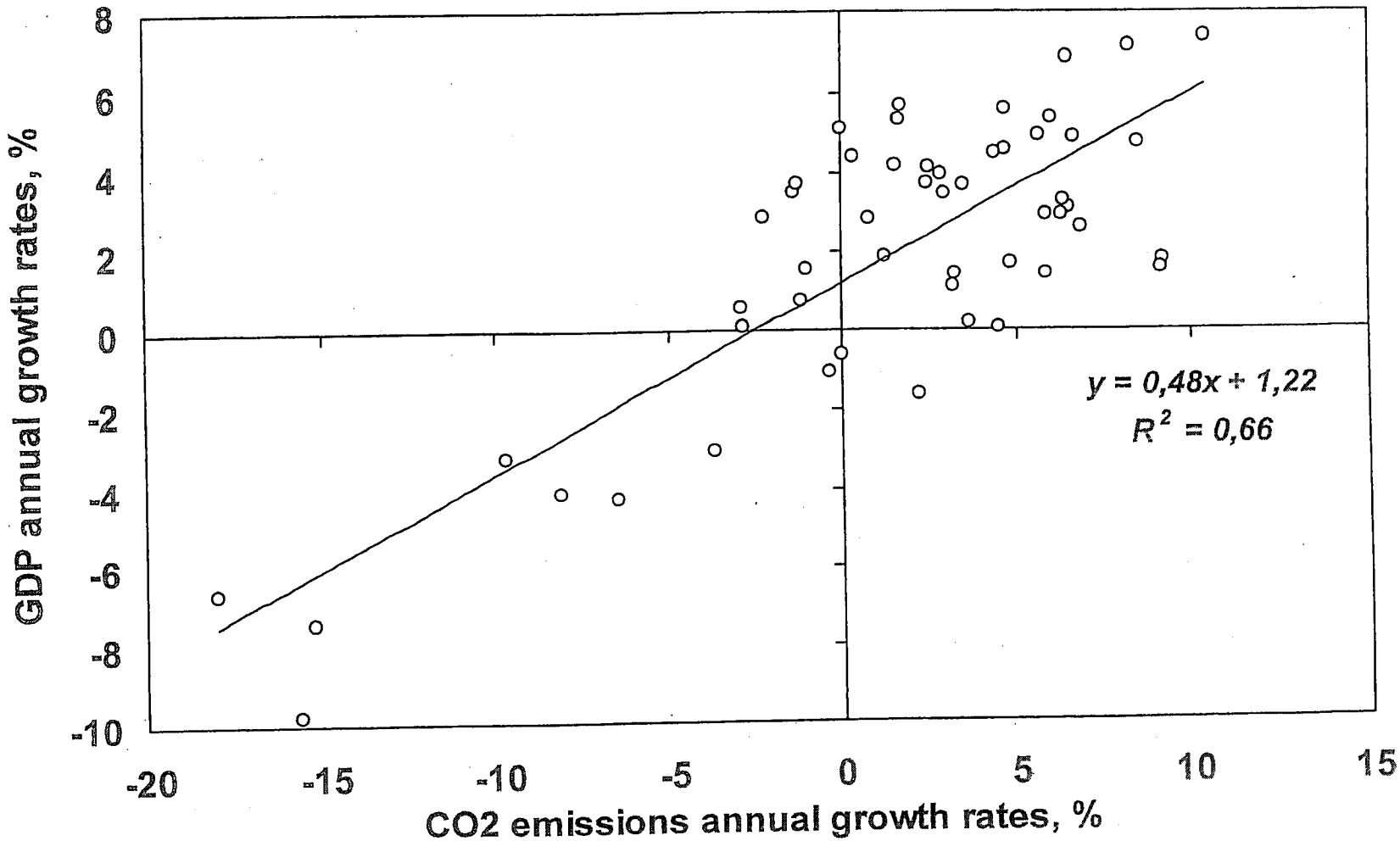
The Kyoto Protocol incompatible with economic growth.

CO_2 emissions are associated with economic growth in the mid-income countries (47 countries),1960-2000



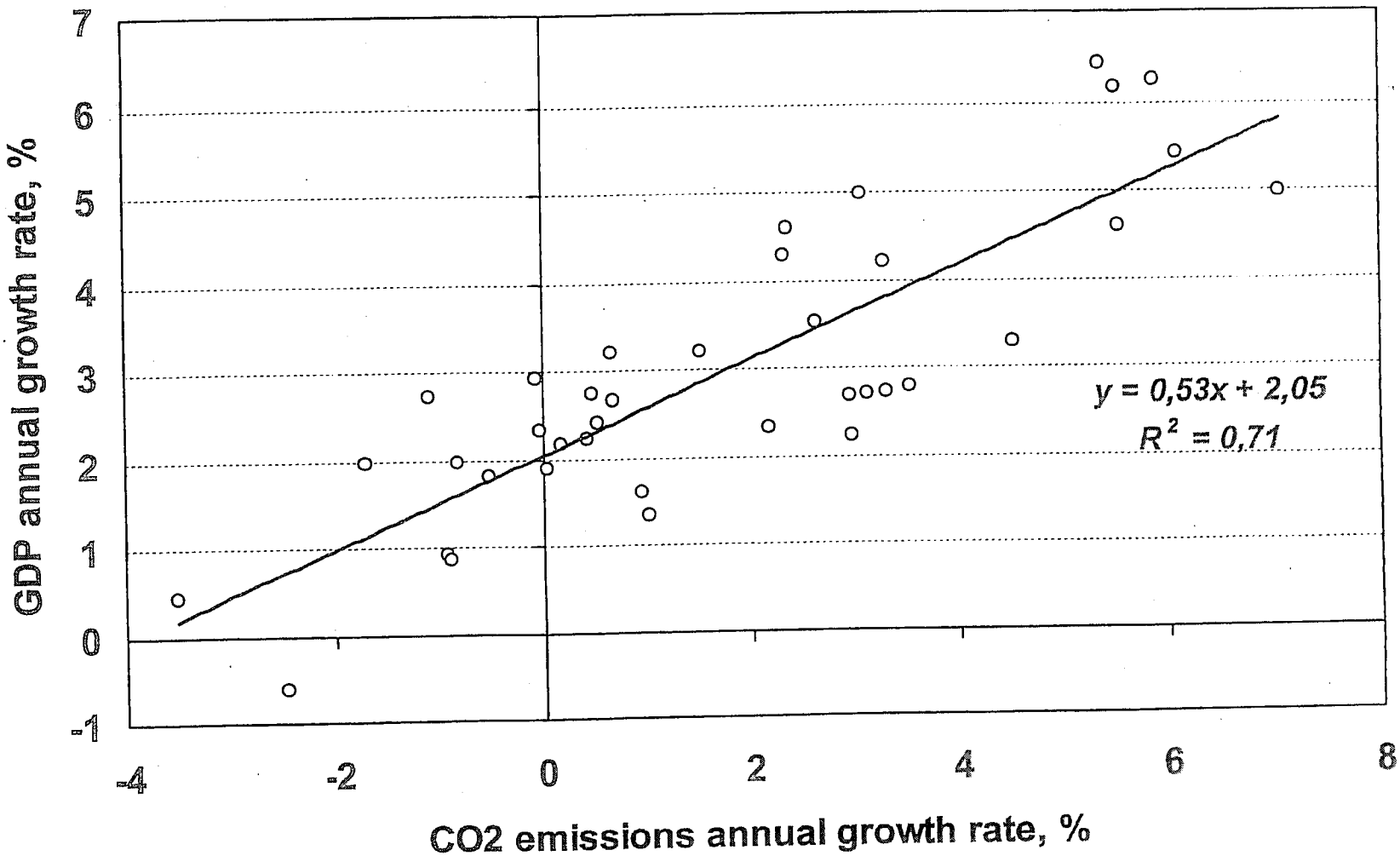
The Kyoto Protocol is incompatible with poverty reduction.

CO_2 emissions are associated with economic growth in the low-income countries (52 countries),1960-2000



The Kyoto Protocol is incompatible with wealth accumulation.

CO_2 emission are associated with economic growth in developed economies, too (38 countries), 1991-2000



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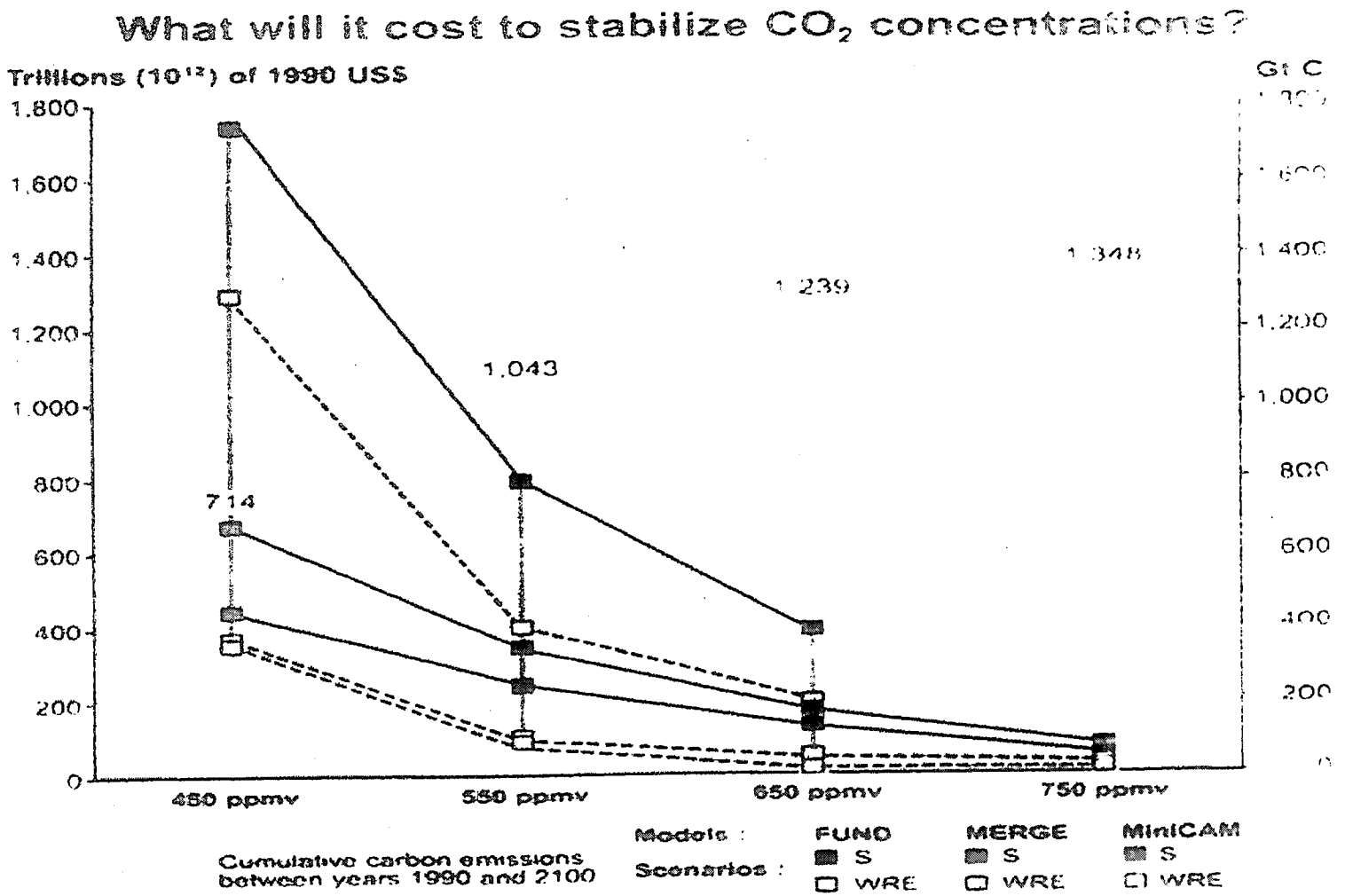
The cost of compliance can be as high as 1750 US$ tln between 1990 and 2100, or 15% of their annual GDP in affected countries

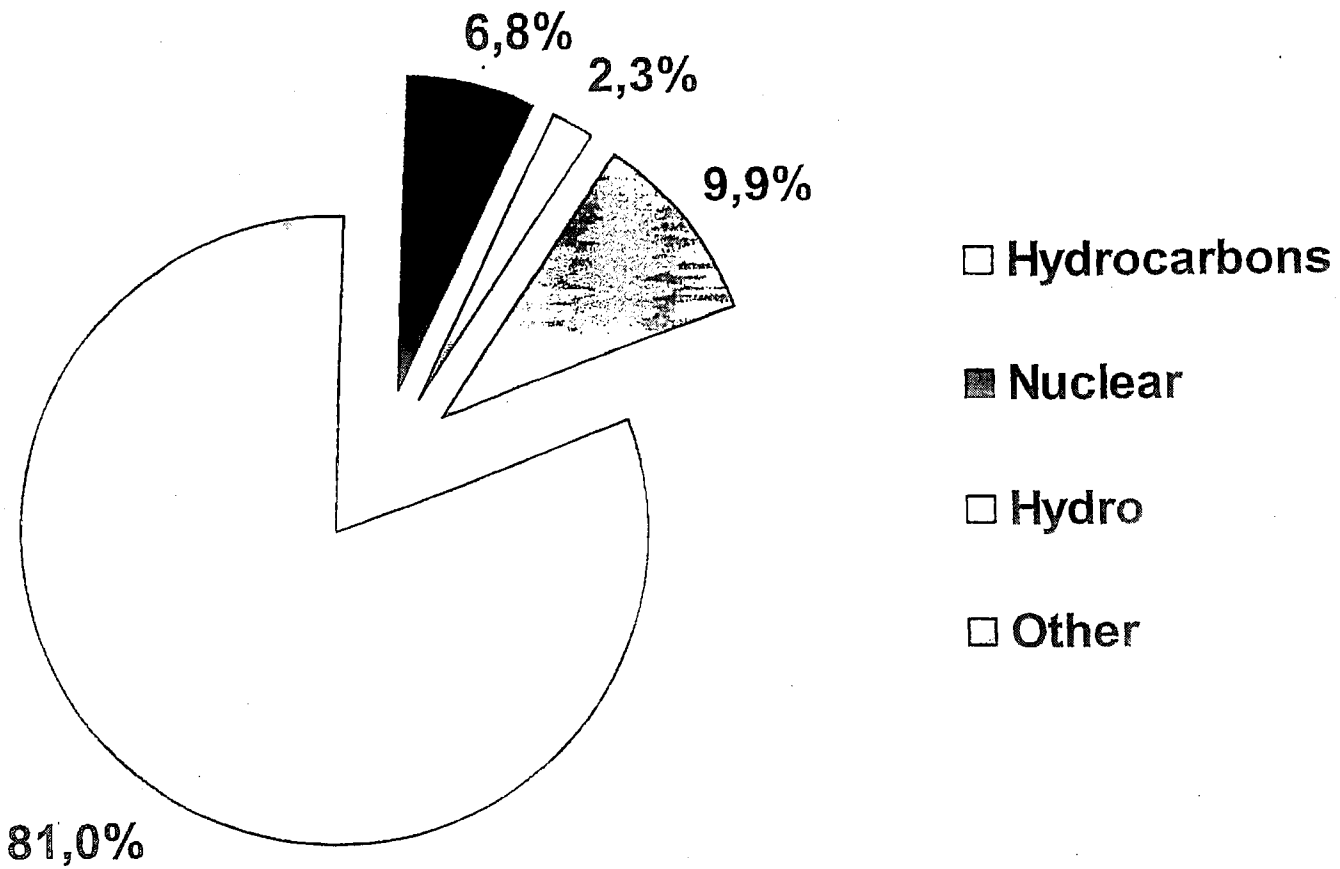


Source: Climate Change 2001 Synthesis Report, IPCC, p.119.

The Kyoto Protocol is oriented on technological illusions.

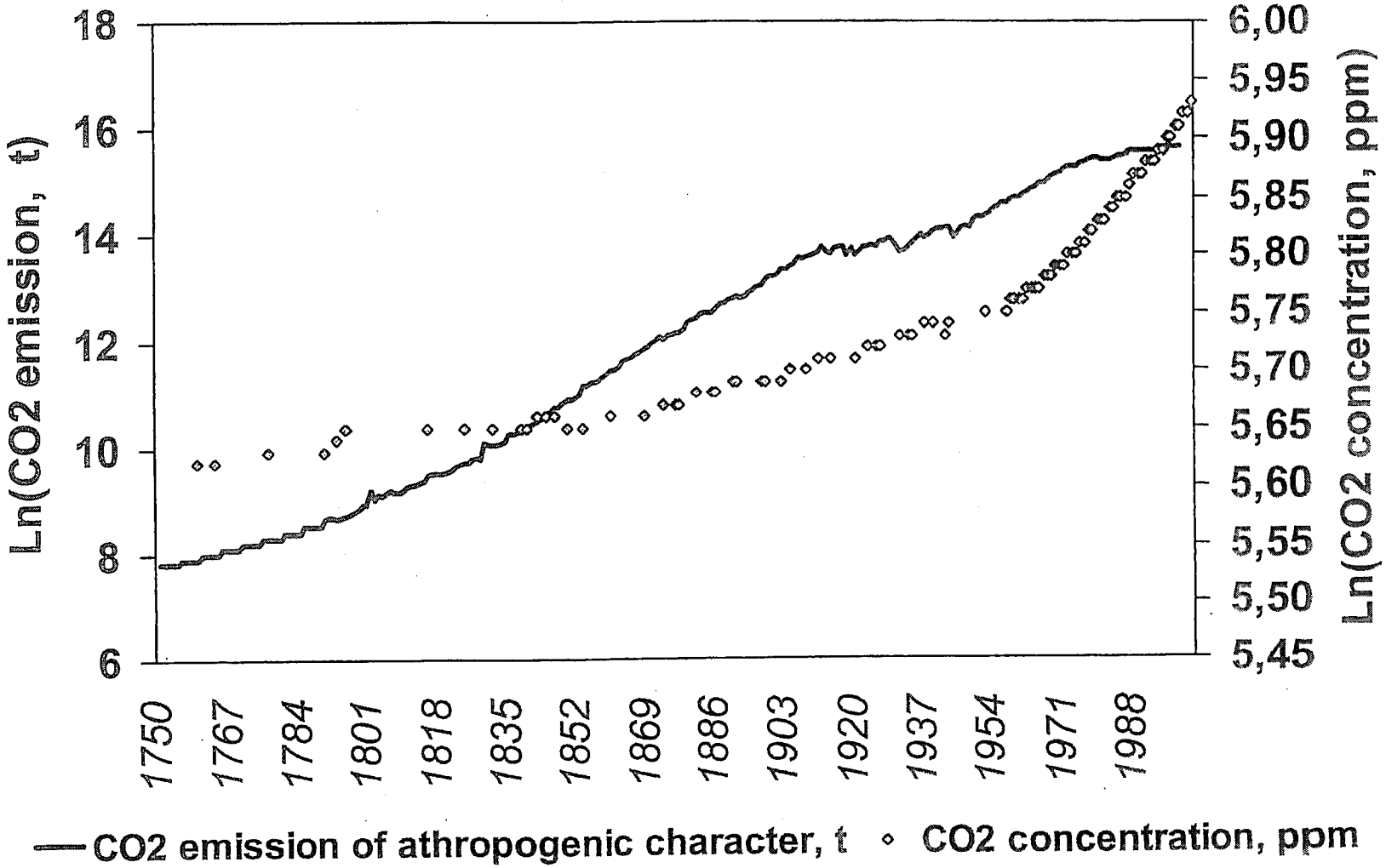
It's impossible to switch away from hydrocarbons to another energy base in a short period of time

World energy consumption by source of origin



The Kyoto protocol is based on flawed science.

The variation of CO_2 concentration can not be explained by variation in CO_2 emissions of anthropogenic character



Source: Carbon Dioxide Information Analysis Center, 2003.

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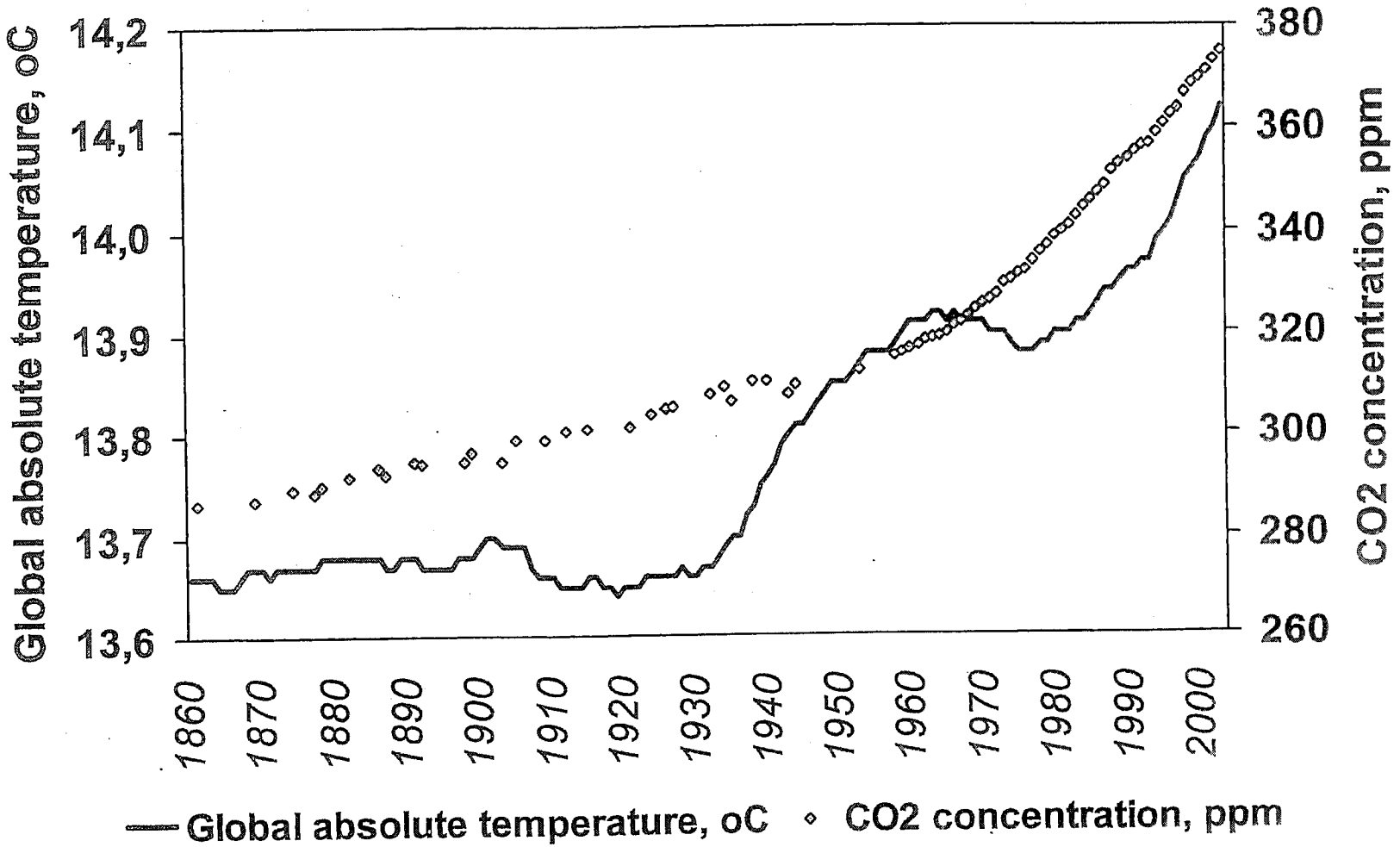
The variation in temperature can not be explained by the variation in CO_2 concentration



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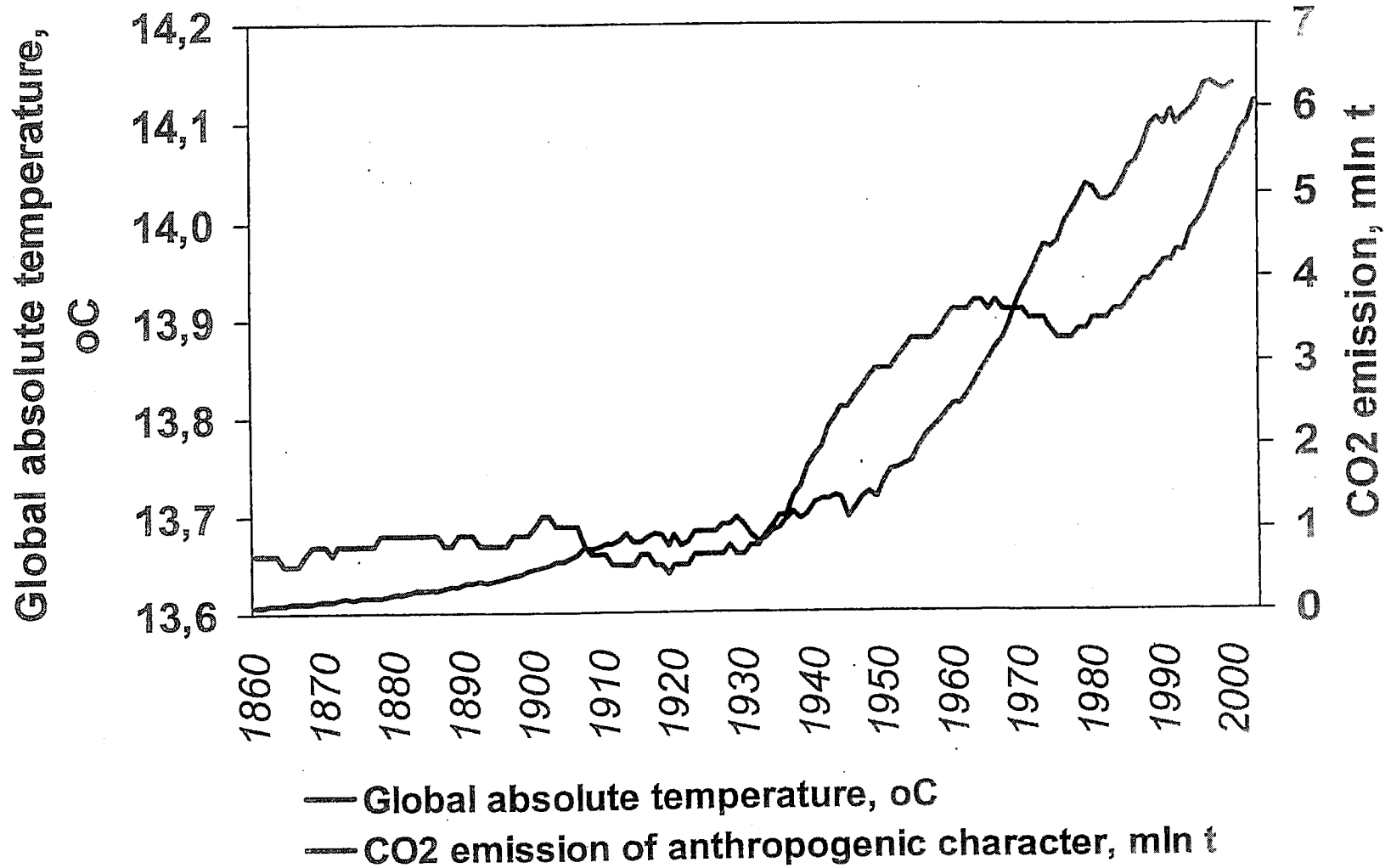

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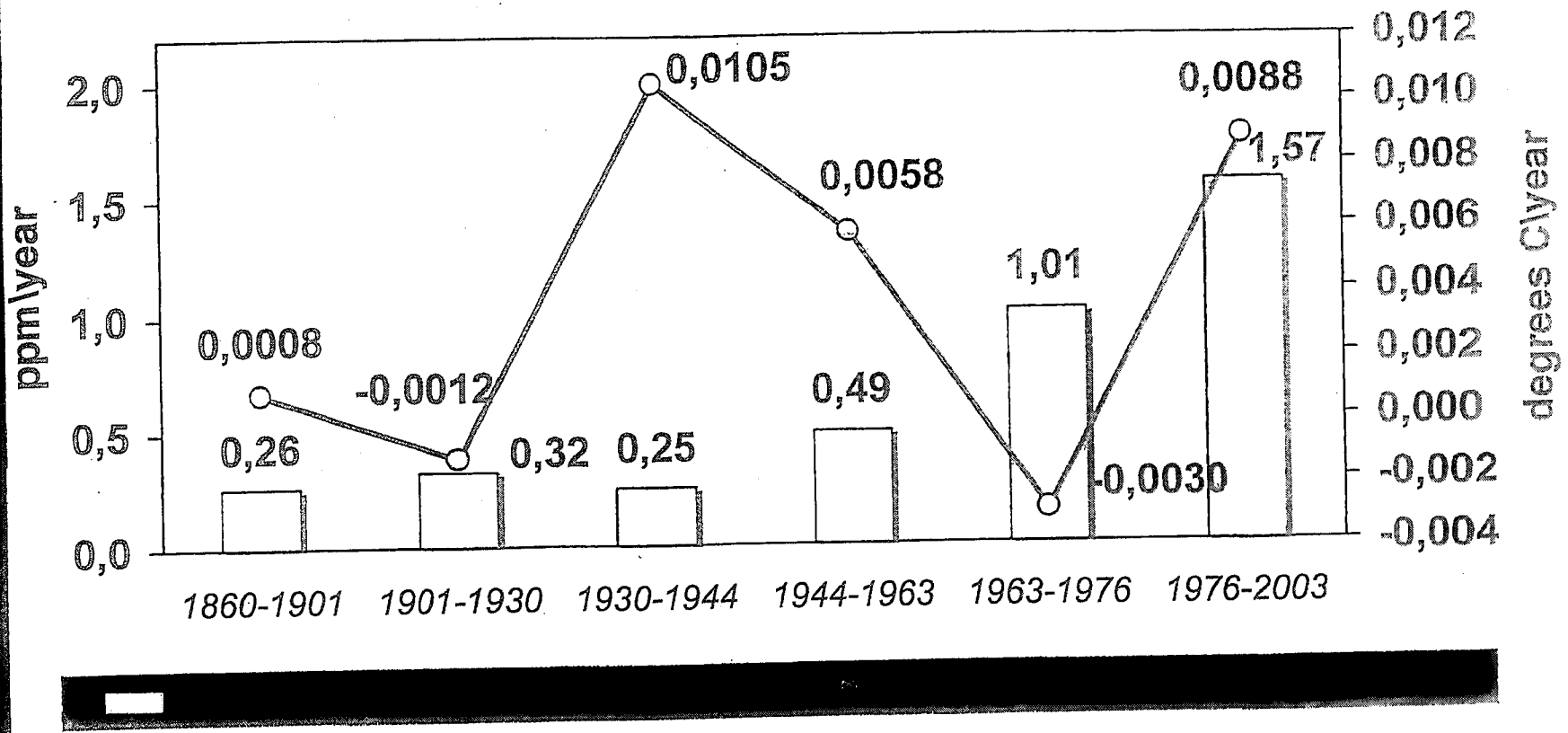
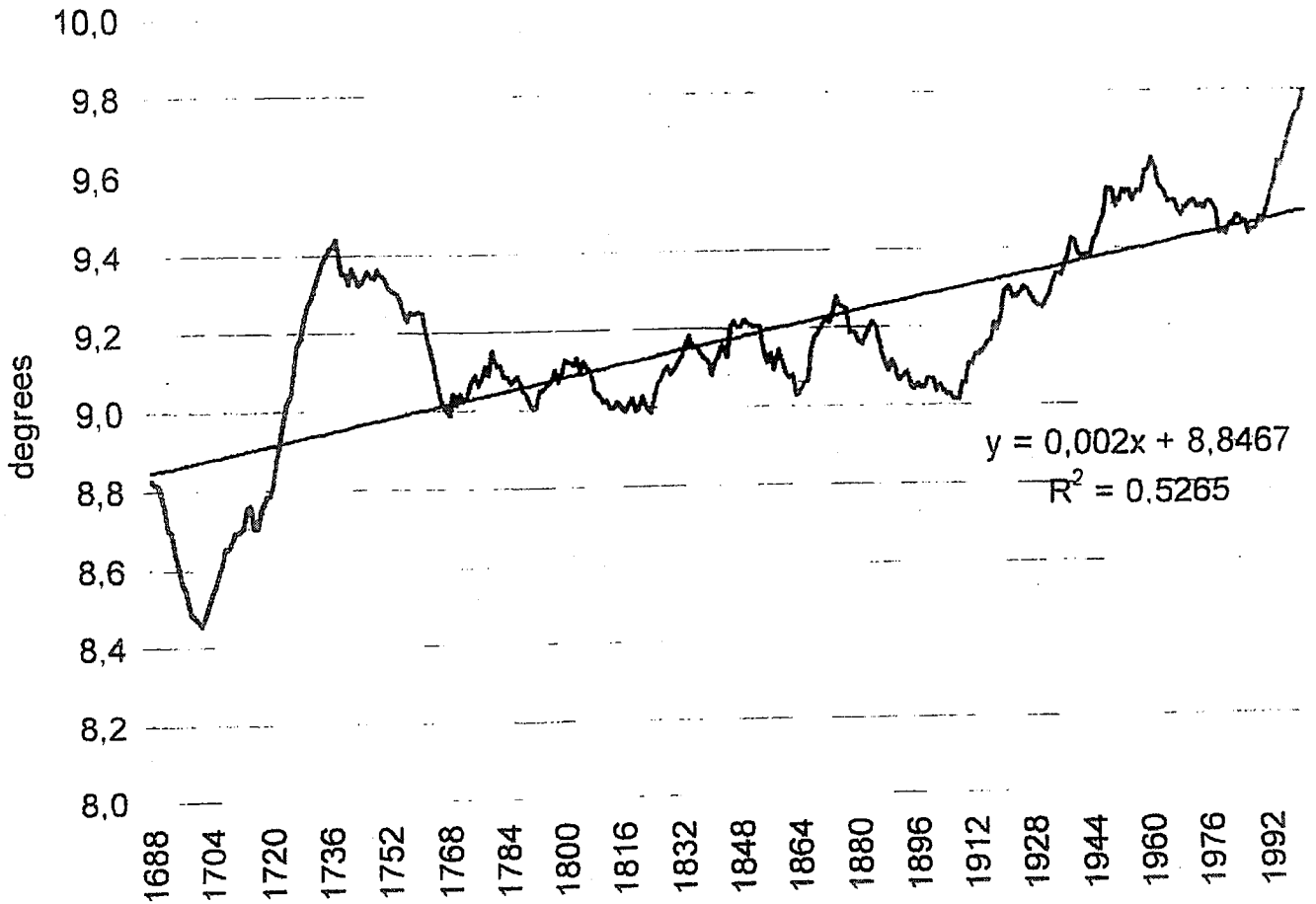
Variation in CO2 concentration and variation in temperature



The very concept of "Global Warming" critically depends on the time horizon chosen. It appears reasonable for short-term periods.

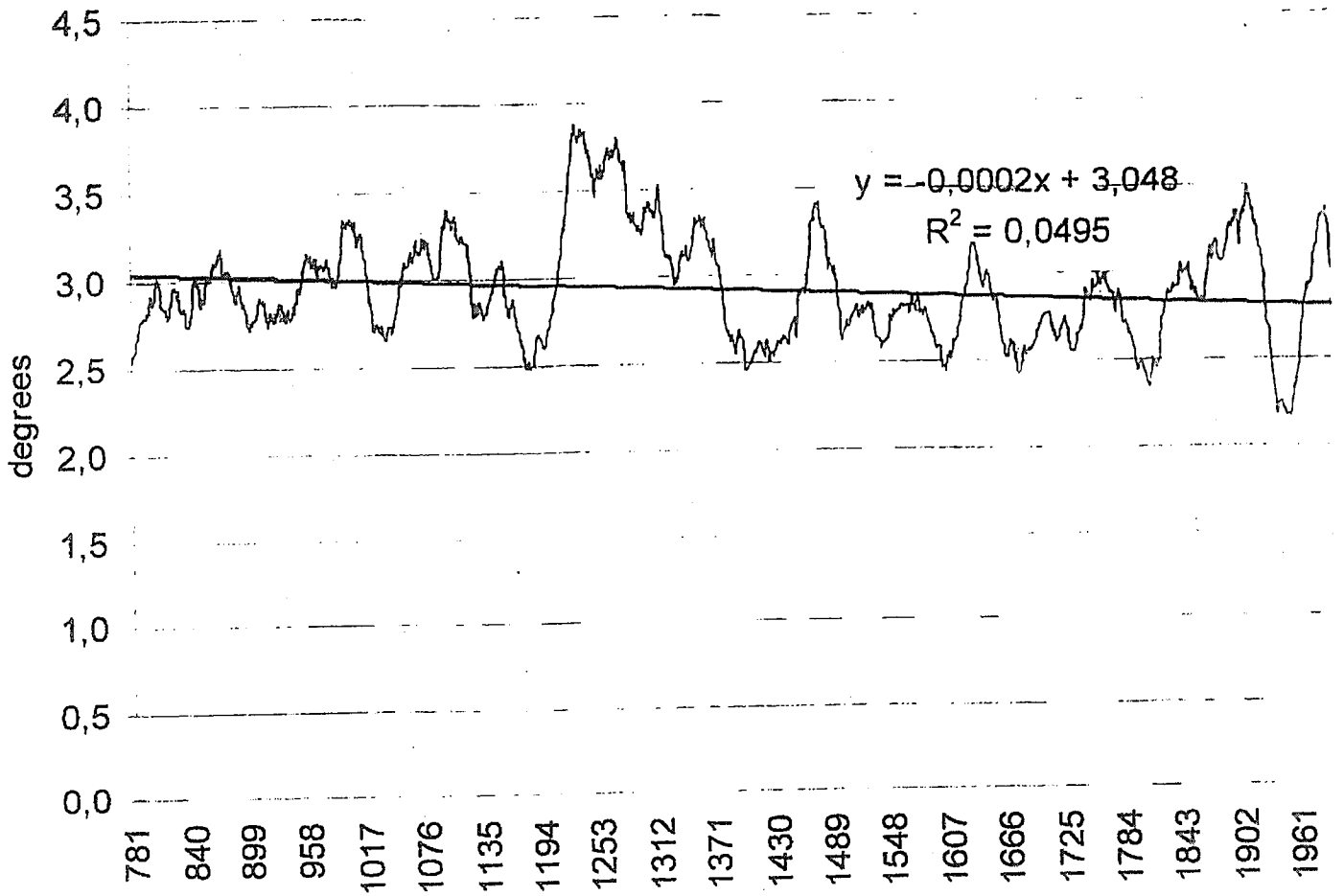
Absolute temperature (30 YMA), England, 1659-2002



Source: www.met-office.gov.uk.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

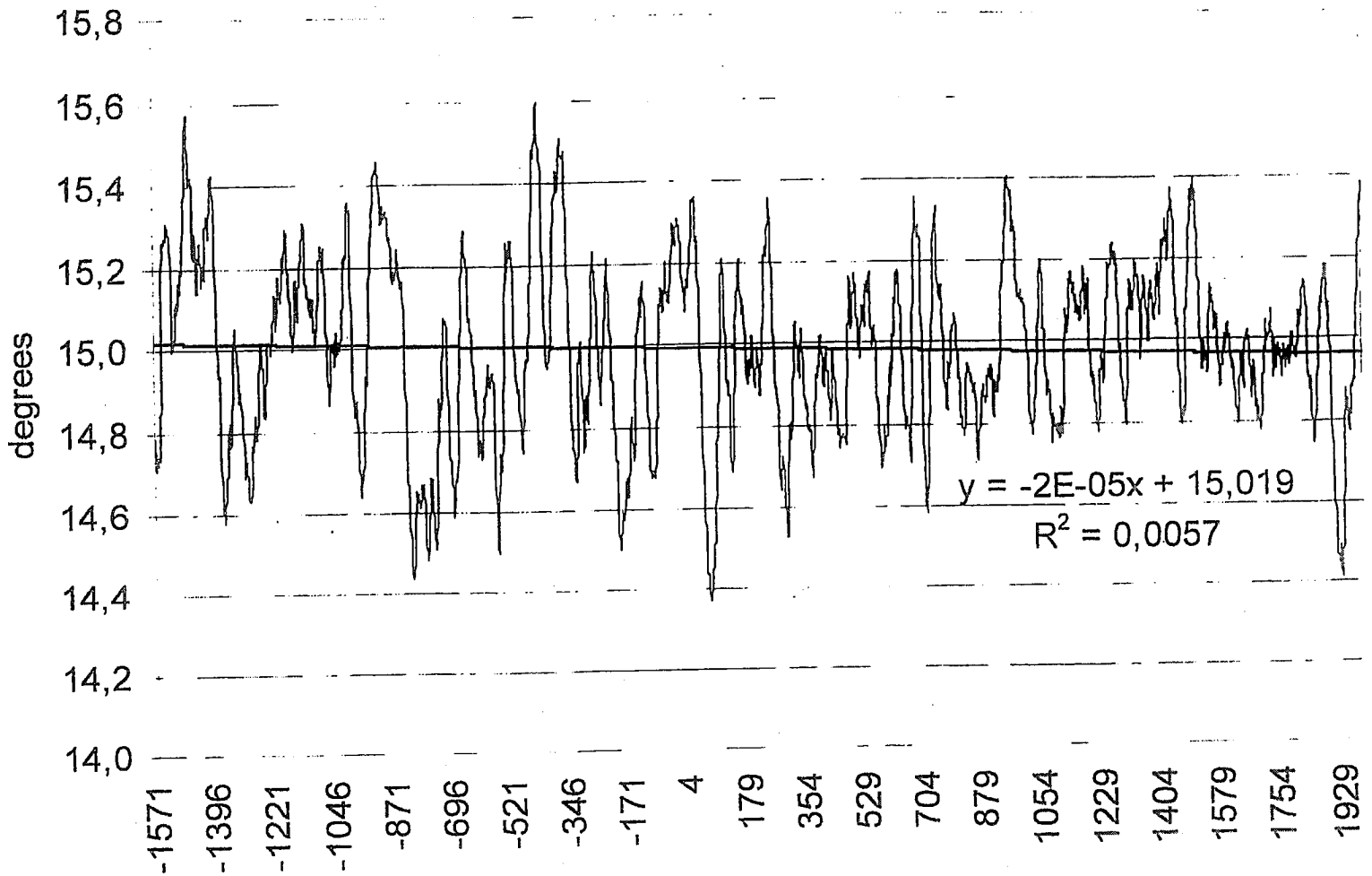
Absolute temperature (30 YMA), NE Canada (Baffin Island), 752-1992



Source: World Data Center for Paleoclimatology, Boulder, USA.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

Absolute temperature (30 YMA), Tasmania,1571 BC - 1991 AD

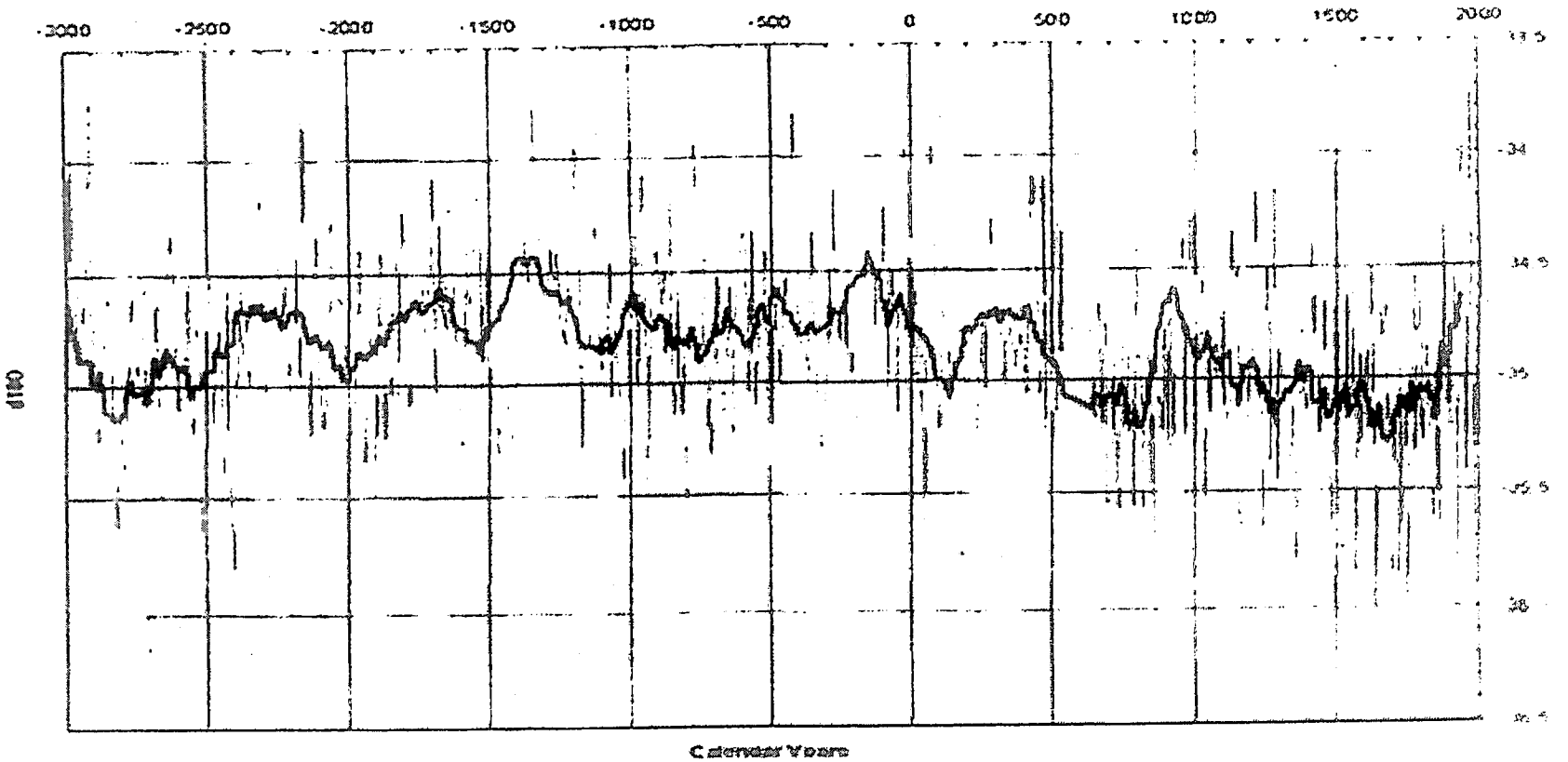


Source: World Data Center for Paleoclimatology, Boulder, USA.

The very concept of "Global Warming" critically depends on the time horizon chosen. It appears unproven for longer-term periods.

The current "Global Warming" is not unique and is not strongest in the history of civilization.

Variation in temperature in the last 5000 years



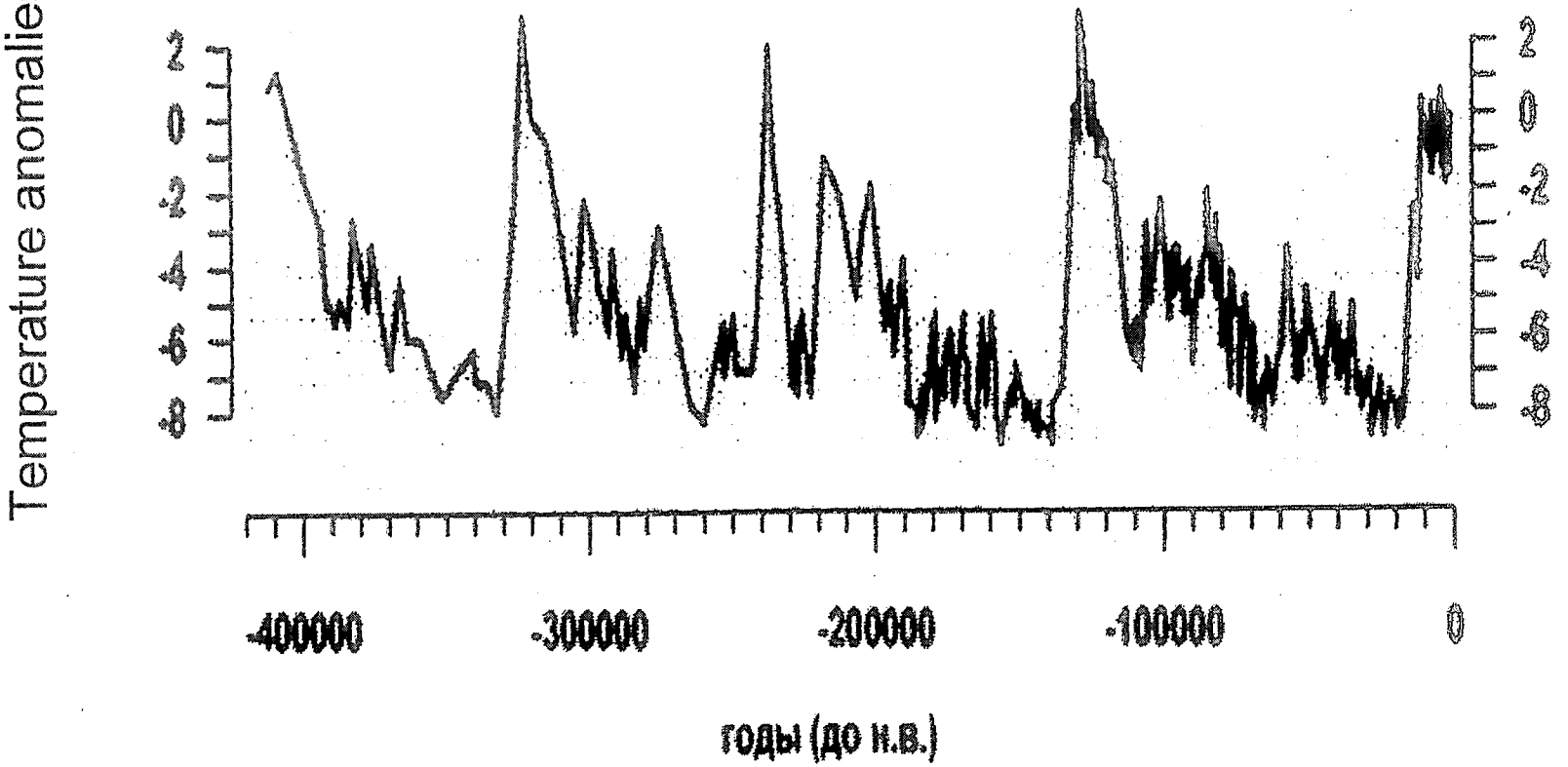
Distribution of Oxygen $\delta^{18}O$ in the upper part of the kern from drill GISP2 (last 5000 years)

Source: Grootes, P.M., Stuiver, M., White, J.W.C., Johnsen, S.J., Jouzel J., Comparison of oxygen isotope records from the GISP and GRIP Greenland ice cores. Nature 366, 1993, pp.552-554.

The very concept of "Global Warming" critically depends on th time horizon chosen. It appears unproven for long-term period

The current "Global Warming" is not unique and is not strongest in the history of Earth.

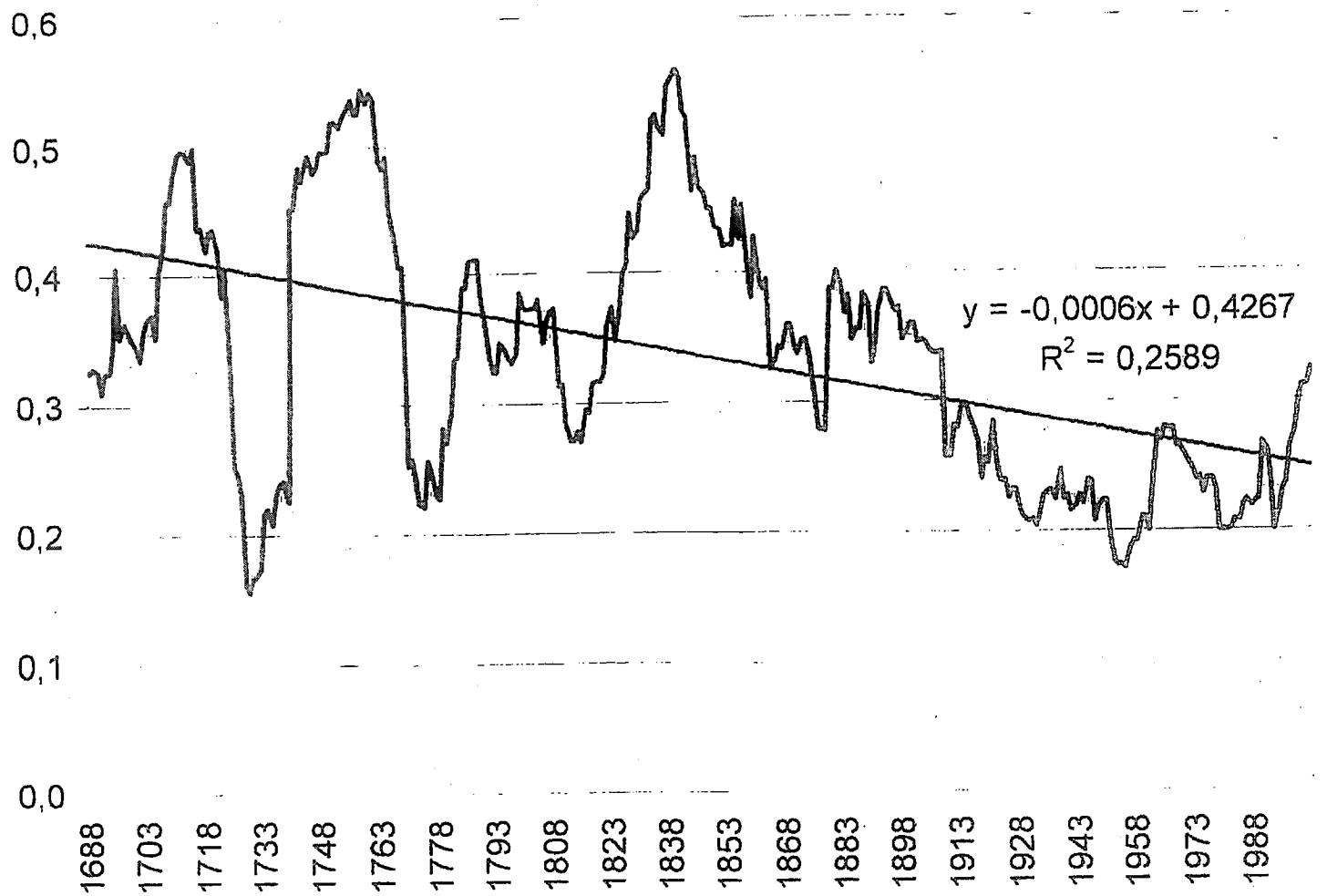
The long-term (M.Milankovitch) climatic cycles for the last 420 000 years.



Source: J.R. Petit et al. (19 authors). Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. -Nature, 399 (1999), 429-436.

The asserted increase in the frequency of extraordinary climatic events appears unproven.

Variance in temperature (30 YMA), England, 1659-2002



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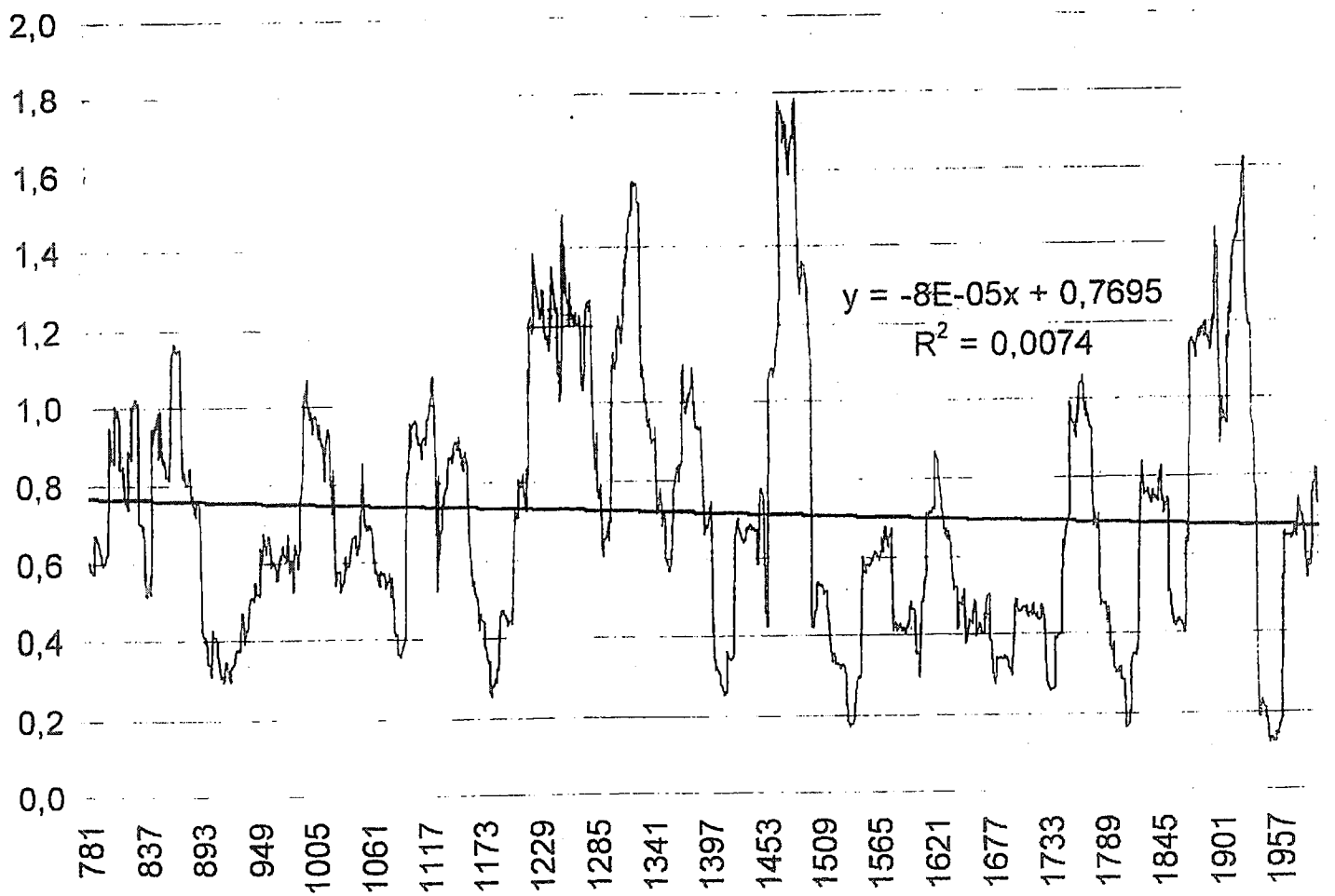

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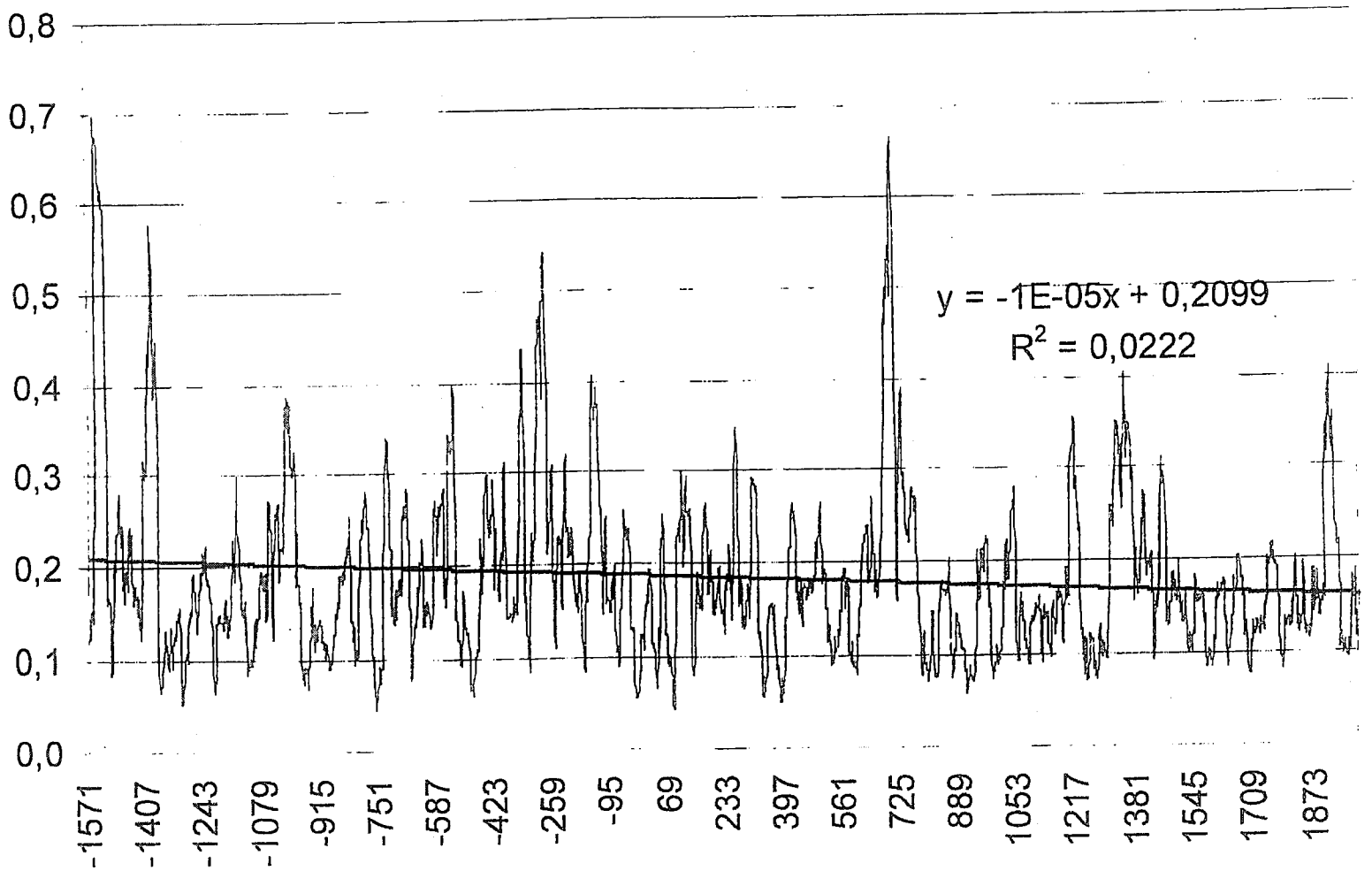
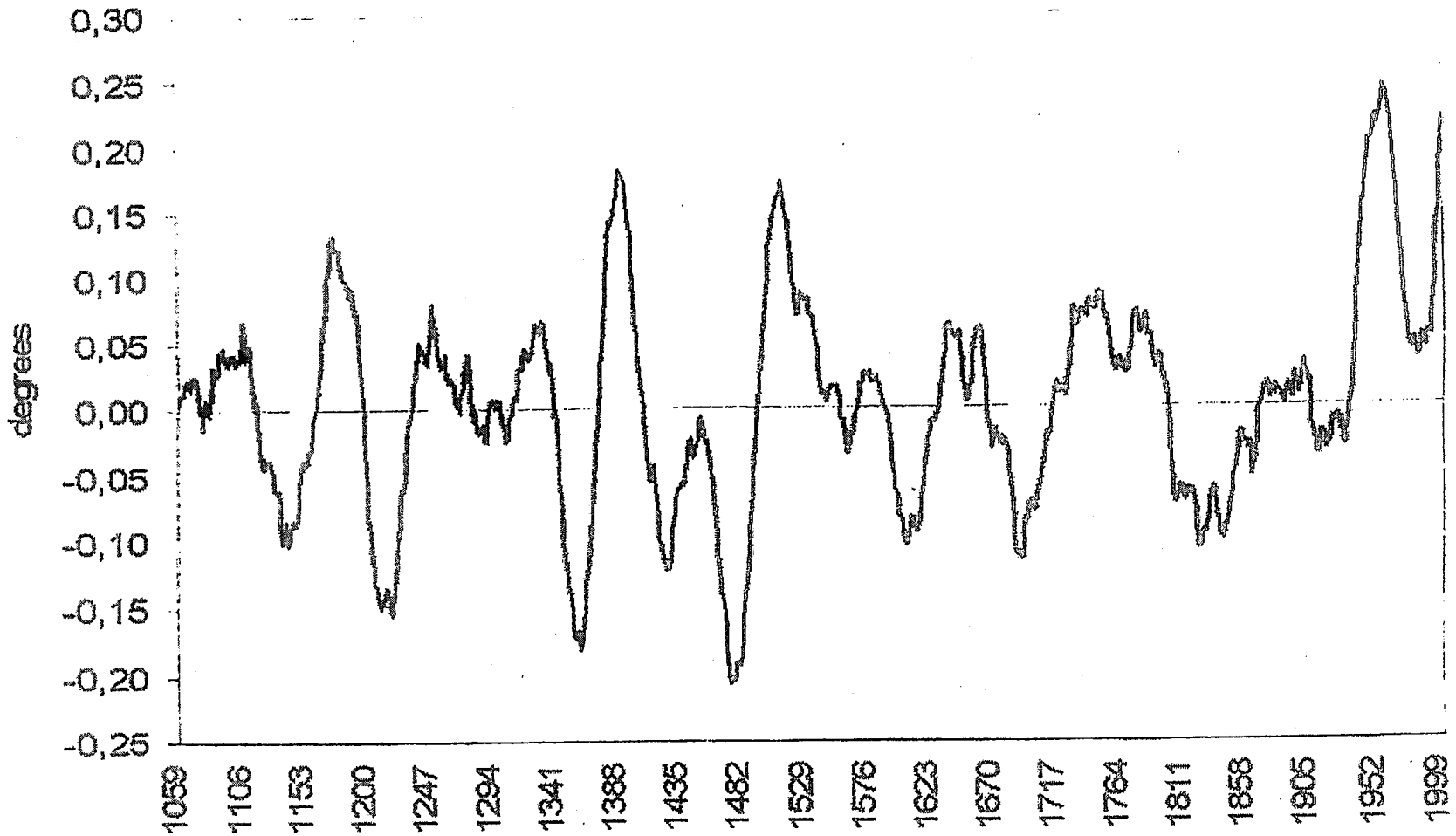
Variance in temperature (30 YMA), Tasmania, 1751 BC – 1991 AD



Source: World Data Center for Paleoclimatology, Boulder, USA.

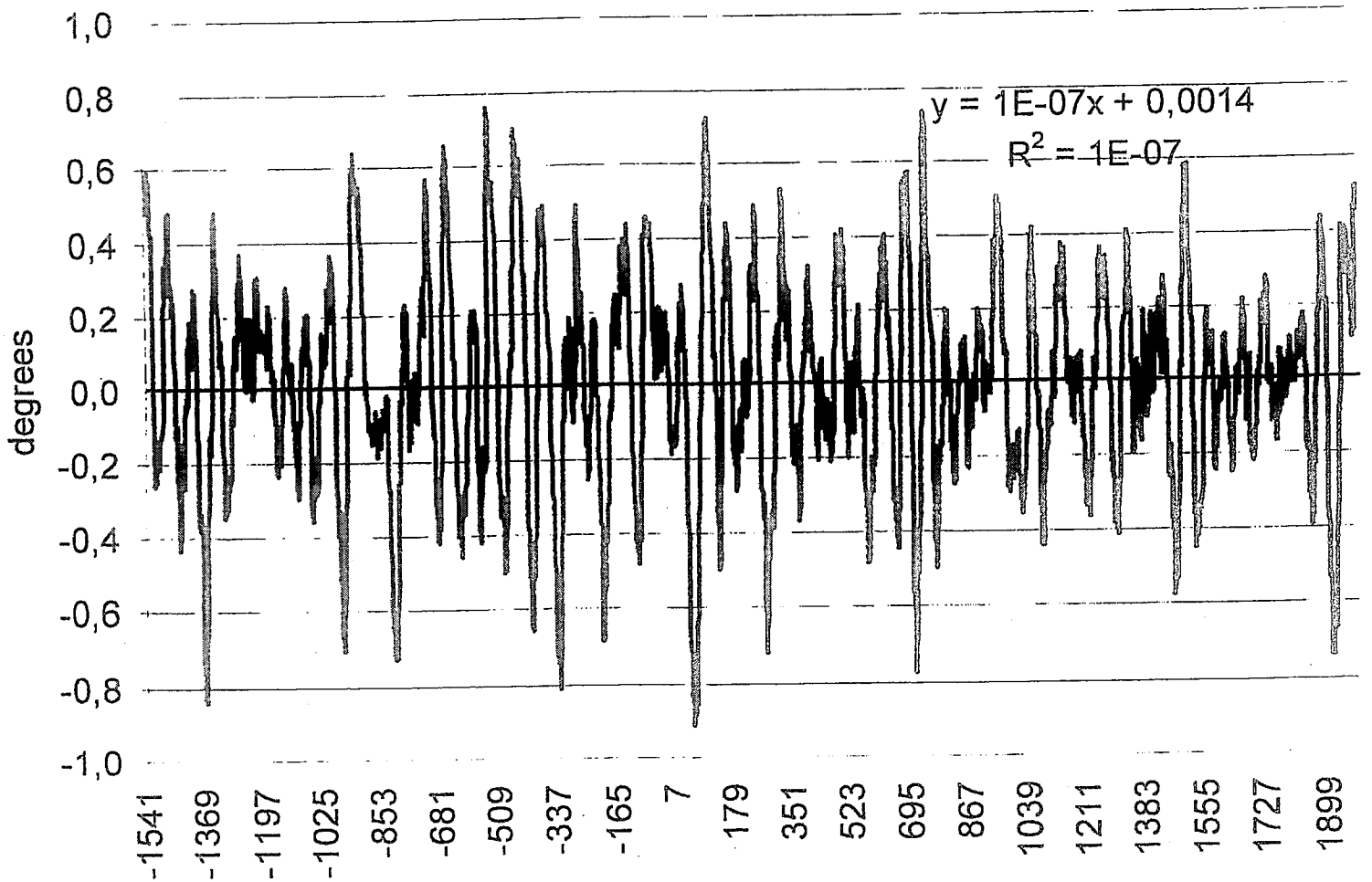
Asserted increase in the speed of the current temperature change appears unproven. It is not unique and is not strongest in the last 1000 years.

Change in the global temperature over 30 preceding years



Asserted increase in the speed of the current temperature change appears unproven. It is not unique and is not strongest in the last 4000 years.

Change in temperature over 30 preceding years, Tasmania, 1751BC–1991AD

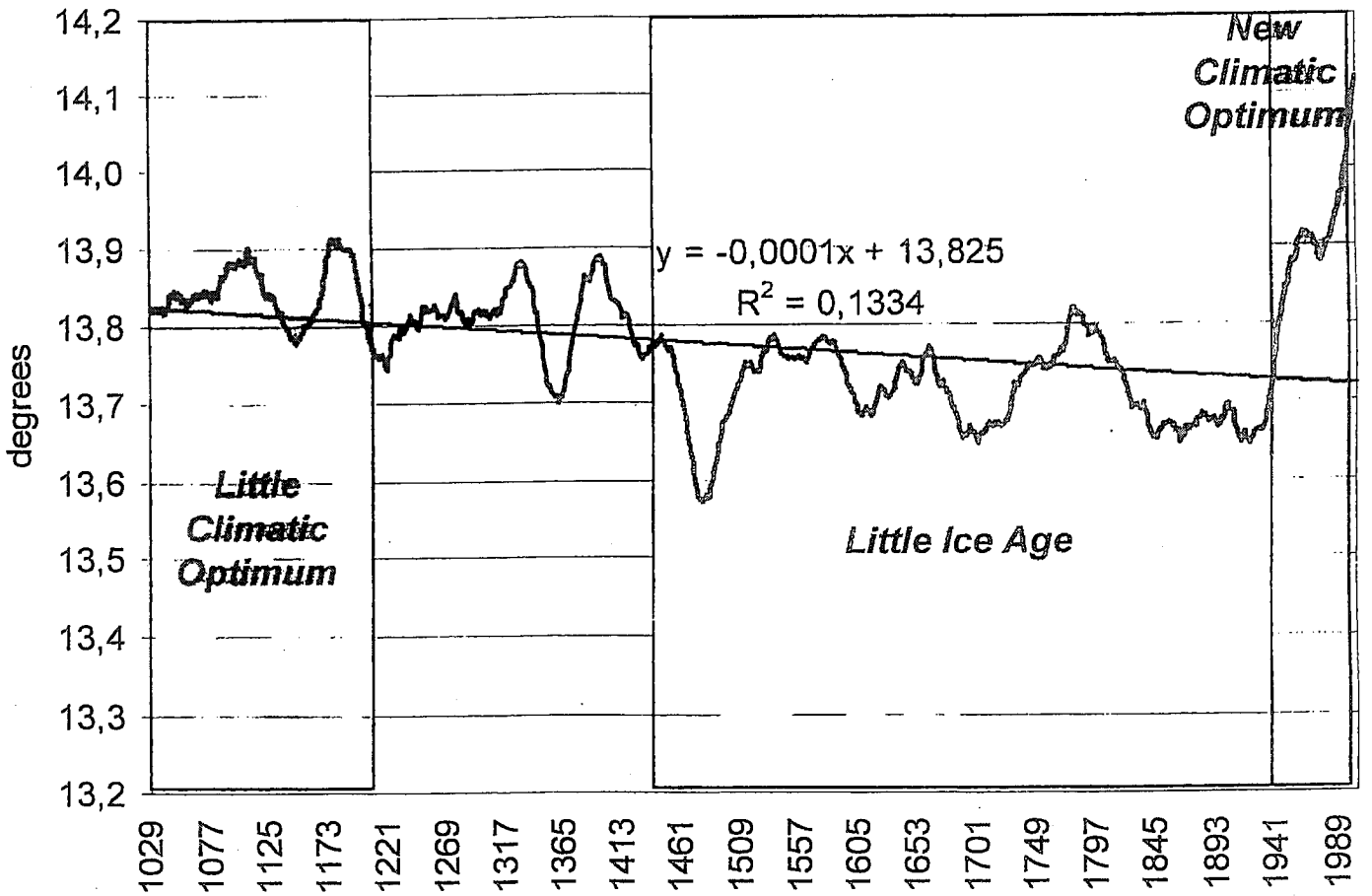


Source: World Data Center for Paleoclimatology, Boulder, USA.

Mother Nature's Weapon of Mass Destruction is actually Global Cooling, not Global Warming.

In the history of civilization climatic optimums are more associated with prosperity and progress, ice ages – with hardships and catastrophes.

Global absolute temperature (30 YMA), 1000-2003



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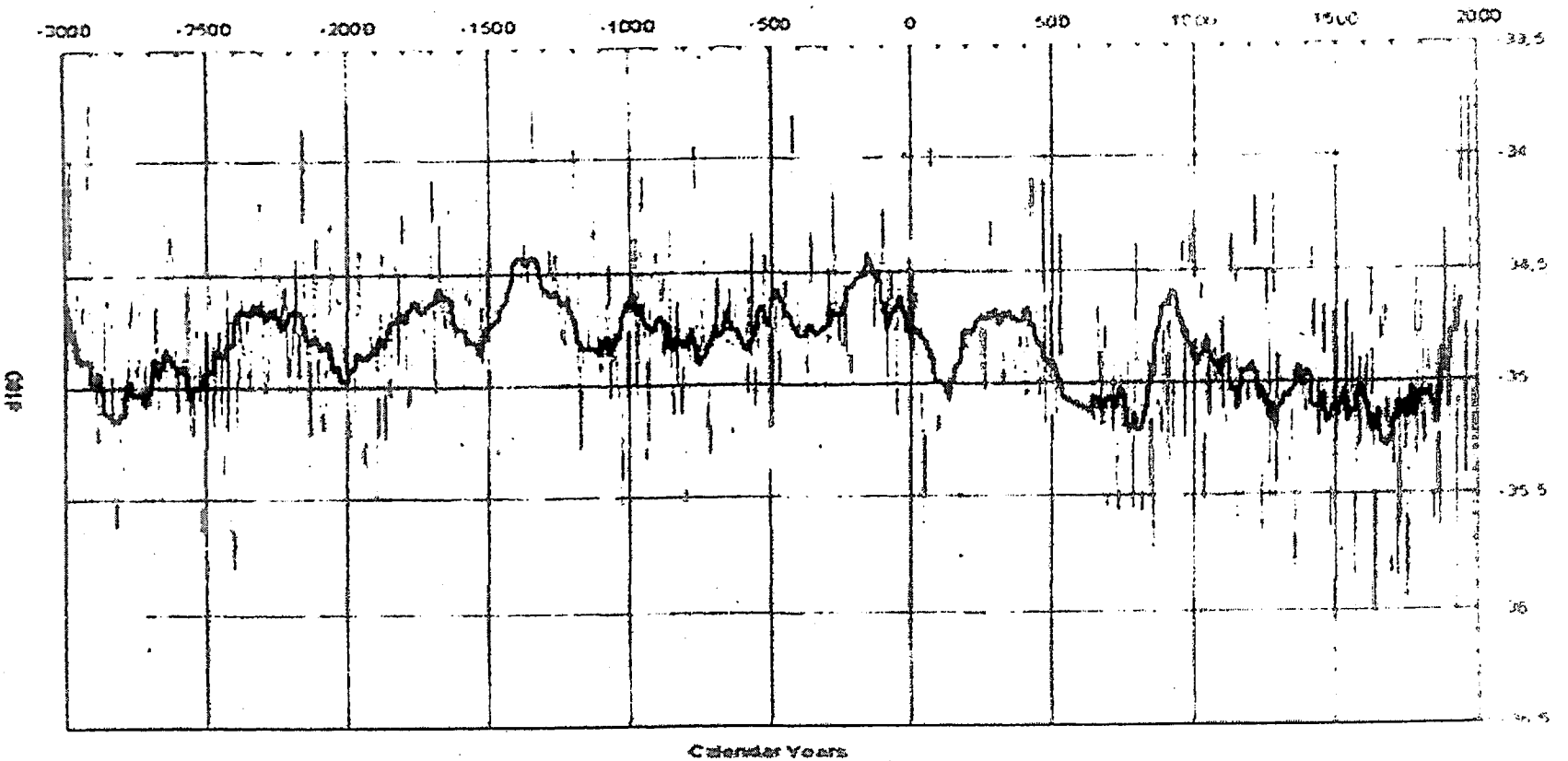

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Cooney, Phil

From: Watson, Harlan L (OES) [WatsonHL@state.gov]
Sent: Wednesday, April 14, 2004 12:15 PM
To: Cooney, Phil
Subject: FW: 2-25-04.Illarionov.The Kyoto Protocol-To Ratify or Not to Ratify.pdf

illarionov.pdf (3 MB)

> <<illarionov.pdf>> This is a 52-slide presentation (The Kyoto
> Protocol-To Ratify or Not to Ratify") that Illarionov gave at Canada's
> Frazier Institute on Fenruary 25.

004297

THE KYOTO PROTOCOL: TO RATIFY OR NOT TO RATIFY?

A. Illarionov
Adviser to the President of Russia

Calgary, Vancouver, Canada
February 25, 2004

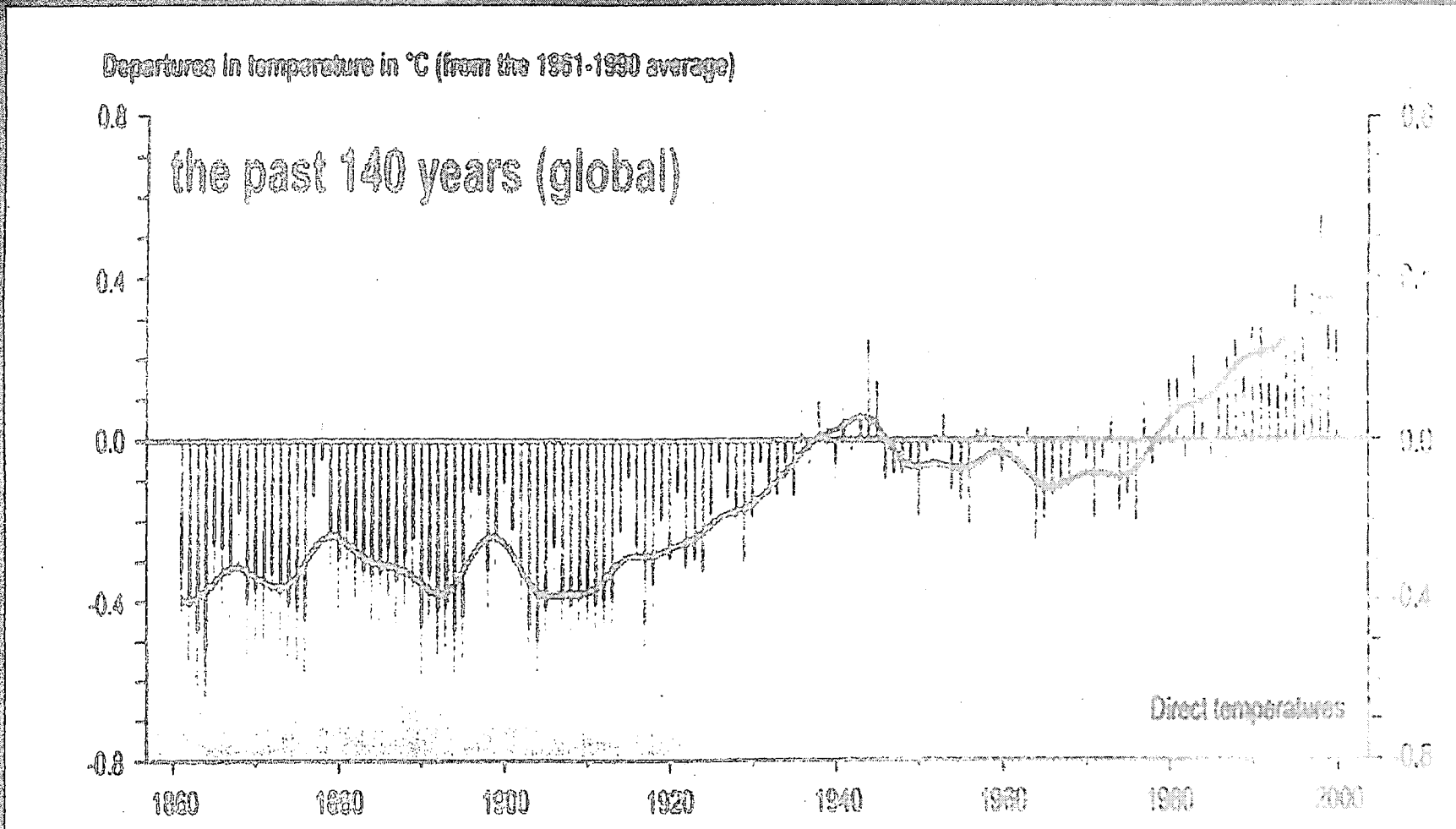
"How so? Is there nothing new in the political world?"

"It is being said that the earth is growing colder every day, and that one day it will become frozen altogether."

"Away with you! Is *that* politics?"

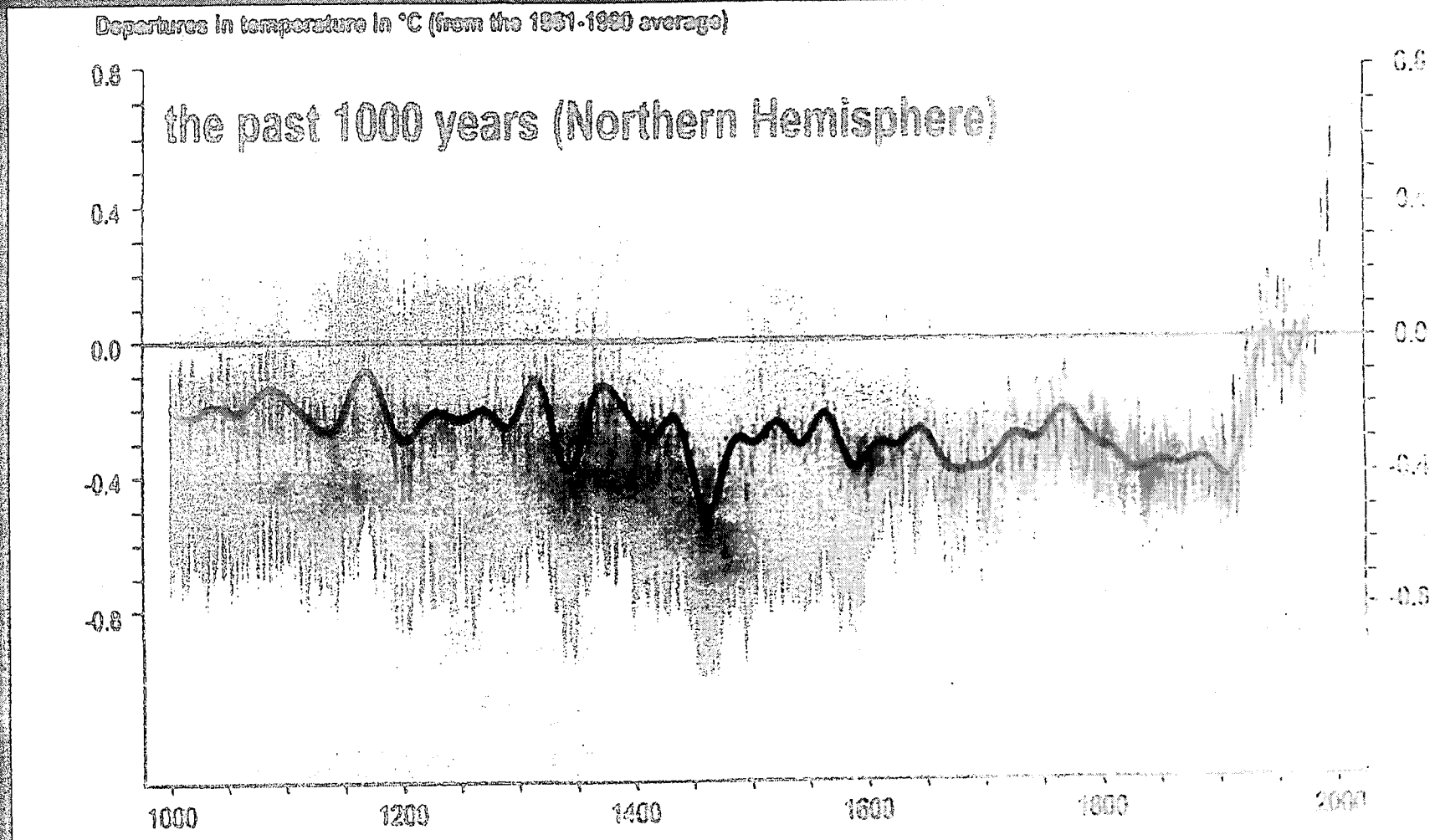
Oblomov, by Ivan Goncharov, 1858

The Kyoto Protocol is based on the hypothesis of the unique "Global Warming" in the XX century



Source: Climate Change 2001 Synthesis Report, IPCC, p.49.

It is asserted that the XX century happened to be the warmest one in the last Millenium



Source: Climate Change 2001 Synthesis Report, IPCC, p.49.

Global Warming is explained by the increase in the CO_2 concentration
ppm
390
370
350
330
310
290
270
1860
1868
1876
1884
1892
1900
1908
1916
1924
1932
1940
1948
1956
1964
1972
1980
1988
1996
2004
Source: Carbon Dioxide Information Analysis Center, 2003.

It is asserted that the CO_2 concentration in atmosphere is driven by the CO_2 emissions of anthropogenic character
ppm
25
20
15
10
5
0
1860
1868
1876
1884
1892
1900
1908
1916
1924
1932
1940
1948
1956
1964
1972
1980
1988
1996
Source: Carbon Dioxide Information Analysis Center, 2003.

To stop "Global Warming" the Kyoto Protocol puts limits on CO_2 emissions of anthropogenic character.

In its first phase (2008-2012), the Kyoto Protocol envisages reduction in GHG emissions compare to 1990:
for all countries of the Annex B – by 5,2%,
for the European Union – by 8%,
for the USA – by 7%,
for Russia – by 0%.

Since the USA and Australia have refused to ratify it the Kyoto Protocol may come into force only if it is ratified by Russia.

So, Russia, along with some other countries, faces historical dilemma:

TO RATIFY
OR
NOT TO RATIFY?

Arguments FOR RATIFICATION:

- revenues from GHG quota sales,
- attraction of foreign investments,
- implementation of the so-called «clean» technologies,
- improvements in «quality» of growth,
- quotas will not be used up to 2012,
- exchange for WTO membership,
- no «international isolation»,
- participation in multilateral environmentalist actions,
- reduction in the frequency and scale of extraordinary natural event
- preventing Global Warming, this Mother-Nature' Weapon of Mass Destruction.

Arguments AGAINST

The Kyoto Protocol is incompatible with economic growth.

The Kyoto Protocol is incompatible with poverty reduction

The Kyoto Protocol is incompatible with wealth accumulation

The Kyoto Protocol is penalizing the best performers in the E

Its targets by 2010 can hardly be achieved by majority of the EU membe

Source: Commission of the European Communities, Report from the Commission under Council Decision 93/389/EEC as amended by Decision 99/296EC for a monitoring mechanism of Community greenhouse gas emissions. COM(2003) 735 final. Brussels, 28.11.2003, p. 12.

The Kyoto Protocol puts brakes on economic growth

The Kyoto Protocol is particularly discriminatory against low- and middle- income economies

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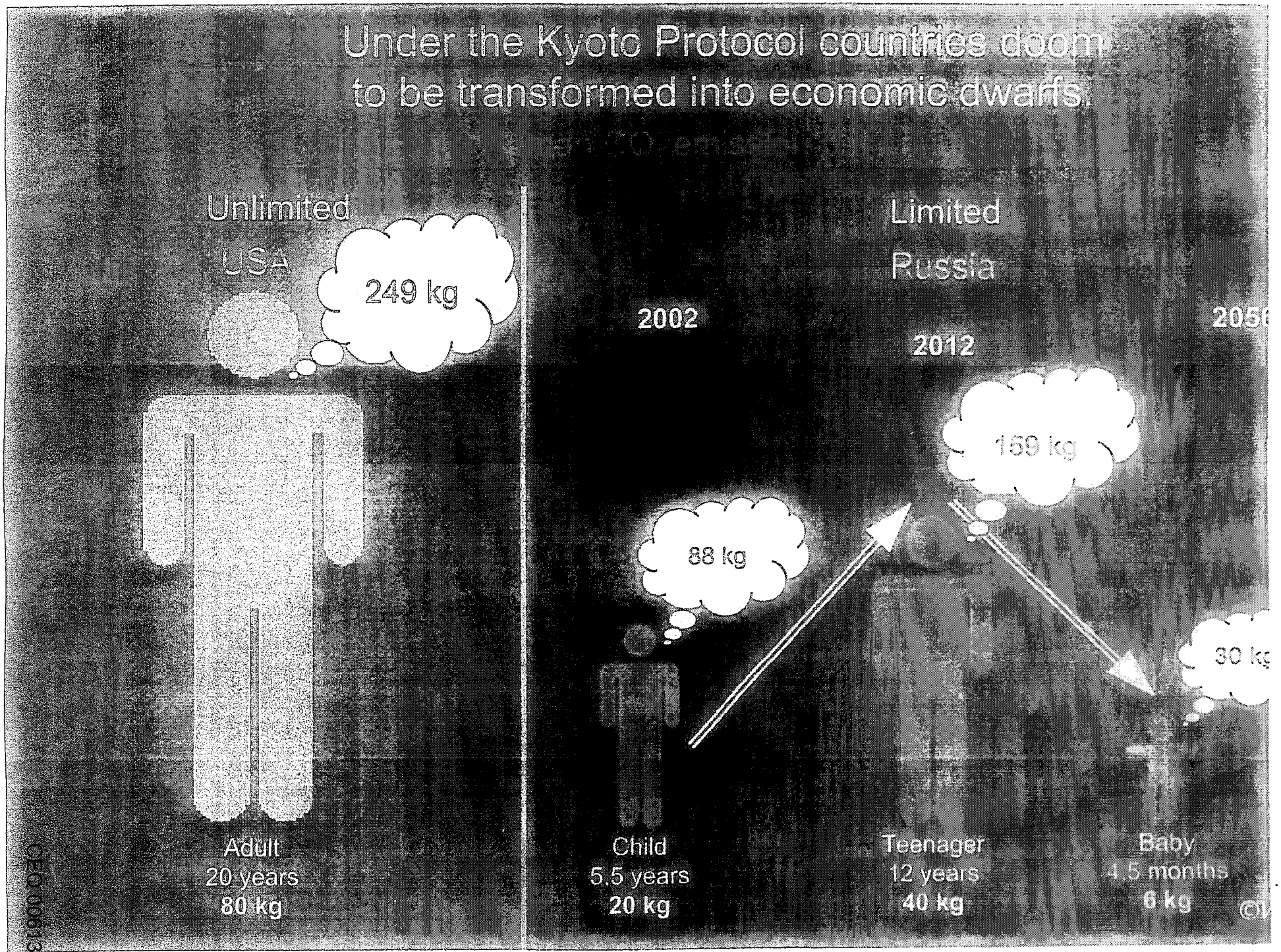
Under the Kyoto Protocol countries doom
to be transformed into economic dwarfs
Unlimited
USA
249 kg
Adult
20 years
80 kg
Limited
Russia
2002
2012
88 kg
159 kg
30 kg
Child
5,5 years
20 kg
Teenager
12 years
40 kg
Baby
4,5 months
6 kg

CEO 060130

The Kyoto Protocol is discriminatory against Russia

Russia's total CO_2 emissions are lower than those of other countries not adopting emission limits

The Kyoto Protocol is discriminatory against Russia

Russia's CO_2 emissions per capita are lower than those of other countries not adopting emission limits

The Kyoto Protocol is discriminatory against Russia
Russia's CO_2 emissions per unit of GDP are lower than those of other countries not adopting emission limits
kg per PPP $ of GDP
0
2
4
6
8
10
12
14
16
18
With unlimited emissions
Russia
1,6
Virgin Islands (U.S.)
14,4
Qatar
8,0
Bahrain
5,3
Iraq
2,3
UAE
2,2
Azerbaijan
2,0
Brunei
1,9
Uzbekistan
1,9
Kuwait
1,9

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Russia's GDP are lower than those of other countries not adopting emission limits

The Kyoto Protocol is discriminatory against Russia

Russia's GDP per capita is lower than those of other countries not adopting emission limits

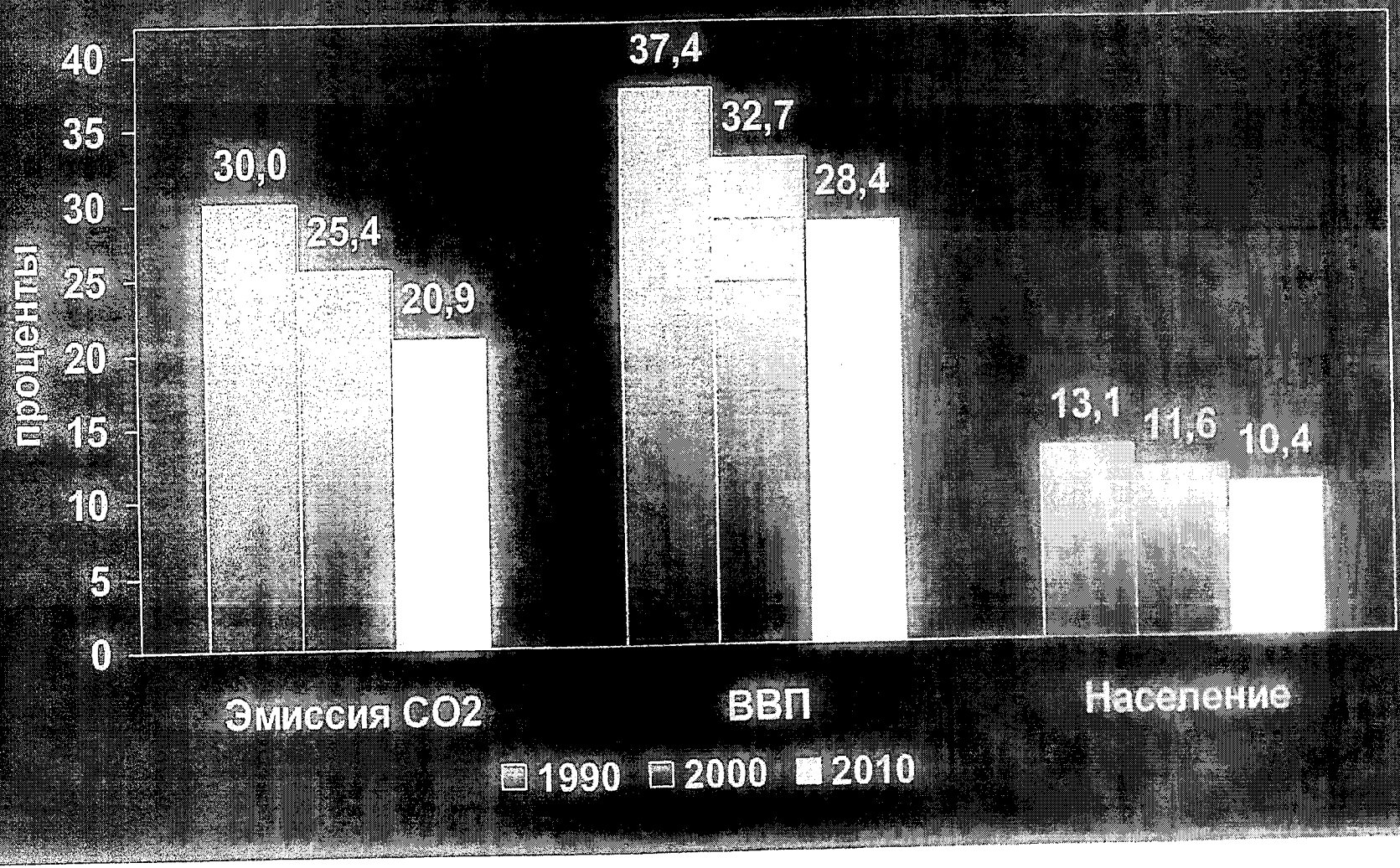
The Russia's Kyoto Cross.
Under the Kyoto Protocol Russia will be a buyer, not a seller of CO_2 quota
?
Actual
Kyoto-2050 Limits
"Auschwitz"
mln t
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050

The Russia's Kyoto Trap.

Under the Kyoto Protocol Russia won't be able to sell its CO_2 quotas.

Sequence of purchases according to the EU Directive adopted by the EU Parliament 02.07.03 and accepted by the EU Council 22.07.03

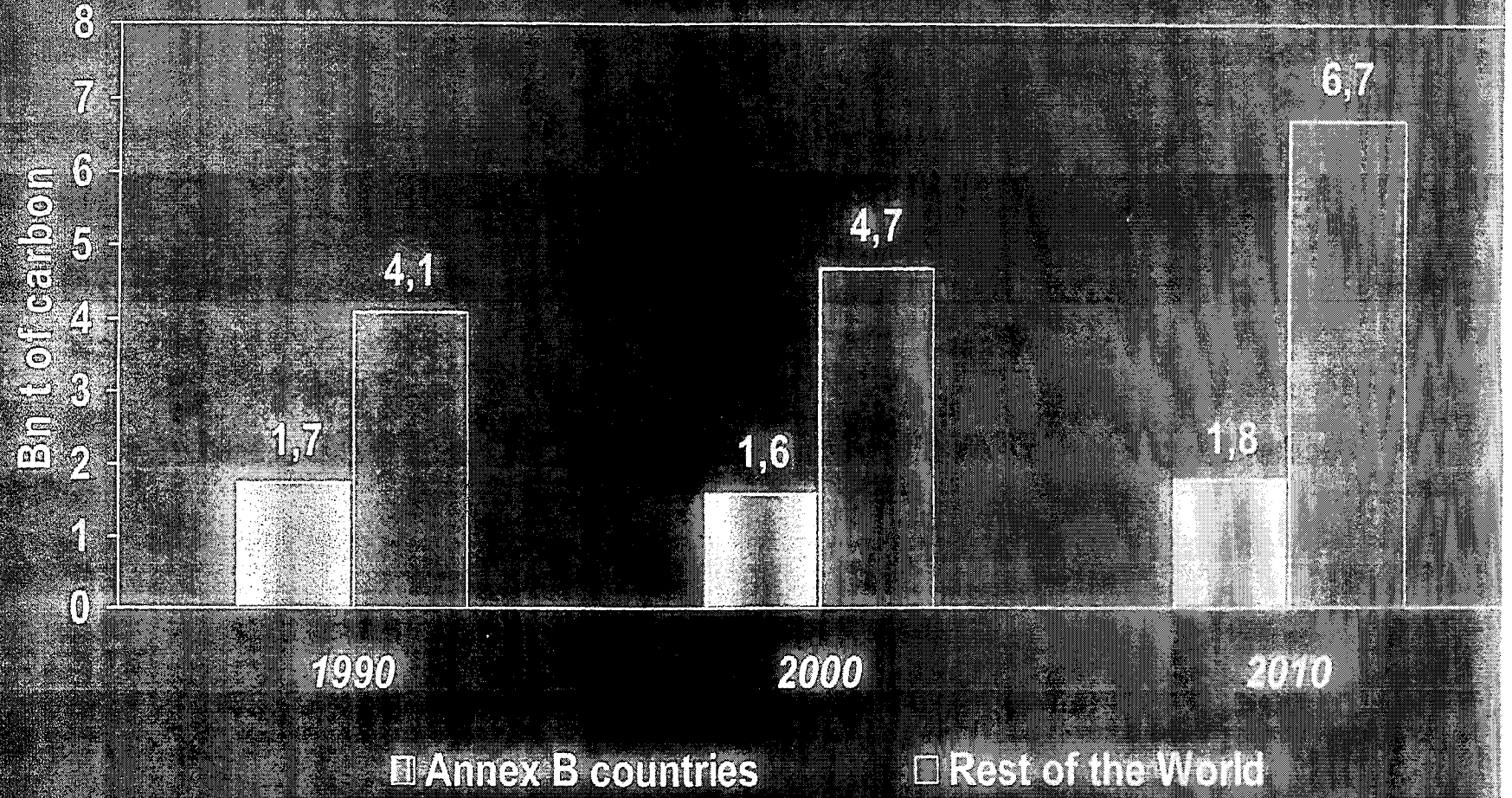
The Kyoto Protocol is far from universal.
It is backed by the absolute minority of the World.
The World majority (178 countries out of 210, or 85%) didn't adopt the Kyoto Protocol limits.



The Kyoto Protocol is unable to achieve its proclaimed goa
50,1
31,7
27,9
With Russia
percents
55
50
45
40
35
30
25
20
15
10
5
0
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010

The Kyoto Protocol is unable to achieve its proclaimed goals

World's CO_2 emissions keep growing



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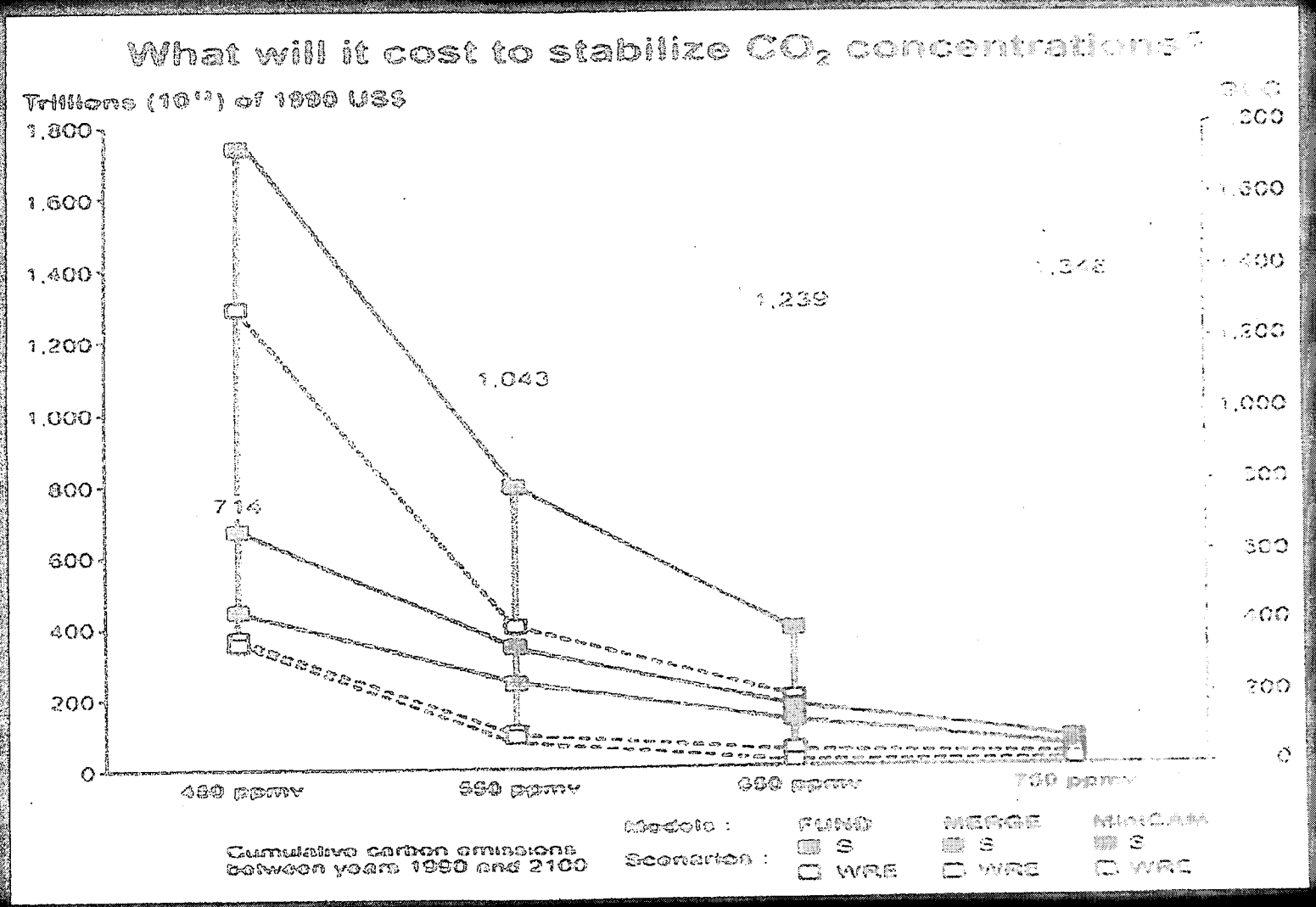
The cost of compliance with such international regulation can be as high as 1750 US$ trln between 1990 and 2100, or up to 15% of their annual GDP in affected countries



Source: Climate Change 2001 Synthesis Report, IPCC, p.119.

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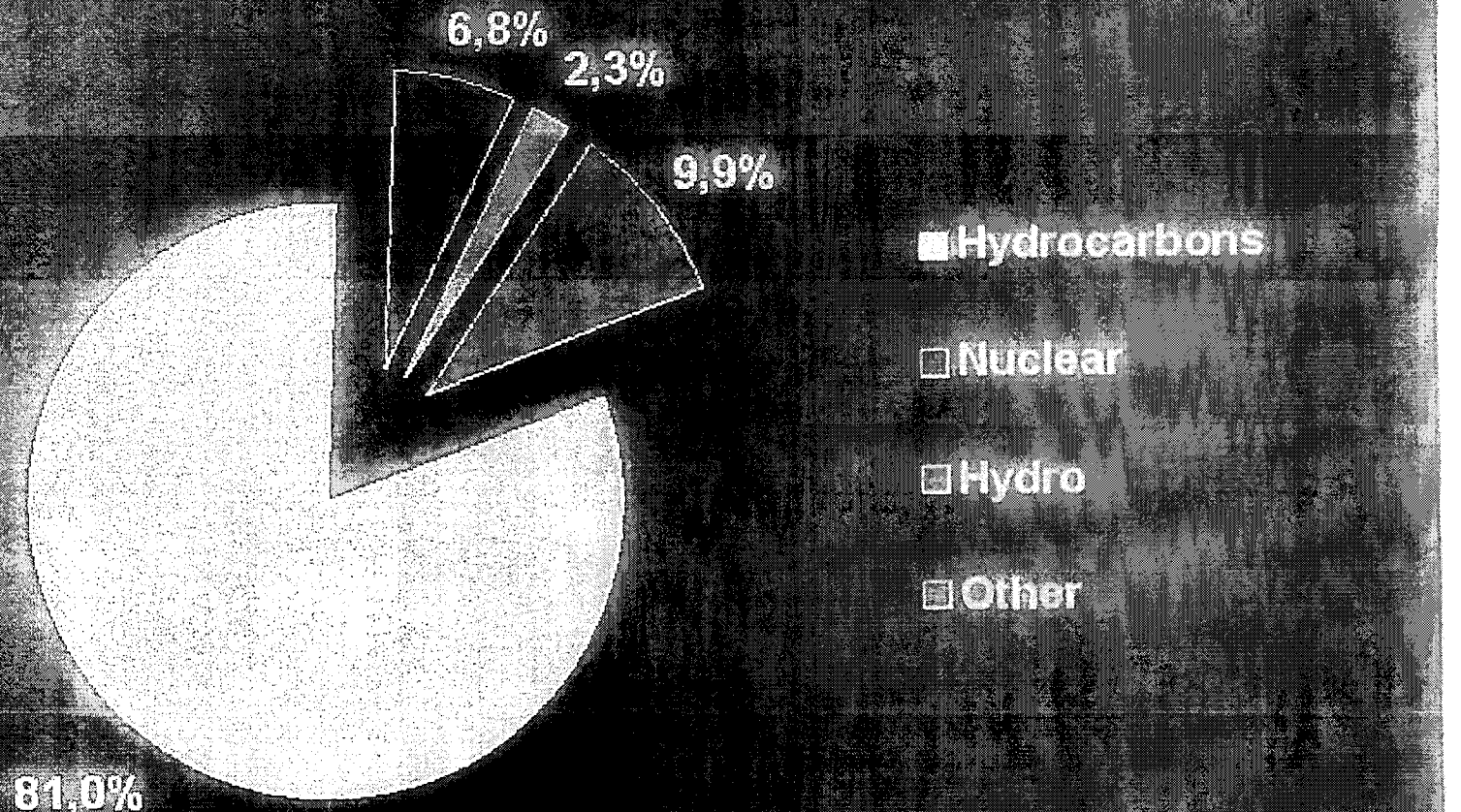
It's impossible to switch away from hydrocarbons to another energy base in a short period of time



Trying to use structural peculiarities of national economies
the Kyoto Protocol appears as powerful instrument
in unfair intergovernmental competition.
per cents
50
40
30
20
10
0
40,3
15,7
16,0
13,1
8,9
5,3
0,0
EU
France
Germany
Japan
USA
Russia
Canada

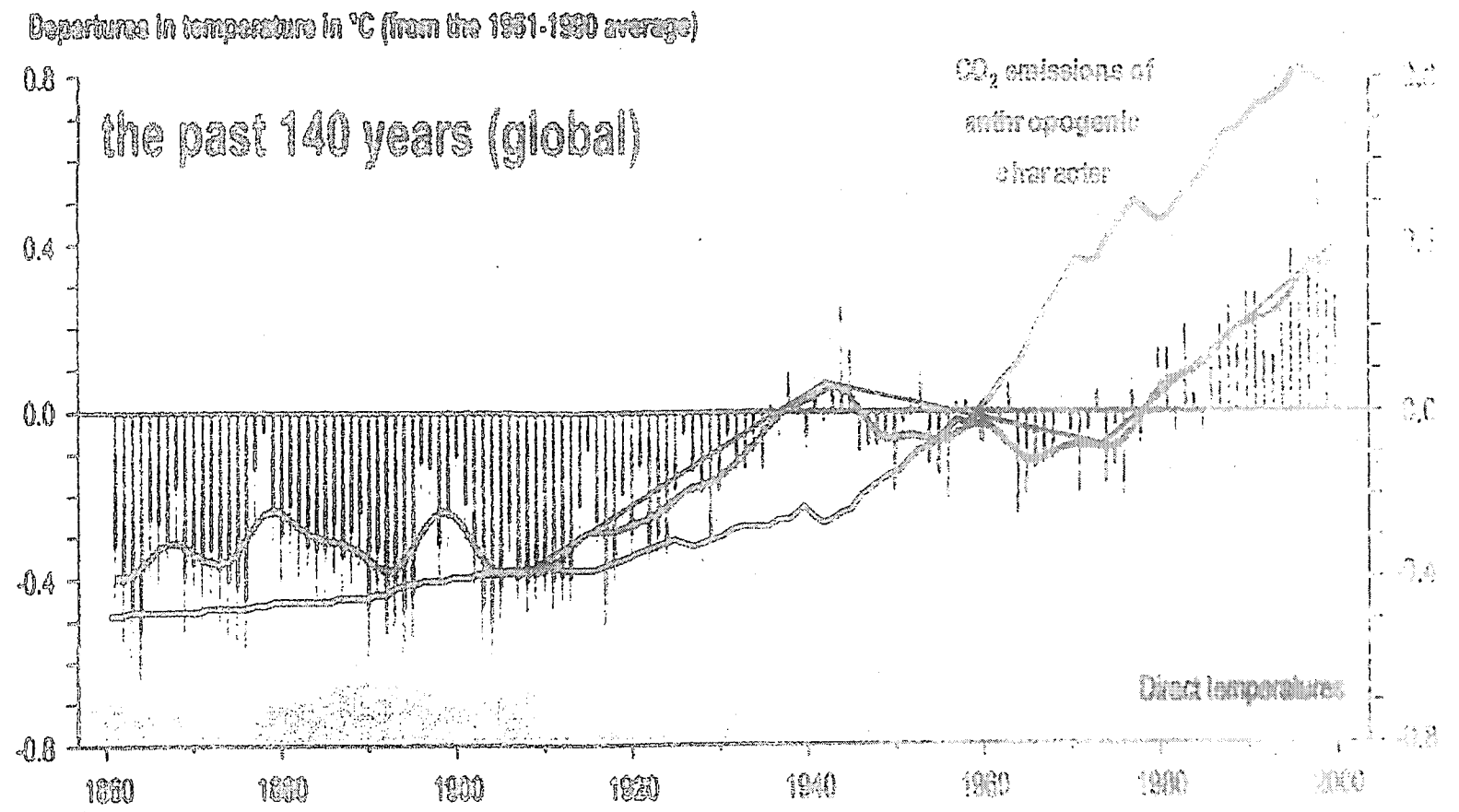
The Kyoto protocol is based on flawed science.

The variation in CO_2 concentration can not be explained by variation in CO_2 emissions of anthropogenic character, 1750–2003

Source: Carbon Dioxide Information Analysis Center, 2003.

The Kyoto protocol is based on flawed science.

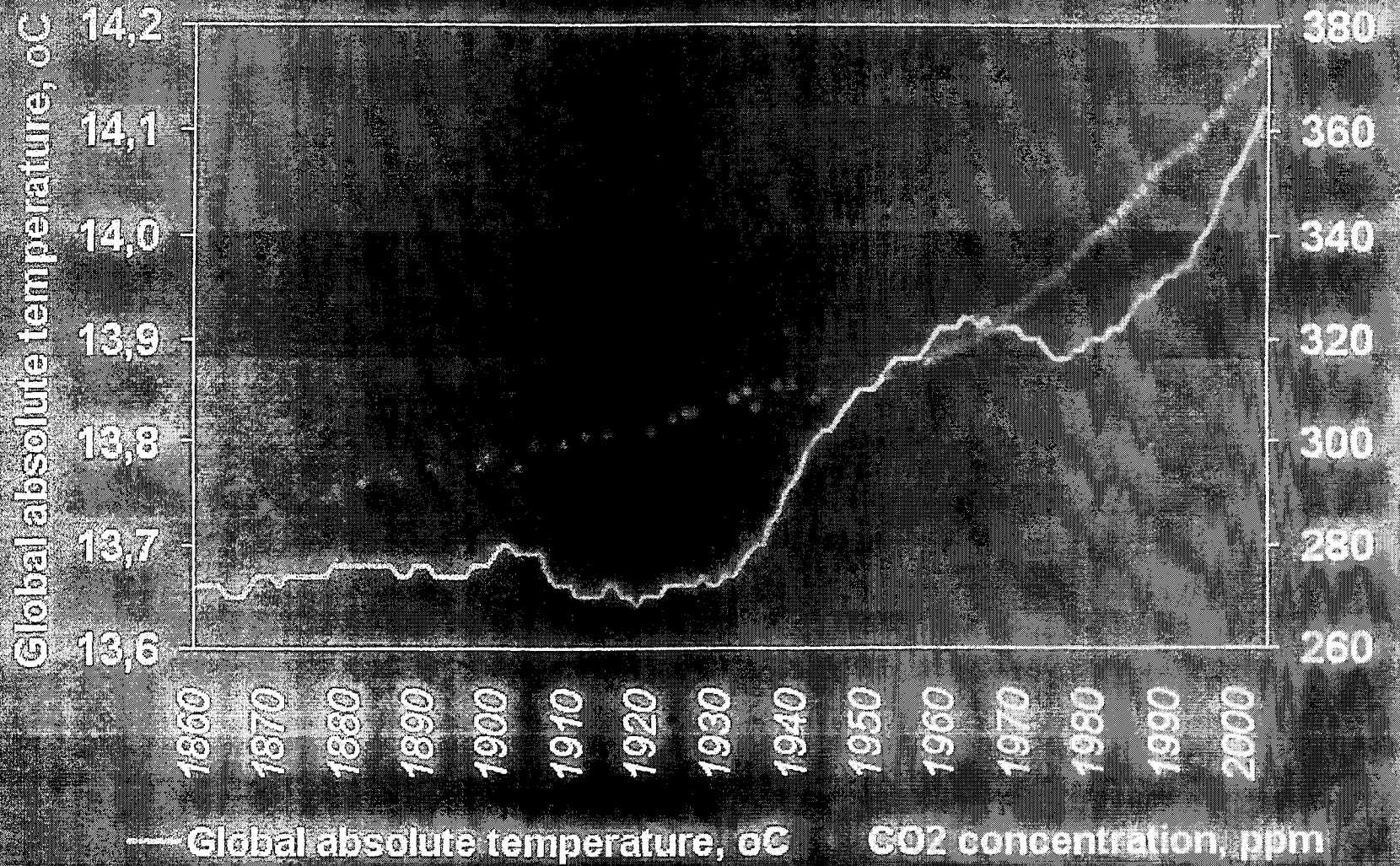
The variation in global temperature can not be explained by variation in CO_2 emissions of anthropogenic character, 1860-2000



Source: Climate Change 2001 Synthesis Report, IPCC, p.49.

The Kyoto protocol is based on flawed science.

The variation in global temperature can not be explained by the variation in CO_2 concentration in atmosphere



Source: Carbon Dioxide Information Analysis Center, 2003.

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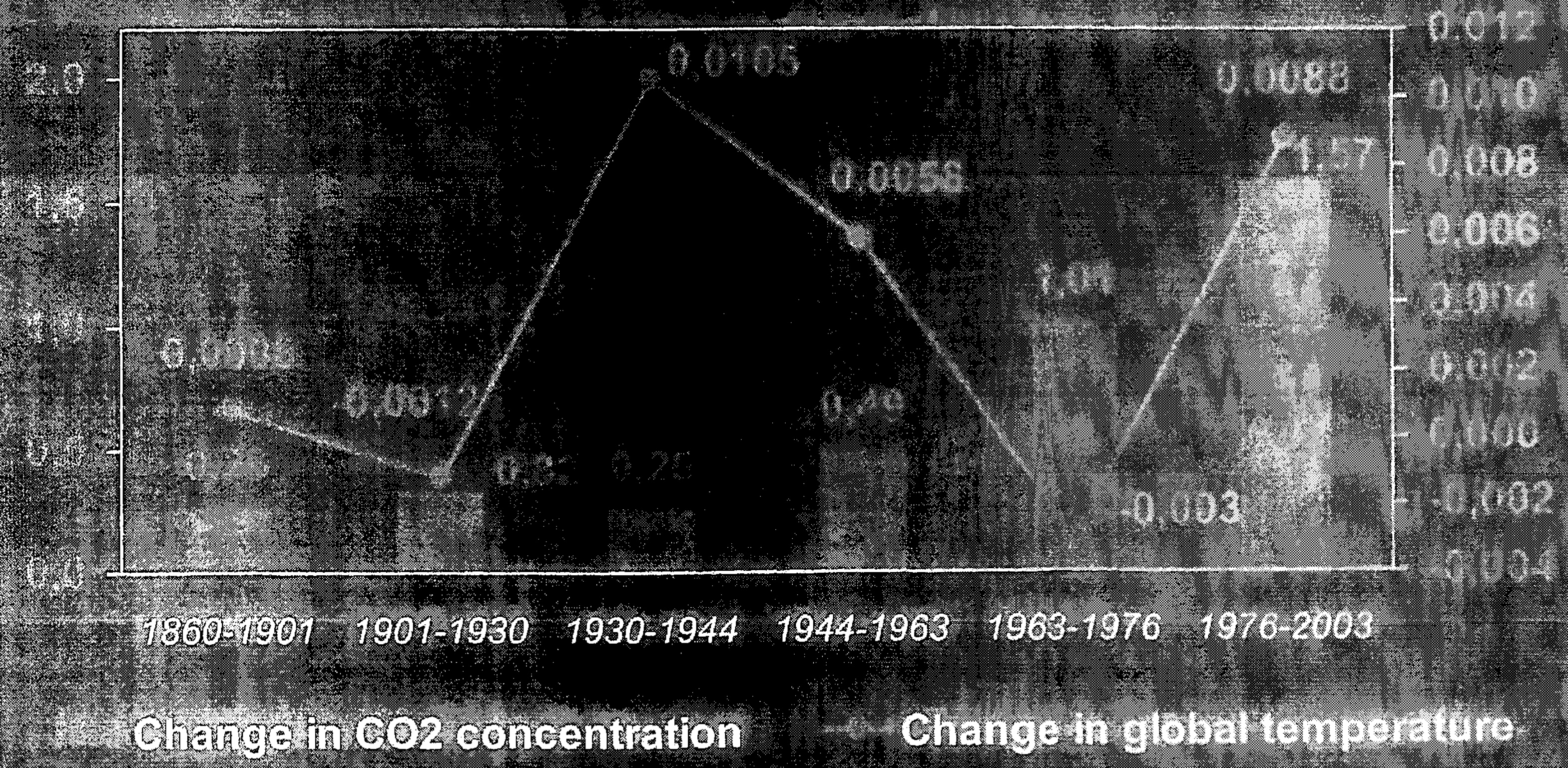
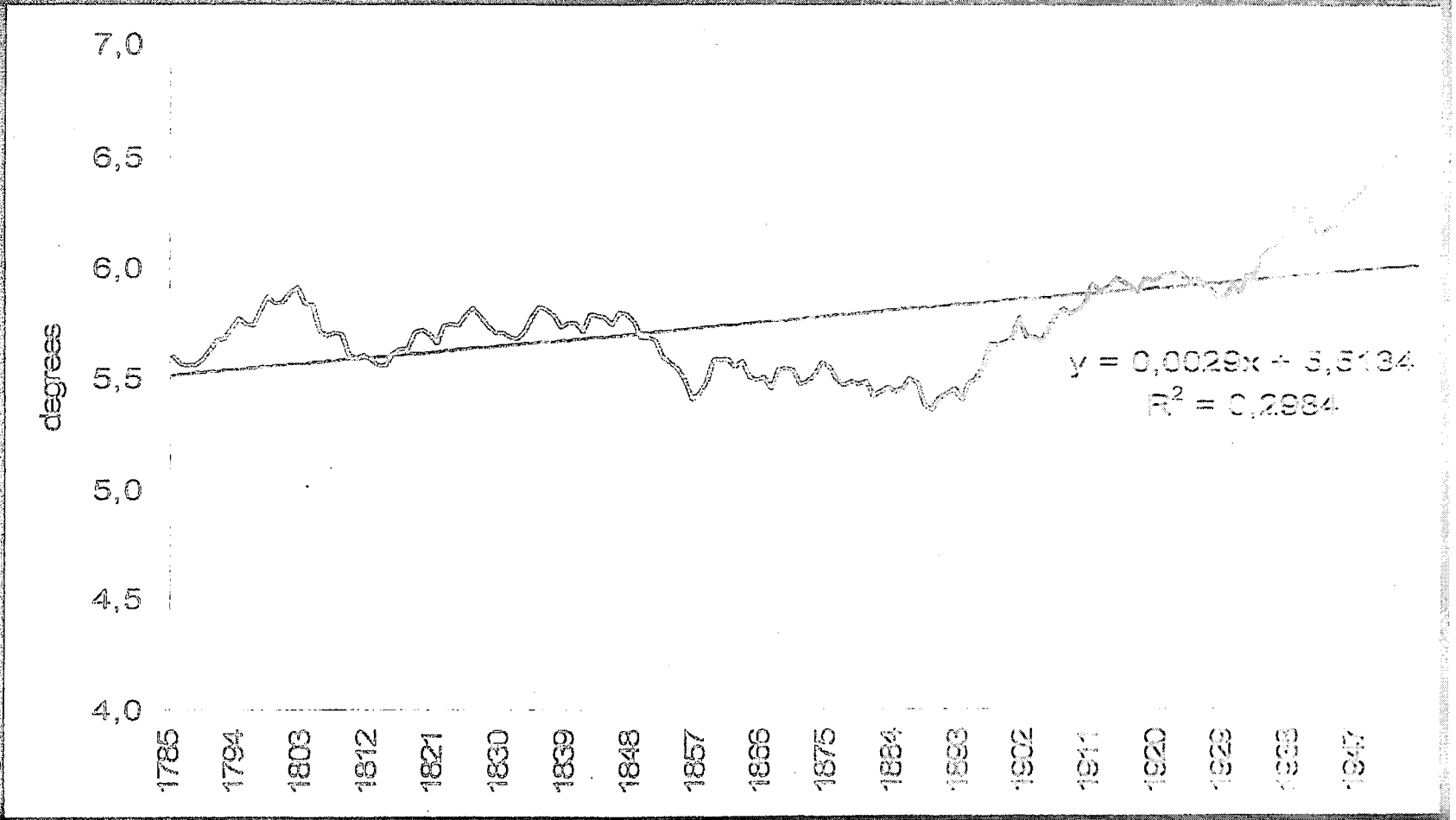


The Kyoto Protocol is based on flawed science.
Global temperature is better correlated with geomagnetic activity, rather
than with CO2 concentration in atmosphere.
3,0
2,5
2,0
1,5
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
1889
1895
1901
1907
1913
1919
1925
1931
1937
1943
1949
1955
1961
1967
1973
1979
1985
1991
1997
AA index
Global temperature
CO2 concentration
Source: Carbon Dioxide Information Analysis Center, 2003, WDC for STP, Moscow

The very concept of "Global Warming" critically depends on the time horizon chosen.

It appears reasonable only for short-term periods.



Source: Statistiska Centralbyran, Historical Statistic of Sweden, II Climate, Land surveying, agriculture, forestry, fisheries – 1955, 1959, pp. 1-6.

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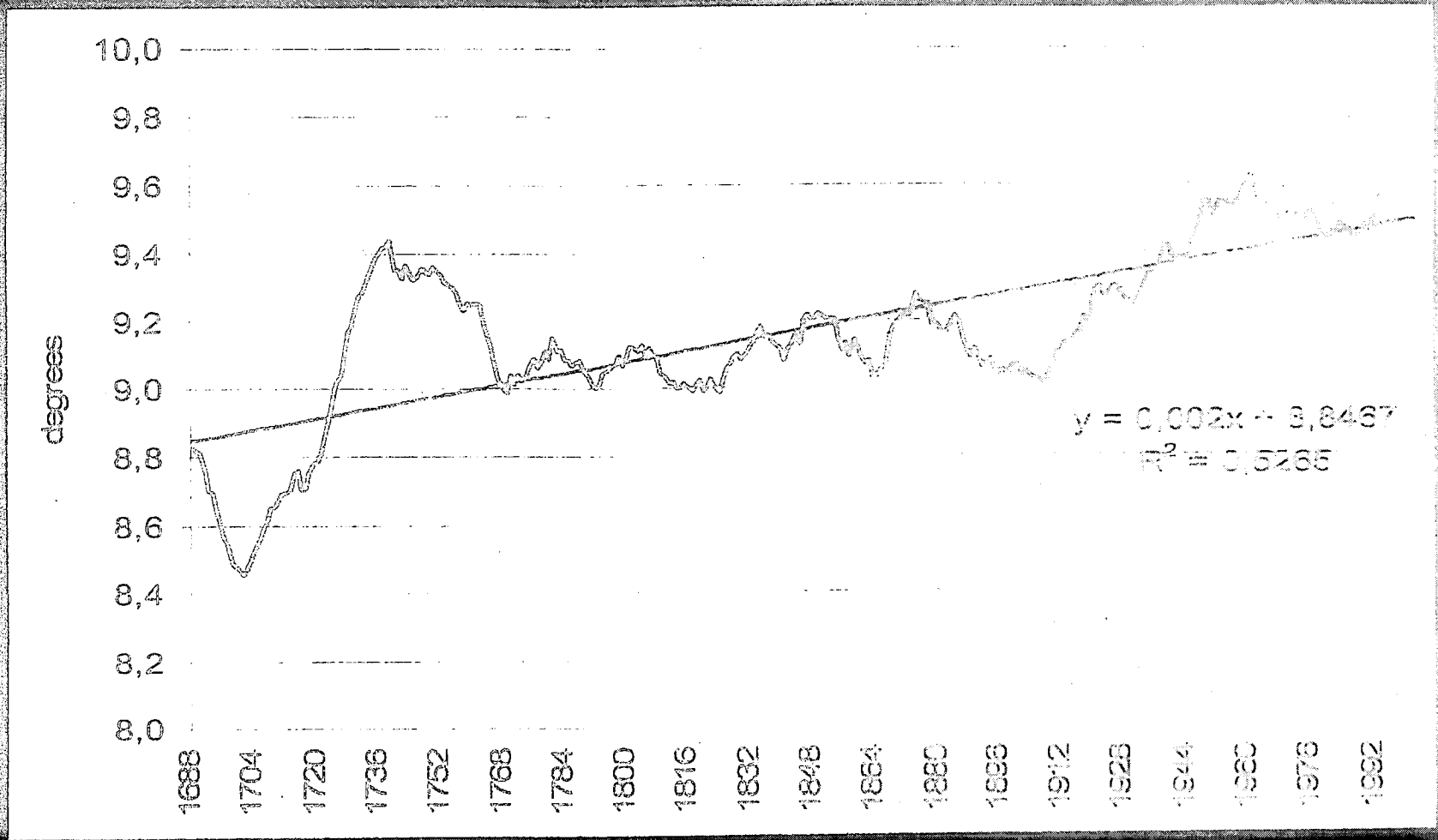
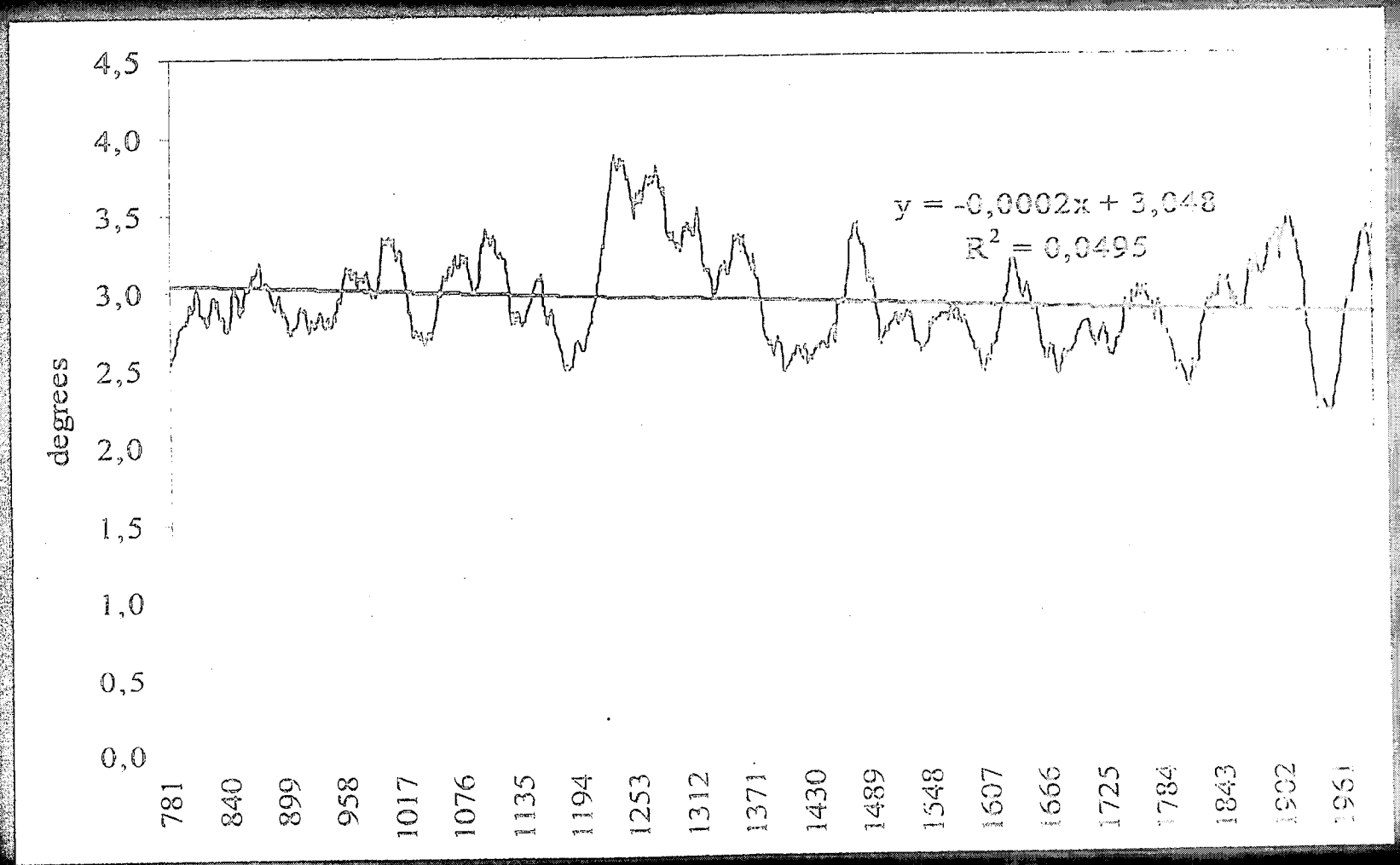


Source: www.met-office.gov.uk.

The very concept of "Global Warming" critically depends on the time horizon chosen.

It appears unproven for longer-term periods.



Source: World Data Center for Palaeoclimatology, Boulder, USA.

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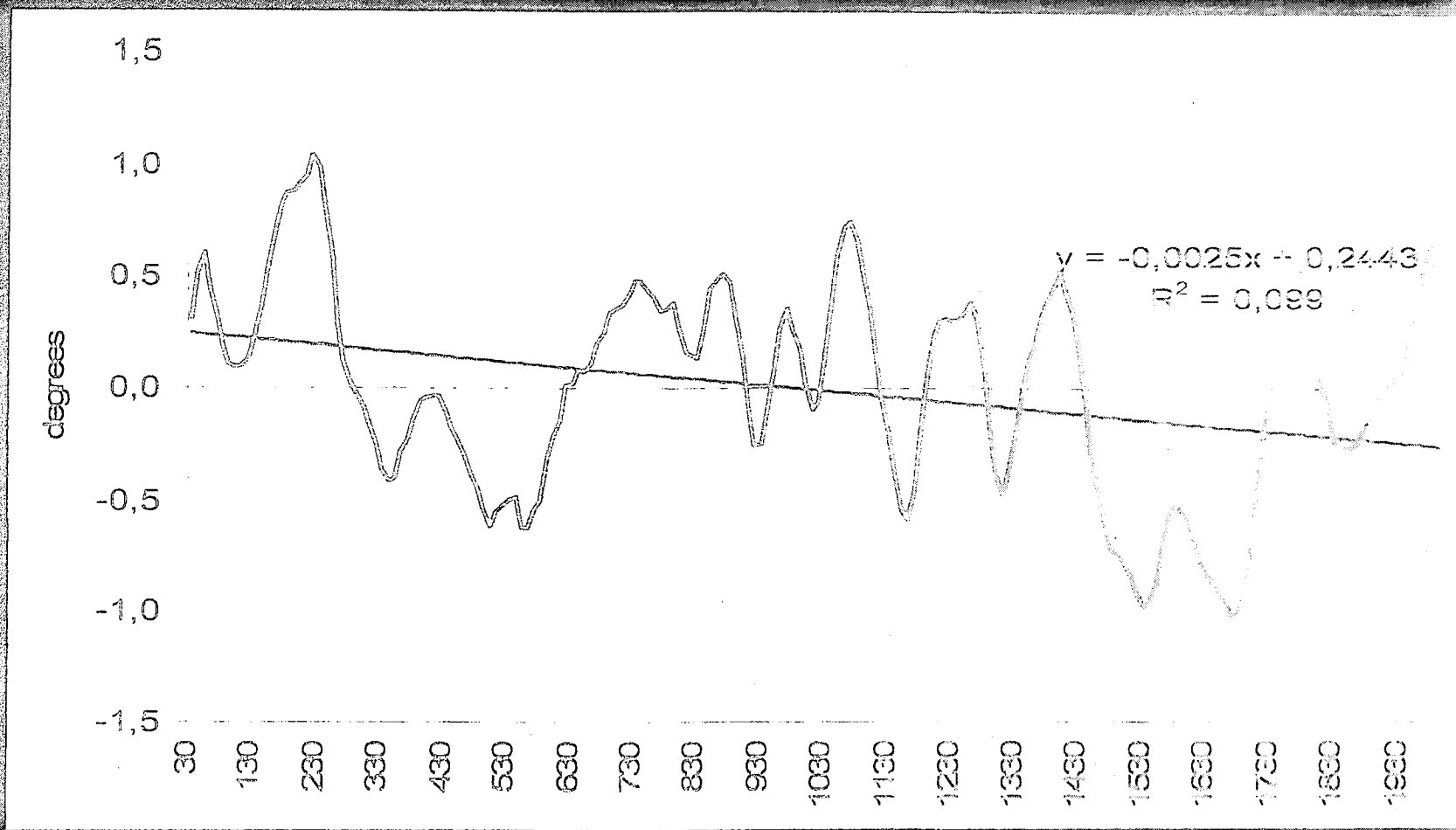

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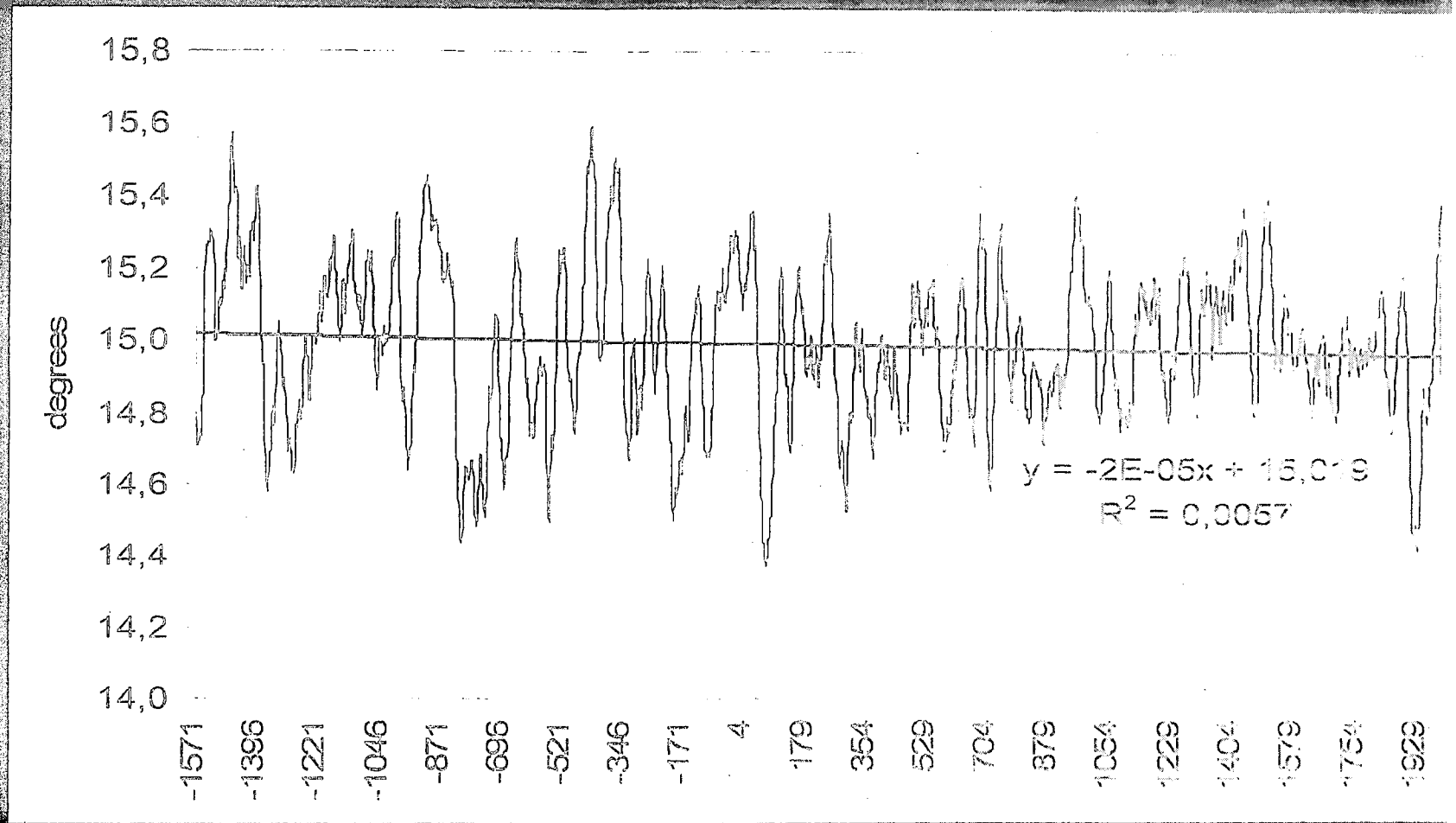
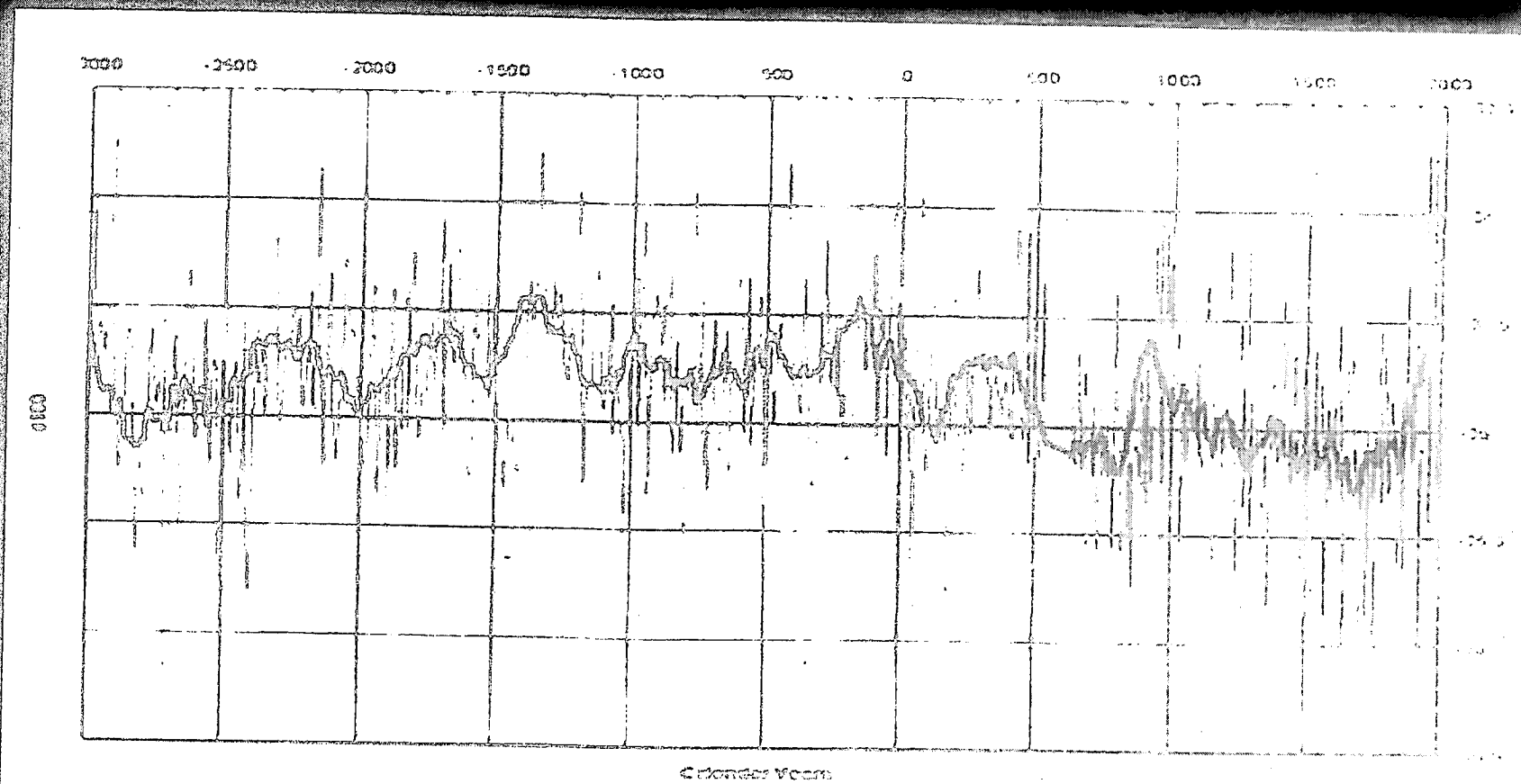


Source: World Data Center for Palaeoclimatology, Boulder, USA.

The very concept of "Global Warming" critically depends on the time horizon chosen.

It appears unproven for longer-term periods. The current "Global Warming" is neither unique, nor the strongest in the history of civilization.

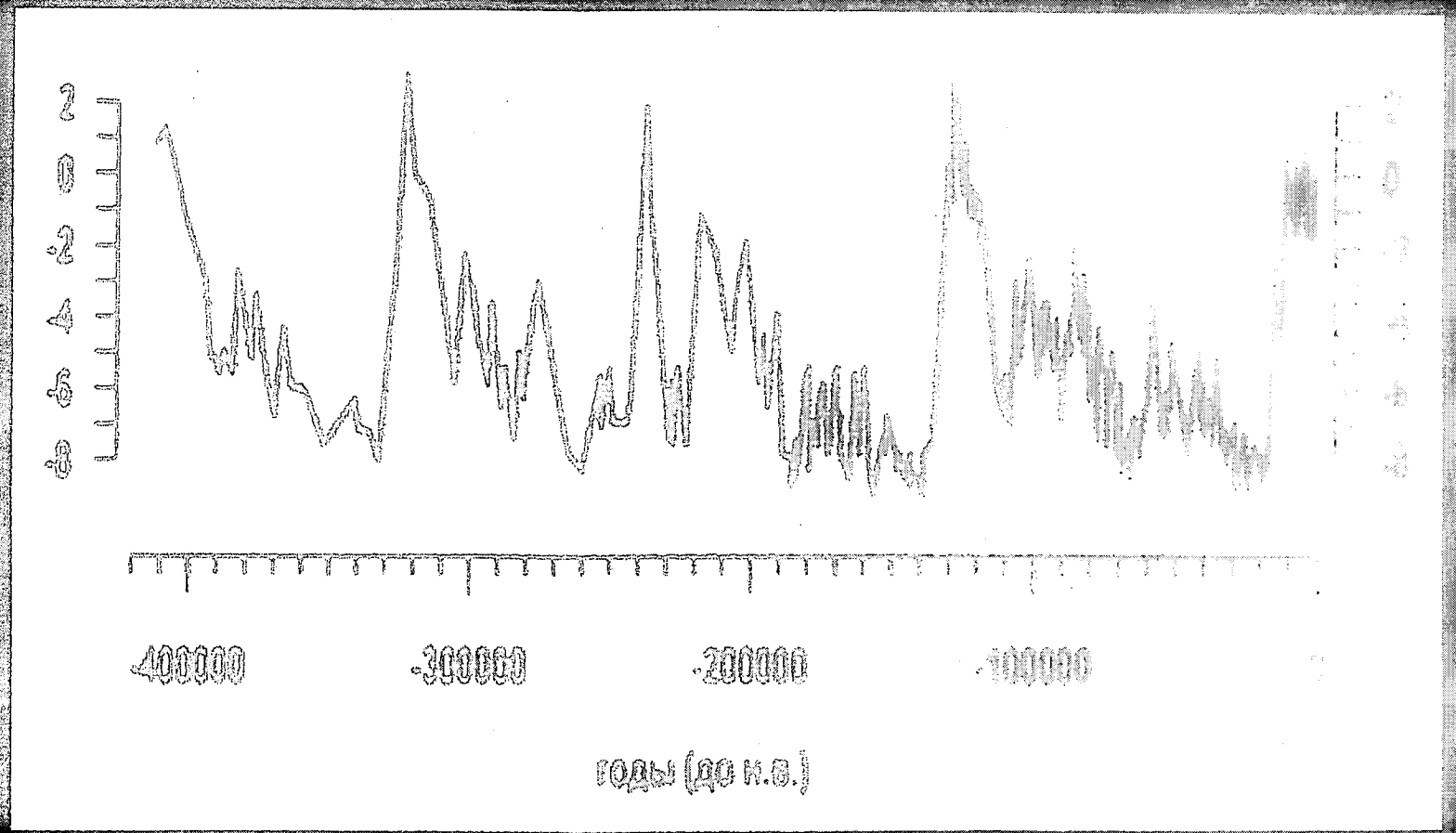


Distribution of Oxygen $\delta^{18}O$ in the upper part of the kern from drill GISP2 (last 5000 years)

Source: Grootes, P.M., Stuiver, M., White, J.W.C., Johnsen, S.J., Jouzel J., Comparison of oxygen isotope records from the GISP and GRIP Greenland ice cores. Nature 366, 1993, pp.552-554.

The very concept of "Global Warming" critically depends on time horizon chosen. It appears unproven for long-term perio

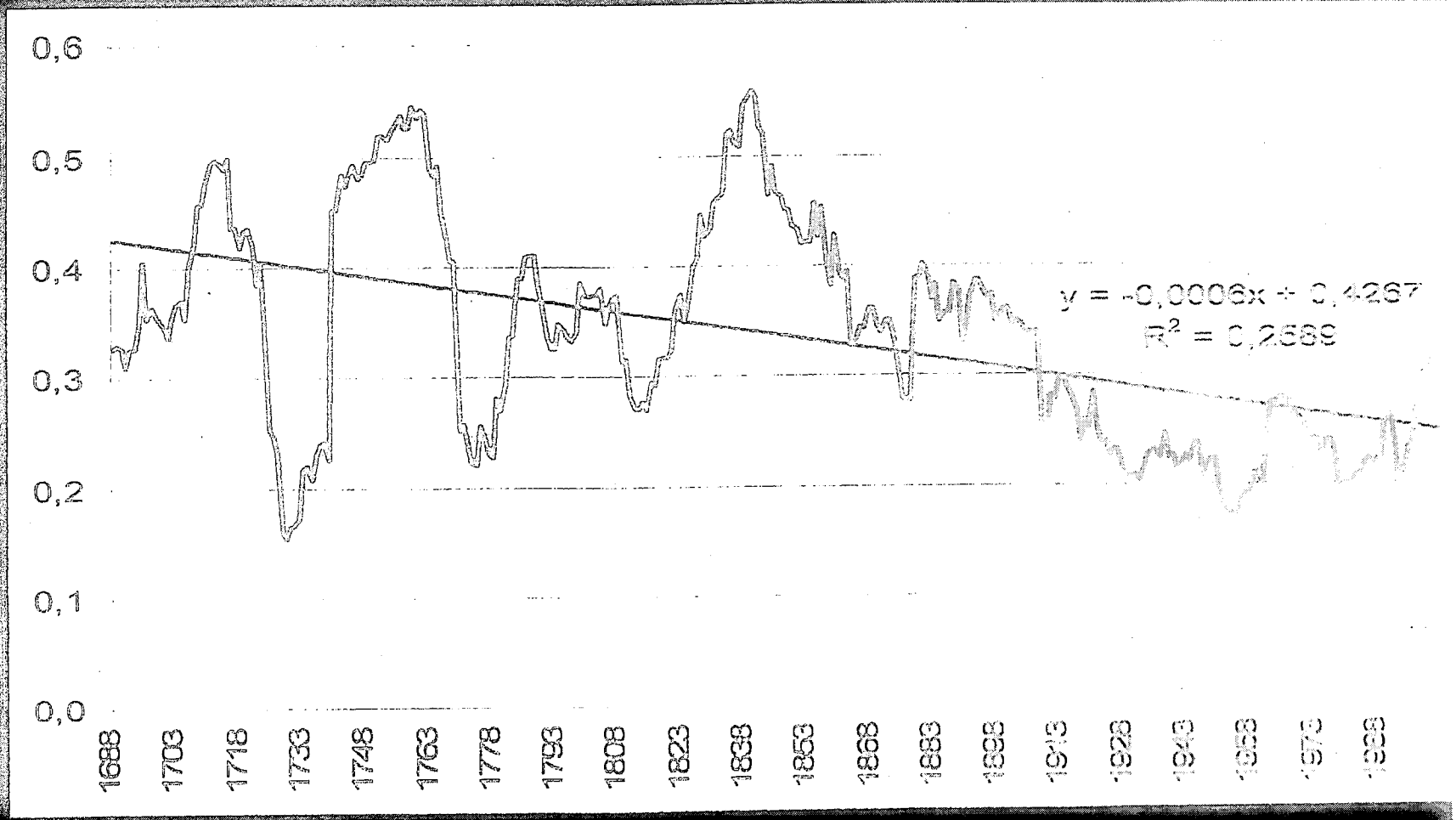
The current "Global Warming" is neither unique, nor the strongest in the history of Earth.



Source: J.R. Petit et al. (19 authors). Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica. -Nature, 399 (1999), 429-436.

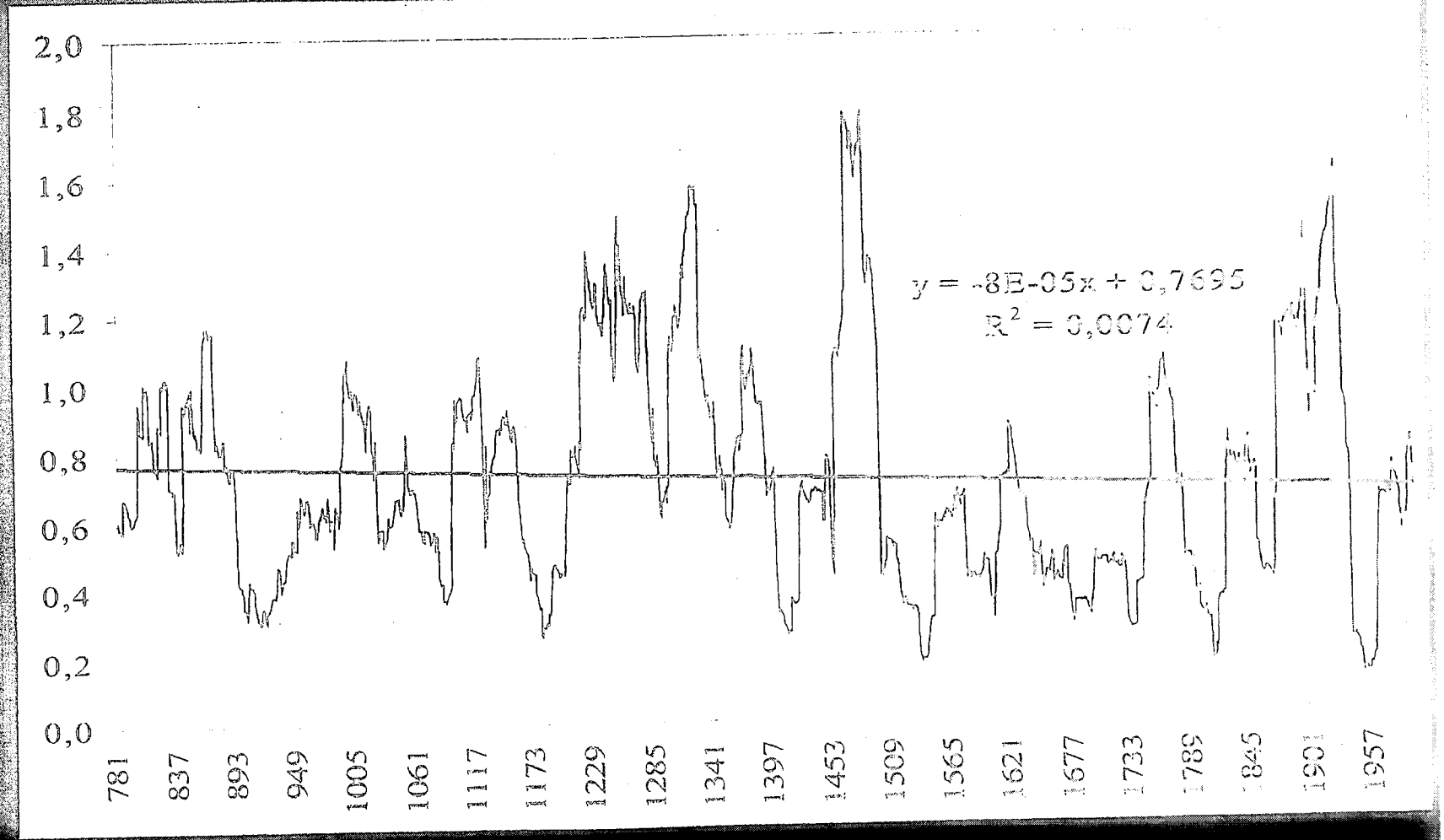
The asserted increase in the frequency of extraordinary climatic events in recent years appears unproven.

It is neither unique, nor the strongest for the last 350 years.



Source: www.met-office.gov.uk.

The asserted increase in the frequency of extraordinary climatic events appears unproven.



Source: World Data Center for Palaeoclimatology, Boulder, USA.

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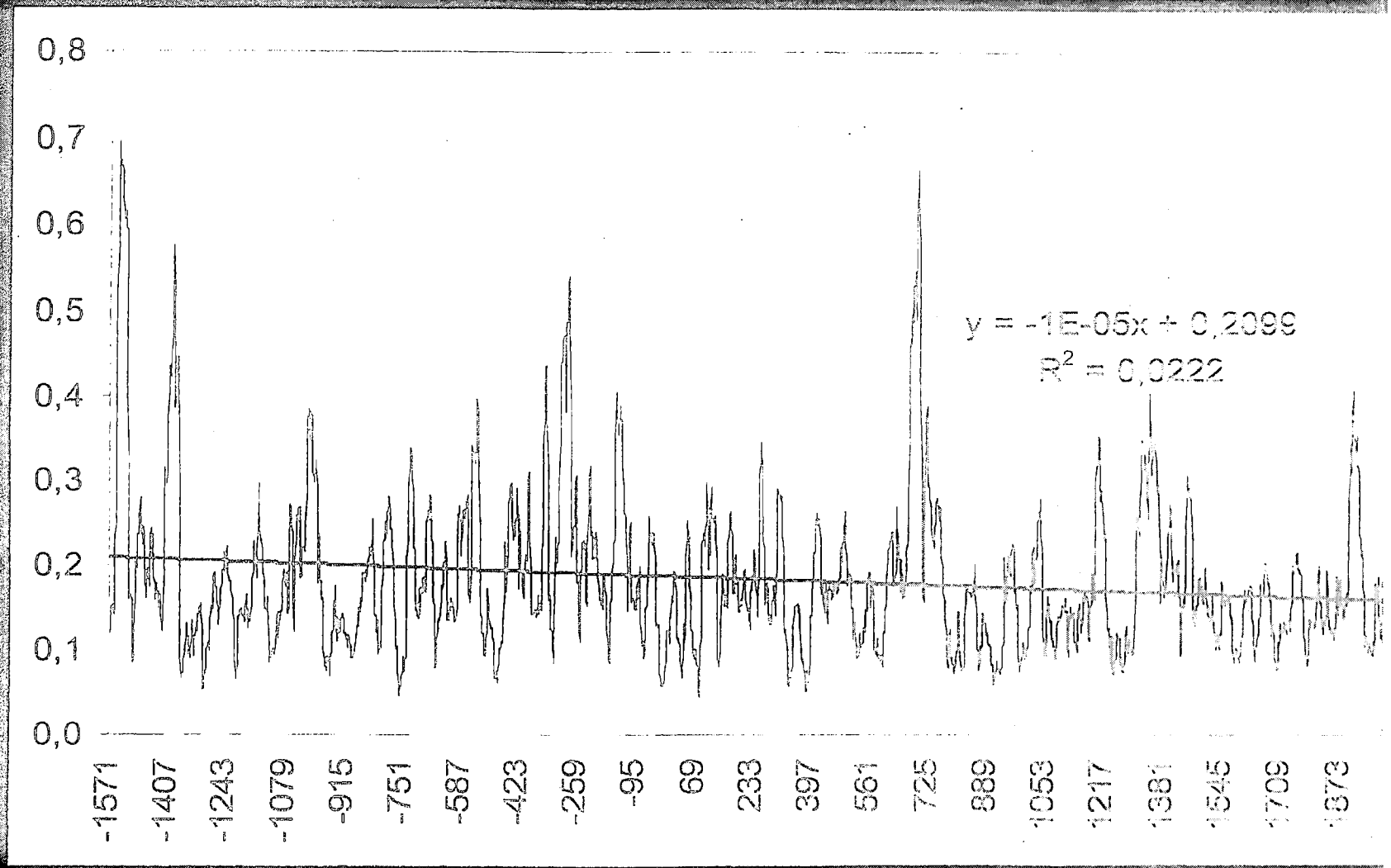
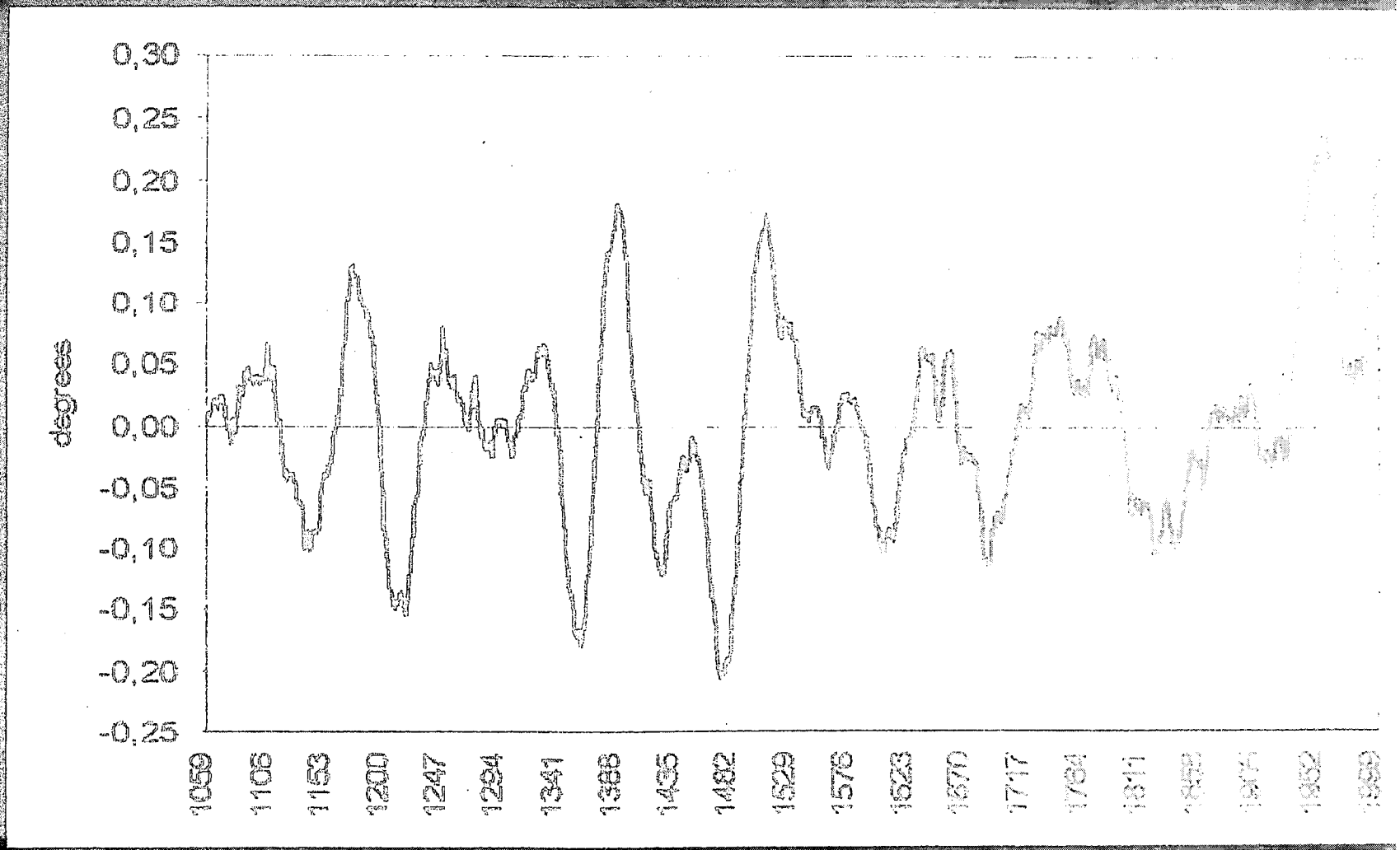


Source: World Data Center for Palaeoclimatology, Boulder, USA.

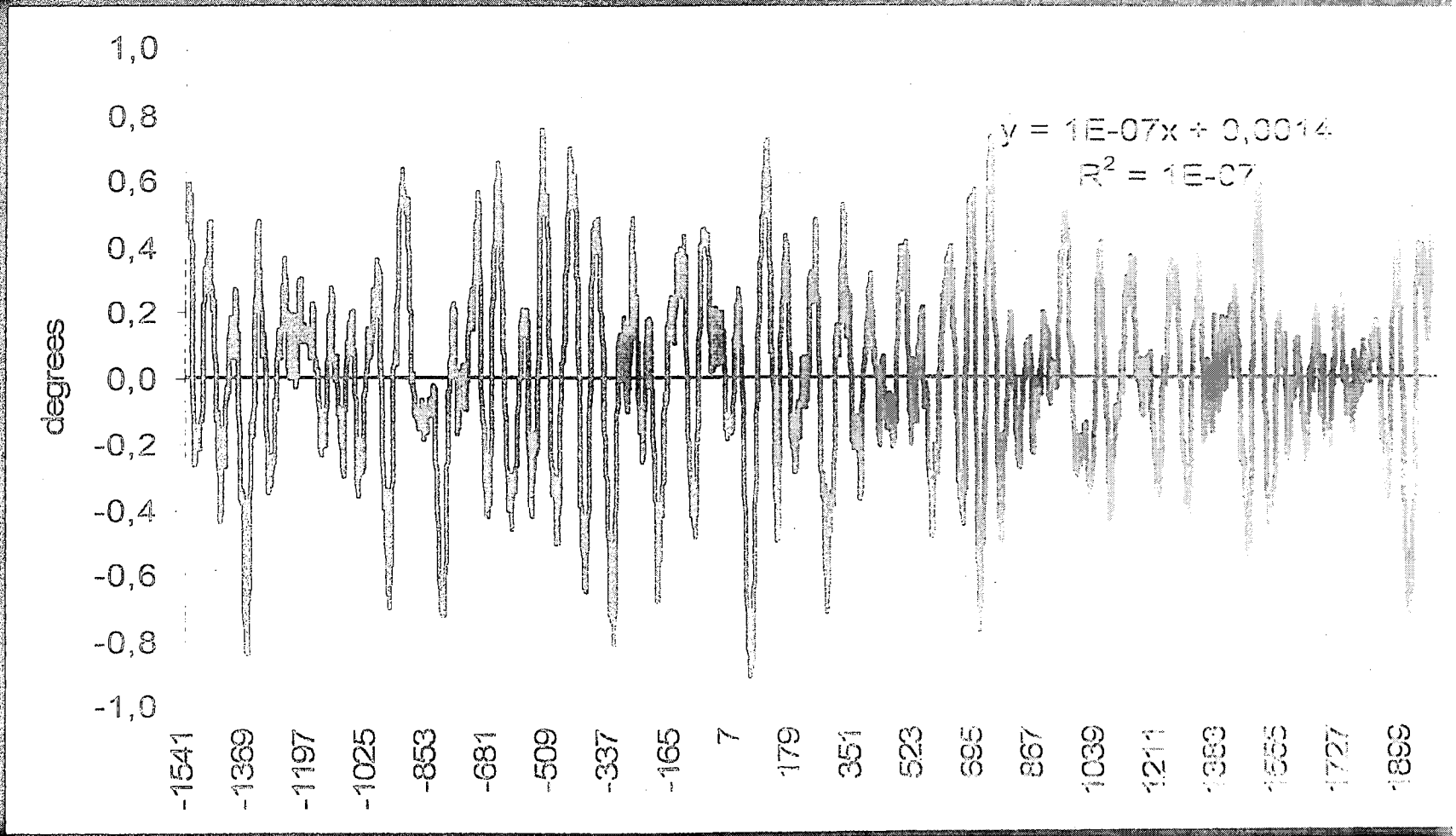
The asserted increase in the speed of the current temperature change appears unproven.

It is neither unique, nor the strongest in the last 1000 years.



The asserted increase in the speed of the current temperature change appears unproven.

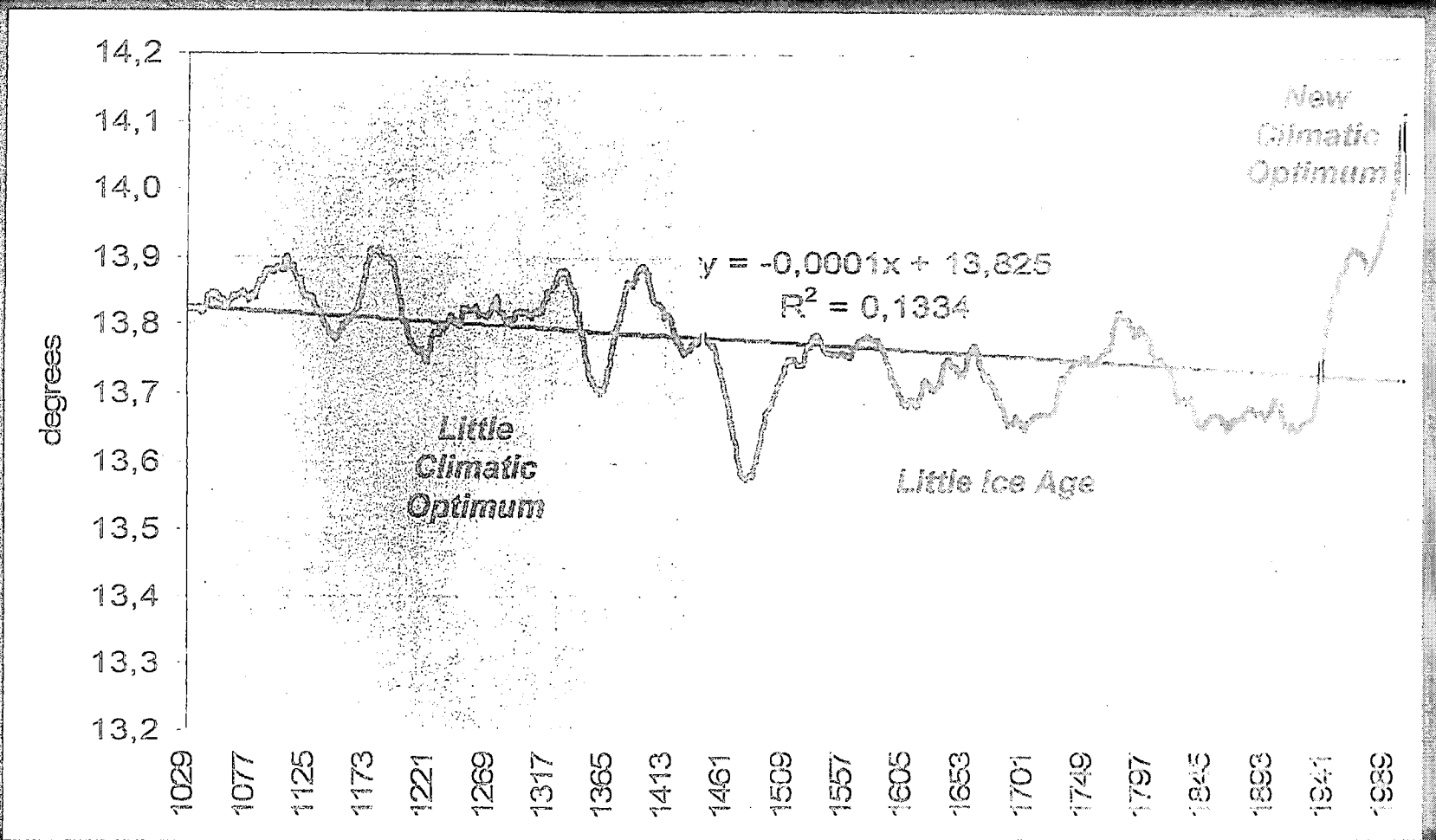
It is neither unique, nor the strongest in the last 4000 years.



Source: World Data Center for Palaeoclimatology, Boulder, USA.

Mother Nature's Weapon of Mass Destruction is actually Global Cooling, not Global Warming.

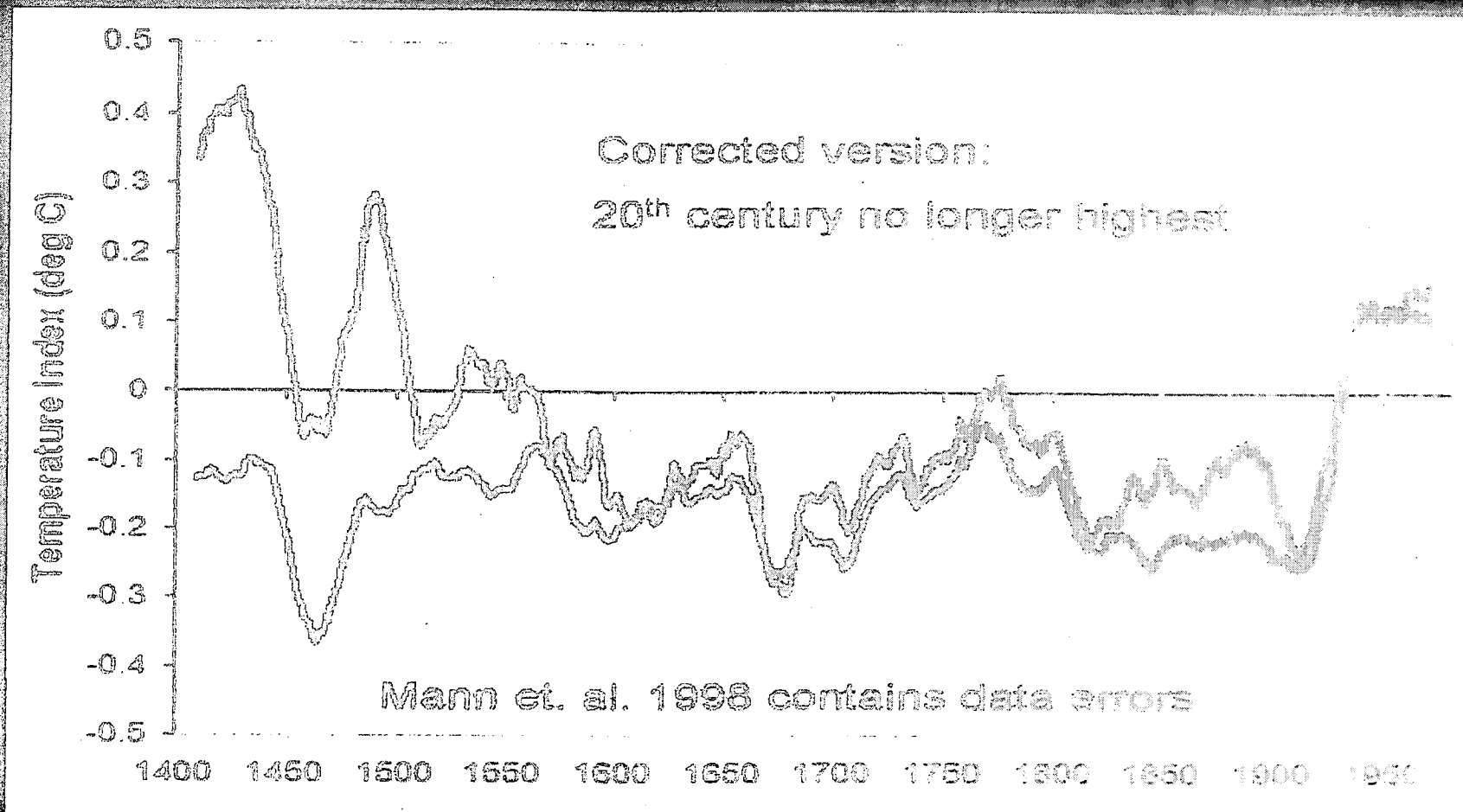
In the history of civilization climatic optimums are associated with prosperity and progress, ice ages – with hardships and catastrophes



Source: World Data Center for Palaeoclimatology, Boulder, USA.

©

The very concept of "Global Warming" is based on poorly processed, if not falsified, data.



Source: S. McIntyre, R. McKitrick, Corrections to the Mann et. al. (1998) Proxy Data Base and Northern Hemispheric Average Temperature Series, Energy & Environment. Volume 14, Number 6, 2003.

Arguments AGAINST RATIFICATION:

1. KP is unfair.
2. KP is discriminatory against low- and middle- income economies, as well as against Russia.
3. Under the KP Russia doomed to be a quotas buyer, not quotas seller.
4. Financial gains from the KP are ungrounded.
5. KP is incompatible with economic growth. Under KP Russia doomed for poverty, weakness, backwardness.
6. KP is unable to achieve its proclaimed targets.
7. KP is not universal. It is backed by the World's minority. 178 countries did not adopt the KP limits on GHG emissions.
8. KP is unbearably expensive. Cost of compliance may be as high as 15% GDP of affected countries in 1990-2100.
9. KP is based on technological illusions.
10. KP is based on flawed science; has no relation with ecology; the KP asserted aim contradicts basic interests and centennial behavior of humanity.
11. KP appears as powerful instrument in unfair intergovernmental competition. It reduces demand for hydrocarbons, but raises demand for nuclear technologies and equipment.
12. KP creates bureaucratic monsters at national and supranational levels. They are supposed to be in charge of rationing economic activity worldwide.

So, whether Russia

SHOULD RATIFY

OR

NOT TO RATIFY?

Scientists stirred to ridicule ice age claims

19:00 15 April 04

NewScientist.com news service

Climate scientists have been stirred to ridicule claims in an upcoming Hollywood blockbuster that global warming could trigger a new ice age, a scenario also put forward in a controversial report to the US military.

The $125-million epic, The Day After Tomorrow, opens worldwide in May. It will show Manhattan frozen solid after the warm ocean current known as the Gulf Stream shuts down.

The movie's release will come soon after a report to the US Department of Defense (DoD) in February predicting that such a shutdown could put the northern hemisphere into a deep freeze and trigger global famine within 15 years.

But in the journal Science on Thursday, Andrew Weaver of the University of Victoria in British Columbia, Canada, surveys the current research and concludes "it is safe to say that global warming will not lead to the onset of a new ice age".

Salty water

The DoD's doomsday scenario, which is very similar to that in the film, was drawn up by Peter Schwartz and Doug Randall of the San Francisco-based Global Business Network. Neither is a climate scientist.

The scenario suggests that as global warming melts Arctic ice packs, the North Atlantic will become less salty. This would shut down a global ocean circulation system that is driven by dense, salty water falling to the bottom of the north Atlantic and that ultimately produces the Gulf Stream.

This much is respectable scientific theory, and some researchers believe it could happen for real in 100 years or so. But the film-makers and DoD authors go further.

They say it could happen very soon. And that if it did, the northern hemisphere would cool so much that that ice sheets would start to grow, creating a catastrophic new ice age.

This is too much even for sympathetic climatologists. Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research in Germany, whose own models say the Gulf Stream could shut down within a century, told New Scientist: "The DoD scenario is extreme and highly unlikely."

Achilles heel

And Wallace Broecker of Columbia University, New York, US, who has warned for two decades that the Atlantic circulation is "the Achilles heel of our climate system", seriously questions both the speed and severity of the changes proposed.

In a letter to Science, he accuses the DoD authors of making exaggerated claims that "only intensify the existing polarisation over global warming". He adds: "What is needed is not more words but rather a means to shut down CO2 emissions." Such action could avert any Gulf Stream shutdown in the next 100 years.

Schwartz defends his scenario, saying that while it is "not the most likely scenario, it is plausible, and would challenge US national security in ways that should be considered immediately".

Weaver notes that the movie's budget "would fund my entire research group for my entire life, 10 times over". That might even allow him to discover which scenarios are most plausible.

Cooney, Phil

From: Conover, David [David.Conover@hq.doe.gov]

Sent: Tuesday, April 20, 2004 3:38 PM

To: Ted Kassinger (TKassinger@doc.gov); Anderson, Margot; Christina Beato; Conover, David; Conrad Lautenbacher (conrad.c.lautenbacher@noaa.gov); Dr. James E. Andrews (DOD); Olsen, Kathie L.; Emil Frankel (emil.frankel@ost.dot.gov); Gary Martin, Ghassem Asrar (gasrar@hq.nasa.gov); Harlan Watson; Connaughton, James; Jim Moseley (jrm@usda.gov); Marburger, John H.; Kyle McSlarrow; Peacock, Marcus; Patrinos, Ari; Paula Dobriansky (nelsondj2@state.gov); Rita Colwell (rcolwell@nsf.gov); Sam Bodman (sbodman@doc.gov); Simmons, Emmy; Stephen Johnson; Steve Griles (steven_griles@ios.doi.gov)

Cc: Yvonne Brown (yvonne.brown@ost.dot.gov); Ann Klee (ann_klee@ios.doi.gov); Bill Hohenstein (whohenst@OCE.USDA.gov); Granville Paules (gpaules@hq.nasa.gov); James Mahoney (James.R.Mahoney@noaa.gov); John Beale (Beale.john@epa.gov); Linda Lawson (linda lawson@ost.dot.gov); Margaret Leinen (Mleinen@nsf.gov); Mary Cleave (Mcleave@hq.nasa.gov); Cooney, Phil, Scott Rayder (Scott.Rayder@noaa.gov); Violanda Botet; Cobb, Al; Anderson, Margot; Barbara Diehl; Betty James; McDonald, Christine A.; Debra White; Dobriansky, Larisa; Burgeson, Eric; Sloan, Gwinnette; Jackie Krieger; Jacqueline Schafer; Parrish, Jobi A.; Joy Viars; Ko Barrett; Linda Catlett; Lu-ann Kleibacker; Lynn Scarlett; Margarita Conkright Gregg; Marlay, Robert; Melinda Moore; Pat Simms; Pat Thorne; Patrice Kortuem; Reifsynder, Daniel A. ; Sandoli, Robert; Conde, Roberta L.; Ron Bonjean; Sherron White; Eule, Stephen, Sue Stendebach; Vaughn Tureklan; Viars, Joy; Vicki Horton; DeVito, Vincent

Subject: IWG meeting April 27 2-4pm at DOE

Importance: High

Attached please find the agenda for this meeting, to be chaired by DOE Deputy Secretary Kyle McSlarrow. Instructions for getting precleared into the building are on the attached. Regards, Dave

<<Agenda Mtng #2 Apr 04 doc>>

Dave Conover
Senior Policy Advisor, Office of the Secretary
Director, US Climate Change Technology Program
Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
202-586-3994 (voice)
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240-472-4264 (wireless)

INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY
Meeting #04-2

Tuesday, April 27, 2004, 2:00 to 4:00 PM
Department of Energy, Conference room 8E-089
Call or email Gwinette Sloan at 586-7131/Gwinnette.sloan@hq.doe.gov by cob Monday April 26 to be cleared into the building

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	Dpty McSlarrow, DOE
2:05 – 2:20	Policy Update • NEP annev, May • Energy bill • Clear Skies	Chm Connaughton, CEQ
2:20 – 2:35	Science Update	Ari Patrinos, DOE Acting
2:35 – 2:45	Technology Update	Dave Conover, DOE
2:45 – 2:55	1605(b) Update	Dave Conover, DOE
2:55 – 3:20	Voluntary Programs • Climate Vision/DOE • Climate Leaders/EPA • SmartWay Transport/EPA	DAS Dobriansky, DOE; AA Holmstead, EPA
3.20 – 3:35	Agriculture Update	Dpty Moseley, AG
3:35 – 3:50	International • Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment • Other international developments	US Dobriansky, State
3:50 – 4:00	General Discussion/Next meeting • Topics for next meeting • Date for next meeting – proposed for Tuesday, June 29	Dpty McSlarrow, DOE

June 29 – repl @ Box
@ Jamet of mtg + Kyle

4/20/2004

Cooney, Phil

From: Scott Smullen [Scott.Smullen@noaa.gov]
Sent: Wednesday, April 21, 2004 8:33 PM
To: Conrad C Lautenbacher; James R Mahoney; Jack Kelly; Tim Keeney; Scott Rayder
Cc: Jordan St.John; Ahsha Tribble; Debra Larson; Craig Montesano
Subject: Nat. Media Report / NY Times, budget cuts in climate research

National Media Report

Event/Activity: New York Times interview about budget cuts in '05 climate research.

Date: Wednesday, April 21.

Spokesperson: Dr. Mahoney by phone from his office.

Description:
New York Times science writer, Andy Revkin, was seeking information about "...substantive cuts in '05 climate programs that seem directly related to the President's goals (like producing policy relevant information on how climate relates to human affairs)." Revkin was told the Human Dimensions of Climate Change program and NOAA's abrupt climate change research have been eliminated and there are sharp cuts in paleoclimate work. These cuts "...are apparently to compensate in part for boosts in aerosol, carbon cycle and more long-term work on physical processes." He says critics argue this "...illustrates that the Administration's plan... is smoke and mirrors to hide an actual pullback from some of the most vital work, the efforts leading to a better understanding of the interface between climate and people." Revkin asked Dr. Mahoney to respond. Highlights of the interview follow.

Revkin) My main interest is the budget priorities that are laid out in the '05 proposal. Some folks pointed out that there are some big cuts and actually programs eliminated completely that I thought were priorities under the CSSP. Basically the social science component includes the human dimensions of global change, and the health impacts that I thought was the big unanswered questions which seemed kind of surprising that that would be cut, unless it's compensated for by uh... see, one of the hard things for me to understand is how this NOAA stuff relates to what's happening in NSF or other agencies that are all under your umbrella. 'Cause it's not all... the budgets are individual agencies, but what I'm interested in is exactly what the President's trying to do... which is a consolidated sense of where the priorities are going and where they're ebbing.

Mahoney) Let me comment in overview first and then specifically. And I'll say that you can imagine some people in the community have expressed themselves vigorously to me, and you may have heard from some of the same people. One place I want to start... I was in the middle of being out and in hospital during the last round of the budget negotiations. I'm not saying, 'gee I wasn't here, didn't have anything to do with it," but the fact is, I'm playing catch up on the last phase of this anyway.

Revkin) Sure.

Mahoney) The place to start is this. Even within NOAA, there was no top down order to cut one area or another. I myself was trying to understand whether there was any direction to cut this or that, but no. There was direction about budget numbers we had to live with, which is a typical 11th hour squeeze. But I see nothing of a directed "cut these areas on purpose,' but rather I see senior, career management

employees doing what they thought was right in those circumstances. Now still painting the big picture here... we are nearly ready to publish an updated Our Changing Planet with FY 04/05, and we're in final review and cross referencing the numbers between the agencies. I won't estimate the exact day it'll be out, but likely in a couple of weeks. I have a copy of the budget in front of me, and it might change a little before we're through, but let me cite a couple of numbers. I'm looking at the cross cut human contributions part... the CCSP total for '04 was $98.7M and the new budget is $94.2M. NSF in both '04 and '05 is $17.2M. And NSF is moving to some major new programs in decision under uncertainty that includes the human dimensions and decision making issues and health issues as part of the analysis base. EPA, which does much with its regional program, was at $5.8M, they'll be at $5.5M. The 800-pound gorilla in these numbers for human contributions is HHS, which is at $61M for both years. Although that's their pro forma number that depends upon the grants they make by the end of the year. The HHS cover a number of wide topics you wouldn't typically think as closely related to climate issues. The DOE does a fair amount and is basically the same - $5.2M in the prior year and $5.1M in the new year. And so the one that is different is ours at Commerce / NOAA. We were at $9.5M and the new one is $5.4M....

Revkin) Before you go on, it sounds like this is useful but it relates to my quandary which is how to write in a fair way about overall research intensity in different sectors, and it sounds like it makes sense to wait till the OCP (Our Changing Planet) comes out. Because, as I said, it's really hard to... you know I can look at things zeroed out under NOAA, but if there's something happening in a different agency that partially compensates it makes it a better, more comprehensive way to write about it. Do you think that that makes sense?

Mahoney) If your deadline allows, yes, wait till the OCP comes out. By that time you can have everything in OCP and there is a fair amount of that. Let me turn back to the NOAA issue for a moment... I made one half of a general statement that there was not some Administration wide conspiracy, nor any top down NOAA or Commerce Department or OMB direction to cut some place here. It was truly career managers dealing with the fact that they were told 'you go back and find X amount of dollars out of your budget request cause here is where we're going to be.' And when we released the CCSP strategic plan last July.... at the same time because of some initiatives that were Administration initiatives, we noted that the plan included a special emphasis on three areas - aerosols, climate feedbacks and on the monitoring systems. And as you well know there is a large head of steam on the GEO program and the global observation system that my boss Vice Admiral Lautenbacher has taken a real lead on and is now is co-chairing in Tokyo, but everyone knows he is prime mover for this activity. That is strongly supported by the Administration. So the point is, at the time the plan was put out, the matter of looking with pride about 'what are we claiming credit for' there had been a lot of press on what I call the hard science in aerosols and climate feedback, and there was even this international flavor relative to the very important moves on GEO, and then we released the plan and one week later we had the kickoff of the meeting at the State Dept. these issues were very much in focus. So interestingly, no one was de-emphasizing the other areas, but to be fair to career staff, they were hearing about an emphasis in these areas. So then word comes along that you have to find places to bring your budget down some and that's tends to be part of what followed. There still remains substantial work in the human dimensions area by NOAA and NOAA still maintains substantial support for abrupt climate change, i have a whole list of programs that are still supported there, so I don't know if anybody passed you on the quiet a couple pieces of paper that i have that were sort of management summaries of what was done that have language about entire program eliminated or defunded...

Revkin) (nervous laugh) Yeah... that does sound familiar.

Mahoney) ...Yeah. No, that kind of a local view talking about those programs and not about the.. even within NOAA.. about of the work in human dimensions. For example, much of OGPs recent work

continues, the majority of it continues. And so to my mind trying to puzzle through what all had happened, I acknowledged that there was this special fanfare for observations, aerosols, and climate feedbacks as appropriately... actually they were tied back -- and they still exist in the budget this way -- they were tied back to the President's call for CCRI in 2001, and that in turn was tied back to the Cicerone Report by the NRC, calling for attention in those areas.

Revkin) Right, right, right...

Mahoney) I fully acknowledge the human dimensions, human interaction, health issues, and decision support are also highly important and we said so in our plan and the NRC more recent reports, the two of them on our plan, commended that we were paying attention in this area. So I'm not for a minute saying that we're doing all the hard science and that's everything. But I can see the kind of thing that happened and I know we have some substantial initiatives underway because as part of our planning process that was something they were going to do anyway... NSF launched 15 months ago a major new effort in decision under uncertainty for climate and related ecosystem issues. And that was something we discussed a good deal in the context of the climate change program.

Revkin) That's something I want to learn more about.

Mahoney) Second, we are in the process of converting the plan of last July into a serious priority and budget crosscut relative to the '06 budgets that are now in production, for exactly the kind of point which is behind your first question - who's doing what, in what agencies. On the timing issue, when we got the plan completed last July and everyone working on it was so wrung out on getting it done because of the way we ended up having to extend the time to answer many more critiques, the budget requests were already in before the plan was on the street in that case. Although the agencies knew a lot about it, the people that knew the most about it were very busy with the plan itself. The budget decisions that led to the cuts came later, they came in the early Fall because that's when the hard push back came from OMB before it gets packaged as the President's budget. So I have a sense that whatever we may have missed in communications in some priorities in the '05 case, I certainly not going to promise there is going to be some change in '06, but I'm certainly aware that just structurally we are following the path that we really started more than a couple of years ago to get this plan out and then to use it for both strategic, multi-year as well as the next relevant year budget by getting everybody on the same page, and making sure all of the relevant at OMB examiners and PADs and the agency people have the song sheet to deal with. I'm aware you can never cut any program without any concern being raised, but I think you'll see as we work this out that NSF's major program will pick up some of this and is already well launched, and we'll expect to see both NOAA, EPA and DOE continuing to have key roles here, and we'll see other decision support work and sponsorship emerging, although I can't forecast where future President's budgets are going to be.

Revkin) Sure. One of my key presumptions through this whole evolution of the research plan and CCRI has been that you'll see money shifting between agencies as the government makes a more consolidated approach to where's the best place to solve this particular scientific question. So that's another reason why I'm happy to wait until all the data are available and I can look across columns and see who's doing what on different subjects. I could easily write a bunch of scientists are grumpy about cuts of particular programs at NOAA right now, but that loses meaning when you put it in the broader.. it'll be a better story to write when I can cross compare. I will hold off. I have so much on my plate right now, I'm happy to hold off.

Revkin) One more thing. A NASA - NOAA thing. Because of the moon, Mars initiative, the Mission Earth side has been told to give up $200M a year for the next five years to give up to the 'going back to space' side. And I've heard a lot of grumpiness there that the Earth observations that are a high priority

for the agency are going to get squeezed in another way, and NOAA uses the output from that hardware, so I was wondering how much of a concern it is?

Mahoney) I don't know enough to say anything too strongly right now. But the Ocean Commission report that was issued yesterday recommended taking another chunk of NASA obs work and transferring it to NOAA. Now I don't want to touch that with a ten foot pole, but all I'm saying is that's what they're saying under the rubric of resetting the line that NASA should correctly develop observations, but when things are more routinely operational, NASA should step out of it and come over to NOAA. Now at the same time the Ocean Commission was very clear that while it did call for creation of substantial new funding through the trust funds that might be levied, the report is full of comments about 'don't expect new money to do these various missions other than what might come from the trust funds', so I don't mean that there is a simple shift that NASA will free up some money by sending it over to NOAA and NOAA will somehow convince OMB and its appropriators to come up with a couple hundred million new dollars. But there will be some shifts around like this.

And one more thing that ties back to your point. I think you may have a good story with the OCP and the budget tables and some good follow up on some key questions then... you're well aware that NOAA research has been critiqued over the last year and we have a special advisory committee looking at NOAA research in the future. And your probably aware too of NOAA's new strategic plan under Admiral Lautenbacher that reduces stove pipes and don't do things in a vacuum and the theme of making sure the research is related to operational missions, and my guess is this may have driven some of the managers decisions in the current case, that some kinds of research in the social sciences are probably better the province of the research sponsoring organizations, certainly NSF and even arguably EPA because of their ongoing regulatory role. So this is kind of just a heads up. There is no clear statement anywhere. No one has said NOAA shouldn't work in these areas. But there's a sense of understanding where the NOAA research is altogether and I could see two things that might run in opposite directions for NOAA research on this. One is, are we focusing on research that can build into forecast systems and other things fairly directly, for the atmosphere and oceans and fisheries management we have. And on the other hand is the other much more integrated approach to management and even public education and clearly much more thought being given to the issues of how can NOAA use its resources, including the resources of having forecast offices on the weather service side and other reps. literally everywhere in the country to engage other communities of interest that come very much from the CCSP type issue - the governors, the regional planners, the coastal zone managers, water resource system managers and the like. So I would argue there will be an interesting interplay of NOAA looking for ways to be much more directly and organically involved with various constituencies that would argue for doing more of the kind of work that we just cut down in budget here on the one hand, and on the other hand an argument that NOAA should certainly get its physical sciences and observations right and look very carefully at what NSF and EPA are doing in the social sciences.

Revkin) Yeah. So, at this point why don't we talk as the OCP comes out.

Mahoney) Sure. We'll get a copy to you. Scott will be in touch.

Revkin) One more thing while I've got you that I didn't mention to Scott, but I'm working on. This relates to the abrupt climate change movie coming out next month. Various agencies have been cogitating how to deal with this and I heard there was a meeting... Scott you may have been involved in this last week... I get the sense NASA has told everyone not to talk about the movie, and I don't know whether an all points bulletin has gone around NOAA as well?

Smullen) No. We anticipated we'd get a number of media calls - and we've had a couple already. We didn't put an APB out, but we did compile a list of NOAA climate scientists that might have a particular

angle of the issue. So when we get the call asking about a specific angle we'll make sure the reporter gets the right answer. We've got eight or ten people on call that we've asked if they get a call to tell us about it, or we may send a reporter to them.

Revkin) Yeah. Okay. So it's not like 'don't talk?'

Smullen) No.

Revkin) Well, we'll see... there's these down drafts that turn people into ice sculptures in about three seconds... some meteorologist might want to explain that one to me. (laughter) Well, thanks again for your time.

Mahoney) Glad to give you my sense. When we have OCP ready, we'll get that to you and can try to help respond on specific questions. And I think the idea of looking at that and looking at how the government is deploying to do this work represents something good that still offers plenty of room for both critique and praise hopefully.

From Observation to Action—

Achieving Comprehensive, Coordinated, and Sustained Earth Observations for the Benefit of Humankind

Framework for a 10-Year Implementation Plan

As adopted by Earth Observation Summit II
25 April 2004

1. Introduction

Understanding the Earth system—its weather, climate, oceans, land, geology, natural resources, ecosystems, and natural and human-induced hazards—is crucial to enhancing human health, safety and welfare, alleviating human suffering including poverty, protecting the global environment, and achieving sustainable development. Data collected and information created from Earth observations constitute critical input for advancing this understanding. In 2003, a consensus emerged among governments and international organizations that, while supporting and developing existing Earth observation systems, more can and must be done to strengthen global cooperation and Earth observations. This Framework Document, while not legally binding, marks a crucial step in developing the 10-Year Implementation Plan for the creation of a comprehensive, coordinated, and sustained Earth observation system or systems as envisioned by the Washington Declaration adopted at the Earth Observation Summit of 2003.

2. Benefits of Comprehensive, Coordinated and Sustained Earth Observations

2.1 Observing and understanding the Earth system more completely and comprehensively will expand worldwide capacity and means to achieve sustainable development and will yield advances in many specific areas of socio-economic benefit, including:

- Reducing loss of life and property from natural and human-induced disasters;
- Understanding environmental factors affecting human health and well being;
- Improving management of energy resources;

- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change;
- Improving water resource management through better understanding of the water cycle;
- Improving weather information, forecasting, and warning;
- Improving the management and protection of terrestrial, coastal, and marine ecosystems;
- Supporting sustainable agriculture and combating desertification;
- Understanding, monitoring, and conserving biodiversity.

2.2 Globally, these benefits will be realized by a broad range of user communities, including (1) national, regional, and local decision-makers, (2) relevant international organizations responsible for the implementation of international conventions, (3) business, industry, and service sectors, (4) scientists and educators, and (5) the general public. Realizing the benefits of coordinated, comprehensive, and sustained Earth observations (i.e. the improvement of decision-making and prediction abilities) represents a fundamental step toward addressing the challenges articulated in the declarations of the 2002 World Summit on Sustainable Development and fulfilling the Millennium Development Goals agreed at the Millennium Summit in 2000.

2.3 Full participation of developing country members will maximize their opportunities to derive real benefits in the above socio-economic areas. Such participation is supported as it enhances the capacity of the entire Earth observation community to address global sustainable development challenges.

3. Key Earth Observation Areas

3.1 Coordinated and sustained global cooperation on Earth observations is well established in the crucial area of weather. The World Meteorological Organization's World Weather Watch demonstrates the value of international collaboration in this arena. Improvements in observation

networks are still needed and will yield further success through improved accuracy in weather information and long-term prediction.

3.2 Cooperation is less advanced in the areas of land, water, climate, ice, and ocean observation. Nevertheless, some important work and guidance for future action has been developed in a number of areas, for example:

a. Natural hazard understanding through a range of international observing and early warning systems consistent with the International Strategy for Disaster Reduction (ISDR);

b. Climate understanding and research through the World Climate Research Program (WCRP), and climate monitoring consistent with the Global Climate Observing System (GCOS) in support of the Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC);

c. Ocean monitoring, modeling and forecasting through the Global Ocean Observing System (GOOS);

d. A range of observation themes addressed by the Integrated Global Observing Strategy Partnership (IGOS-P) including oceans; carbon; water cycle; solid earth processes, coastal zone (including coral reef); atmospheric chemistry; and land/biosphere.

3.3 In each of these areas, observation efforts to understand dynamic Earth processes have been identified and should be expanded to support action-oriented solutions in the areas of key socio-economic benefit.

4. Shortcomings of Current Observation Systems

4.1 Human knowledge of the Earth system, although advanced in certain areas, is far from complete. Current efforts to observe and understand the Earth system must progress from the separate observation systems and programs of today to coordinated, timely, quality, sustained, global information—developed in accordance with compatible standards—as a basis for future sound decisions and actions.

4.2 Many international organizations and programs are working to sustain and improve the coordination of Earth observations. However, current efforts to capture Earth observation data are limited by (1) a lack of access to data and associated benefits especially in the developing world, (2) eroding technical infrastructure, (3) large spatial and temporal gaps in specific data sets, (4) inadequate data integration and interoperability, (5) uncertainty over continuity of observations, (6) inadequate user involvement, (7) a lack of relevant processing systems to transform data into useful information, and (8) insufficient long term data archiving.

5. What is Needed - The 10-Year Implementation Plan for Earth Observations (2005-2014)

5.1 To achieve the many benefits of coordinated Earth observations and to move from principles to action, governments adopting this Framework Document set forth the primary components of a 10-Year Implementation Plan for establishing the Global Earth Observation System of Systems (GEOSS). GEOSS will be:

- *comprehensive,* by including observations and products gathered from all components required to serve the needs of participating members;
- *coordinated,* in terms of leveraging resources of individual contributing members to accomplish this system, whose total capacity is greater than the sum of its parts;
- *sustained,* by the collective and individual will and capacity of participating members.

5.2 GEOSS will be a distributed system of systems, building step-by-step on current cooperation efforts among existing observing and processing systems within their mandates, while encouraging and accommodating new components. Participating members will determine ways and means of their participation in GEOSS. The 10-Year Implementation Plan for GEOSS will be based on the following considerations:

a. With the socio-economic benefits identified in Section 2 as the roadmap, the 10-Year Implementation Plan will identify, document, and prioritize actions to address user requirements for current and future Earth observations. This process will be based on

appropriate dialogue and procedures, taking advantage of and building upon the experience of existing initiatives and infrastructures.

b. The architecture model will build incrementally on existing systems to create a distributed system of systems, incorporating an observation component, a data processing and archiving component, and a data exchange and dissemination component.

c. The 10-Year Implementation Plan will elucidate practical methods for filling critical gaps in, *inter alia*, observation parameters, geographical areas, observation specifications, and accessibility.

5.3 The GEOSS will address key challenges of data utilization, including the need for:

- Full and open exchange of observations with minimum time delay and minimum costs, recognizing relevant international instruments and national policies and legislation;
- Assured data utility and usability (including thresholds for validation, calibration, and spatial and temporal resolution);
- Assured continuity and availability of the many observations and products in place or planned;
- A robust regulatory framework for Earth observations (e.g. through protection of radio frequency bands that are uniquely essential for Earth observations).

5.4 The plan will facilitate both current and new capacity building efforts, particularly in developing countries, across the entire continuum of GEOSS activities, which will include education, training, institutional networks, communication, and outreach as fundamental to those efforts. Building on existing local, national, regional, and global capacity building initiatives, GEOSS will:

a. Focus on training and education for the development and/or utilization of existing human, institutional, and technical capacities for data utilization;

b. Develop the infrastructure resources necessary to meet research and operational requirements;

c. Build on globally accepted sustainable development principles – most notably those outlined in the World Summit on Sustainable Development Plan of Implementation.

5.5 The development of GEOSS should take maximum advantage of developments in research and technologies. Conversely it will enable the global scientific community to address key scientific questions concerning the functioning of the Earth system.

6. Outcomes

The success of the 10-Year Implementation Plan will be measured by the operational achievement of GEOSS. Specific outcomes for GEOSS, both short and long-term, will be elaborated in the 10-Year Implementation Plan, including but not limited to the following:

a. Enabling global, multi-system information capabilities for each of the following:

- disaster reduction, including response and recovery;
- integrated water resource management;
- ocean monitoring and marine resources management;
- air quality monitoring and forecasting;
- biodiversity conservation;
- sustainable land use and management.

b. Global tracking of invasive species;

c. Comprehensive monitoring of global and regional climate on annual, decadal, and longer time scales, and enabling information products related to climate variability and change;

d. Improving the coverage, quality, and availability of essential information from the *in situ* networks and improving the integration of *in situ* and satellite data;

e. Involvement of users from developed and developing countries, monitoring their needs and fulfillment over time;

f. An outreach mechanism to actively demonstrate the usefulness of Earth observation to decision makers in key user communities.

7. The Way Forward

7.1 The adoption of this Framework Document indicates a decision to proceed with the elaboration of the GEOSS 10-Year Implementation Plan along the lines set forth in this Document and a willingness to cooperate on, and participate in, the implementation of the plan. At present, the *ad hoc* Group on Earth Observations (GEO) is a "best efforts" activity with voluntary input from States and advice and support from international organizations.

7.2 For 2005 and beyond, the implementation of the "10-Year Implementation Plan" will require a ministerial-guided successor mechanism with maximum flexibility—a single intergovernmental group for Earth observations drawing on the experience of the *ad hoc* GEO, with membership open to all interested governments and the European Commission, and with representatives of relevant international organizations taking part.

7.3 The GEOSS 10-Year Implementation Plan will elaborate details for this Group, which will provide generally for:

a. Coordination and planning of GEOSS implementation (*in situ* and remotely sensed);

b. Opportunities for engagement of all members and relevant international and regional organizations;

c. Involvement of user communities;

d. Measuring, monitoring, and facilitating openness of GEOSS to improve cross-flow of observations and products;

e. Co-ordination and facilitation of the development and exchange of observations and products between members and relevant international and regional organizations.

CEQ
632 PC

Cooney, Phil

From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Rich
Sent: Monday, April 26, 2004 10:44 AM
To: ccsp@usgcrp.gov
Cc: ccsp_info@usgcrp.gov
Subject: [ccsp] Original USGCRP Terms of Reference

OMB.TOR1992.doc
(26 KB)

I am circulating this as requested by Jim Mahoney.

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0010724

Cooney, Phil

From: Conover, David [David Conover@hq.doe.gov]

Sent: Tuesday, April 27, 2004 12:20 PM

To: Ted Kassinger (TKassinger@doc.gov); Anderson, Margot; Arden Bement, Christina Beato; Conover, David; Conrad Lautenbacher (conrad.c.lautenbacher@noaa.gov); Dr. James E. Andrews (DOD); Olsen, Kathie L.; Emil Frankel (emil.frankel@ost.dot gov); Gary Martin; Ghassem Asrar (gasrar@hq.nasa.gov); Harlan Watson; Connaughton, James; Jim Moseley (jrm@usda.gov); Marburger, John H.; Kyle McSlarrow; Peacock, Marcus; Patrinos, Ari; Paula Dobriansky (nelsondj2@state.gov); Simmons, Emmy; Stephen Johnson; Steve Griles (steven_griles@ios.doi.gov)

Cc: Yvonne Brown (yvonne.brown@ost.dot.gov); Ann Klee (ann_klee@ios.doi.gov); Bill Hohenstein (whohenst@OCE.USDA.gov); Granville Paules (gpaules@hq.nasa.gov); James Mahoney (James.R.Mahoney@noaa.gov); John Beale (Beale.john@epa.gov); Linda Lawson (linda.lawson@ost dot.gov); Mary Cleave (Mcleave@hq.nasa.gov); Cooney, Phil; Scott Rayder (Scott.Rayder@noaa.gov); Violanda Botet, Cobb, Al; Anderson, Margot; Barbara Diehl; Betty James; McDonald, Christine A.; Debra White; Dobriansky, Larisa; Burgeson, Eric; Sloan, Gwinnette; Jackie Krieger; Jacqueline Schafer; Parrish, Jobi A.; Joy Viars; Ko Barrett; Linda Catlett; Lu-ann Kleibacker; Lynn Scarlett; Margaret Leinen; Margarita Conkright Gregg; Marlay, Robert; Melinda Moore; Pat Simms; Pat Thorne; Patrice Kortuem; Reifsynder, Daniel A. ; Sandoli, Robert; Conde, Roberta L.; Ron Bonjean, Sherron White; Eule, Stephen; Sue Stendebach; Vaughn Turekian; Viars, Joy; Vicki Horton; DeVito, Vincent

Subject: Revised agenda for IWG/blue box meeting this afternoon

<<Agenda Mtng #2 Apr 04rev4.doc>>

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INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY
Meeting #04-2

Tuesday, April 27, 2004, 2:00 to 3:15 PM
Department of Energy, Conference room 8E-089

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	Dpty McSlarrow, DOE; Gen Cnsl Kassinger, DOC
2:05 – 2:20	International Update • Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment • GEO 4/EOS 2 • Other international developments	US Dobriansky, State; VADM Lautenbacher, DOC
2:20- 2:35	Voluntary Programs • Climate Leaders/EPA • SmartWay Transport/EPA • Climate VISION/DOE	AA Holmstead, EPA; DAS Dobriansky, DOE
2:35 – 2:50	Science Update	Dir. Mahoney, DOC; Dr. Patrinos, DOE
2:50 – 3:00	Technology Update	Dave Conover, DOE
3:00 – 3:10	1605(b), Climate Calendar, IEA Climate Activities	Dave Conover, DOE
3:10 – 3:15	General Discussion/Next meeting • Topics for next meeting • Date for next meeting – proposed for Tuesday, June 29	Dpty McSlarrow, DOE

4/27/2004

USG Climate Calendar, 2004					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
4/26/2004	4/27/2004	Geneva, Switzerland	Intergovernmental Panel on Climate Change (IPCC) meeting of Bureau 1 on Science	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
4/28/2004	4/30/2004	Geneva, Switzerland	IPCC Bureau 31st Session	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
5/4/2004	5/5/2004	Selfoss, Iceland	Senior Arctic Officials Meeting - climate issues addressed	DOS and others	Sally Brandel, BrandelSK@state,gov, 202-647-3264
5/18/2004	5/20/2004	Brasilia, Brazil	U.S.-Brazil Bilateral	DOS/interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
5/26/2004	5/27/2004	Beijing, China	International Partnership for the Hydrogen Economy (IPHE) Steering Committee meeting	DOE/DOT/State	Bob Dixon, e-mail: robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov
5/31/2004	6/4/2004	Brazil	Soil Carbon Sequestration Workshop	USDA/DOS	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
6/1/2004	6/4/2004	Bonn, Germany	International Conference on Renewable Energy	DOE/DOS	
6/2/2004	6/5/2004	Mauritius	IPCC GHG Inventory Guidelines Development	EPA/USDA/others	Dina Kruger
6/16/2004	6/25/2004	Bonn, Germany	UN Framework Convention on Climate Change (UNFCCC), 20th Session of Subsidiary Bodies to the UNFCCC	DOS/interagency	Dr. Harlan Watson, Watsonhl@state.gov, 202-647-3489
6/22/2004	6/25/2004	Amsterdam, The Netherlands	Group on Earth Observations (GEO-5)	NOAA/DOS	

USG Climate Calendar, 2004					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
8/30/2004	9/2/2004	Mauritius	Small Island Developing States Review of Barbados Plan of Action	DOS	Shira Yoffe, YoffeSB@state.gov, 202-736-7092
9/13/2004	9/15/2004	Australia	Carbon Sequestration Leadership Forum (CSLF) Ministerial	DOE/DOS	
9/24/2004	9/25/2004	Reykjavik, Iceland	International Partnership for the Hydrogen Econmoy Implementation - Liaison Committee Meeting	DOE/DOT/State	Bob Dixon, e-mail: robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov
10/4/2004	10/8/2004	Paris, France	OECD Annex 1 Expert Group + IEA Emissions Trading Workshop - discuss variety of climate issues with OECD countries	DOS/EPA, DOE	Trigg Talley, talleyt@state.gov, 202-647-4069
10/11/2004	10/15/2004	London, UK	International Maritime Organization - Marine Environment Protection Committee 52 - negotiation of actions on intl maritime emissions	DOS/Coast Guard, EPA, DOD	Christo Artusio, artusiocf@state,gov, 202-647-4295, +others
11/11/2004	11/12/2004	Paris, France	OECD Global Forum on Development and Climate Change	DOS	Dr. Harlan Watson, WatsonHL@state.gov, 202-647-3489
12/6/2004	12/17/2004	Buenos Aires, Argentina	UNFCCC 10th Conference of the Parties	DOS/interagency	Dr. Harlan Watson, WatsonHL@state.gov, 202-647-3489

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
1/6/2003	1/9/2003	Pasadena, CA.	ESIP Federation Meeting	NASA	Dave Jones, dave@stormcenter.com
1/9/2003	1/11/2003	Bethesda, MD.	International Global Observing Strategy (IGOS) Water Cycle Workshop	DOC/NOAA	contacts: Jared Entin, jentin@hq.nasa.gov and Rick Lawford,richard.lawford@noaa.gov
1/13/2003	1/16/2003	Beijing	China Interagency Scoping Meeting	DOS, DOE, EPA, NOAA, NSF, USDA, CEA (tentative team)	Cynthia Brady, bradyca@state.gov, 202-647-2425
1/14/2003	1/15/2003	TBD	Agriculture Accounting Rules and Guidelines public meeting	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
1/15/2003	1/18/2003	Moscow	U.S. - Russia bilateral/world climate change conference committee	DOS	Rob Scott, scottrk@state.gov, 202-647-4688
1/16/2003	1/16/2003	Washington, DC	TRB Annual Meeting, Session on Understanding the Impacts of Climate Change on Transportation: A Research Agenda	DOT/NASA	Joanne Potter, joanne.r potter@fhwa.dot.gov, 202-366-2067
1/21/2003	1/23/2003	Panama	CONCAUSA bilateral meeting	interagency team	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
1/23/2003	1/23/2003	Washington, D.C.	Forest Accounting Rules and Guidelines (public meeting)	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
1/31/2003	1/31/2003	Baton Rouge, LA	National Weather Service/Louisiana State University Climate & Extension Workshop	DOC/NOAA	Fiona Horsfall, Climate Services Division, NOAA/National Weather Service, (301) 713-1970 ext 137.
2/5/2003	2/6/2003	Washington	US-EU Research Scoping Meeting	DOS/Interagency	Dr Harlan Watson, watsonhl@state.gov, 202-647-3489

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
2/9/2003	2/13/2003	Long Beach, CA.	American Meteorological Society Annual Meeting		Email: amsinfor@ametsoc.org, URL:ametsoc.org/AMS/.
2/10/2003	2/14/2003	New Delhi	Interagency Scoping Meetings	DOS/Interagency	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
			UNFCCC Workshop on definitions and modalities for including afforestation and		
2/11/2003	2/14/2003	Foz Do Iguacu, Brazil	reforestation project activities under Article 12 of the Kyoto Protocol in the first commitment period		Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
2/13/2003	2/18/2003	Denver, CO.	AAAS Annual Meeting		URL: www.aaas.org/meetings
2/16/2003	2/21/2003	Geneva	IPCC Plenary	Interagency team	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
2/25/2003	2/28/2003	Pasadena, CA.	2003 AVIRIS Earth Science and Applications Workshop	NASA	Robert Green, rog@mail2.jpl.nasa.gov
3/10/2003	3/14/2003	Japan	Nuclear/Sustainable Development Conference		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
3/11/2003	3/13/2003	Boston, MA.	Eleventh Annual Workshop on Adaptive Sensor Array Processing (ASAP 2003)	NASA	James Ward, jward@ll.mit.edu, URL:www.ll.mit.edu/asap.
3/11/2003	3/14/2003	Paris, France	OECD Annex 1 Expert Group		Vaughan Turekian, turekianvc@state.gov, 202-647-4283
3/16/2003	3/18/2003	Mexico	Bilateral Meeting with Mexico	DOS/Interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511

USG Climate Calendar, 2003					
Begin	End	Location	Event and Purpose	LEAD/ Other Participants	Point of Contact: Name, e-mail and phone number)
3/31/2003	4/3/2003	Beijing	International Climate Change Symposium		Cynthia Brady, bradyca@state.gov, 202-647-2425
3/31/2003	4/3/2003	Kuala Lumpur, Malaysia	IPCC GPG on LULUCF Authors meeting	EPA/USDA	William Hohenstein, whohenst@oce usda.gov, 202 720-6698
4/6/2003	4/11/2003	Nice, France	AGU/European Geographical Society (EGS)/European Union of Geosciences (EUG) Joint Spring Meeting		Email:EGS@copernicus.org, URL www.copernicus.org/EGS/egsga/nice03/
4/6/2003	4/12/2003	Mauritius	Non-Annex 1 National Communication		Dr Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
4/9/2003	4/10/2003	Ghent, Belgium	UNFCCC Workshop on Enabling Environments for Technology Transfer		Rob Scott, scottrk@state.gov, 202-647-4688
4/14/2003	4/16/2003	Marrakesh	1st Scoping Meeting for the IPCC Fourth Assessment Report		Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
4/15/2003	4/15/2003	Washington, D.C	ENERGY STAR Awards Ceremony	EPA	Maria Vargas, vargas.maria@epa gov, 202 564-9178
4/22/2003	4/24/2003	Washington, D.C.	Earth Technologies Forum 2003	EPA/DOE, USAID, others	Maria Vargas, vargas.maria@epa.gov, 202 564-9178
5/5/2003	5/8/2003	Alexandria, VA.	Second Annual Conference on Carbon Sequestration	DOE/NETL, USDA; others	John Litynski John Litynski@netl.doe gov; (304) 285-1339
5/6/2003	5/8/2003	Le Gran-Hornu, Belgium	UNFCCC European Regional Workshop on the New Delhi work programme on UNFCCC Article 6		Rob Scott, scottrk@state.gov, 202-647-4688

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
5/7/2003	5/9/2003	TBD	CCAP Dialogue on Future Actions		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
5/7/2003	5/9/2003	Anchorage, AK.	American Society of Photgrammetry and Remote Sensing		Thomas Eidel, teidel@gci.net, URL: www.asprs.org/alaska2003/
5/20/2003	5/20/2003	Brussels	CEPS Conference (Climate Change Conference)		Dr. Harlan Watson, watsonhl@state.gov, 202-647-3489
6/2/2003	6/4/2003	Raleigh, NC	Anaerobic Digester Technology Applications in Animal Agriculture -- A national summit	USDA, DOE, EPA	Tom Christensen, USDA/NRCS www.wef.org, 301 504 2198
6/2/2003	6/3/2003	Towson University, Baltimore, MD.	16th Annual Geographic Information Sciences Conference		John Morgan, (410) 704-2964, Fax: (410)704-3888, Email: jmorgan@towson.edu, URL: cgis.towson.edu/tugis2003
6/3/2003	6/13/2003	Bonn, Germany	SBSTA/SBI	State and many others	
6/4/2003	6/6/2003	New Orleans, LA.	Oceanology International (OI) Americas		www.oiamericas.com
6/10/2003	6/11/2003	Washington, D.C	Climate Leaders Partners Workshop	EPA	Tom Kerr, kerr.tom@epa.gov, 202-564-0047
6/10/2003	6/13/2003	Vienna, Austria	OECD Workshop on biomass and agriculture	USDA/DOE	Paul Adler USDA/ARS Bill Hohenstein 202 720-6698
6/23/2003	6/25/2003	Washington, D.C.	Carbon Sequestration Leadership Forum	DOS/DOE	Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
6/26/2003	6/27/2003	Washington, D.C	Fourth Meeting of the US-China Working Group on Climate Change	DOS/Interagency	Cynthia Brady, bradyca@state.gov, 202-647-2425

USG Climate Calendar, 2003					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
6/30/2003	7/11/2003	Saporo, Japan	International Union of Geodesy and Geophysics 2003		Email: IUGG_service@jamstec.go.jp, URL: www.jamstec go.jp/jamstec-e/iugg/index.html
7/13/2003	7/18/2003	New London, New Hampshire	Gordon Conference On "Solar Radiation And Climate"	DOC/NOAA	V. Ramaswamy, NOAA/GFDL, vr@gfdl.noaa.gov
7/21/2003	7/25/2003	Toulouse, France	IGARSS 2003		Email: grss@ieee.org, URL: www.igarss03.com
8/30/2003	9/6/2003	Grindelwald, Switzerland	Second International Swiss NCCR Climate Summer School: "Climate Change - Impacts of Terrestrial Ecosystems."		Kaspar Meuli, Email. nccr-climate@giub.unibe.edu, URL: www.nccr-climate.unibe.ch
4/26/2004	4/27/2004	Geneva, Switzerland	Intergovernmental Panel on Climate Change (IPCC) meeting of Bureau 1 on Science	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
4/28/2004	4/30/2004	Geneva, Switzerland	IPCC Bureau 31st Session	DOS	Dan Reifsnyder, ReifsnyderDA@state.gov, 202-647-4069
5/4/2004	5/5/2004	Selfoss, Iceland	Senior Arctic Officials Meeting - climate issues addressed	DOS and others	Sally Brandel, BrandelSK@state,gov, 202-647-3264
5/18/2004	5/20/2004	Brasilia, Brazil	U.S.-Brazil Bilateral	DOS/interagency	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-4511
5/26/2004	5/27/2004	Beijing, China	International Partnership for the Hydrogen Economy (IPHE) Steering Committee meeting	DOE/DOT/State	Bob Dixon, e-mail. robert.dixon@ee.doe.gov Mike Mills, e-mail: michael.mills@ee.doe.gov

USG Climate Calendar, 2002					
Begin	*End*	*Location*	*Event and Purpose*	*LEAD/ Other Participants*	*Point of Contact: Name, e-mail and phone number)*
10/1/2002	10/2/2002	Washington, DC	DOT Workshop: Potential Impacts of Climate Change on Transportation.	DOT / DOE, EPA, USGCRP	Joanne Potter, joanne.r.potter@fhwa.dot.gov, 202-366-2067
10/9/2002	10/10/2002	Shepardstown, WV	Foresty and Agriculture Greenhouse Gas Modeling Forum	USDA / EPA	Carol Jones, cjones@ers.usda.gov, 202 596-5505
10/21/2002	10/25/2002	Fairfax, Virginia	Climate Diagnostics Workshop (public meeting)	DOC(NOAA)	Wanye Higgins, wayne.higgins@noaa.gov
10/23/2002	11/3/2002	New Dehli, India	UNFCCC Conference of the Parties 8 (COP 8). Continuation of ongoing climate negotiations	STATE / DOE, EPA,USDA, CEA	
10/28/2002	10/30/2002	Washington, D.C	Climate Prediction Assessments Workshop (public meeting)	DOC(NOAA)	Mike Brewer, michael.j.brewer@noaa.gov
10/29/2002	10/30/2002	Washington, D.C	Climate Leaders GHG Inventory Protocol and Goal Setting Workshop	EPA	Tom Kerr, kerr@epa.gov, 202 564-0047
11/18/2002	11/19/2002	Washington, D.C.	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot.Anderson@hq.doe.gov, 202 586-2589
11/19/2002	11/20/2002	Charleston, South Carolina	Data Access meeting (pulbic meeting)	DOC (NOAA)	Tom Karl, thomas.r.karl@noaa.gov
11/19/2002	11/21/2002	Raleigh, NC	USDA Symposium on Natural Resource Management for GHG Offsets	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698
11/20/2002	11/22/2002	Annapolis, MD	5th Annual State and Local Climate Change Partners Conference	EPA / DOE, USDA	Andres Denny, denny.andrea@epa.gov, 202-564-3467
11/22/2002	11/22/2002	Raleigh, NC	Bilateral with Australia on Sinks	USDA	William Hohenstein, whohenst@oce.usda.gov, 202 720-6698

USG Climate Calendar, 2002					
Begin	End	Location	Event and Purpose	LEAD/ Other Participants	Point of Contact: Name, e mail and phone number)
12/3/2002	12/5/2002	Washington, D.C.	U.S. Climate Change Science Program. Workshop for Scientists and Stakeholders	DOC / USDA, DOD, DOE, DOI, DOT, EPA, NASA, NSF, SI, USAID, USGS	Dr. James Mahoney, James.R. Mahoney@noaa.gov, 202 482-3567
12/5/2002	12/6/2002	Chicago, Illinois	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/9/2002	12/10/2002	San Francisco	1605(b) Workshop (public meeting)	DOE / EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/10/2002	12/11/2002	Geneva	28th Session IPCC Bureau	DOS	Daniel Reifsnyder, reifsnyderda@state.gov, 202-647-4069
12/12/2002	12/13/2002	Houston, Texas	1605(b) Workshop (public meeting)	DOE/EPA, USDA, DOT, DOC, CEQ, OMB	Margot Anderson, margot. Anderson@hq.doe.gov, 202 586-2589
12/12/2002	12/13/2003	Tokyo	Japan Market-Mechanisms Working Group	Interagency Team	Dr. Toral Patel-Weynand, patel-weynandto@state.gov, 202-647-3934
12/17/2002	12/17/2002	Washington, D C.	U.S. - Canada Bilateral	DOS, DOE, EPA, NOAA	Barbara DeRosa-Joynt, derosabm@state.gov, 202-647-

April 29, 2004

Workshop Agenda
Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

8:00 Registration

Coffee, tea and light breakfast snacks

8:30 Welcome and an explanation of the workshop's objectives – G. Morgan

8:40 Questions and Discussion

8:50 The National Assessment: An overview of the process – T. Janetos

9:10 The National Assessment: A view from the trenches – A. Fisher

9:20 Questions and Discussion

9:35 The survey of folks involved with the National Assessment – G. Morgan

9:45 Questions and Discussion

10:00 Break

10:15 Framing the first Working Group Sessions on "Performing the Assessment" – G. Morgan

10:30 Break into working groups

Group A: Assessment Methods – S. Schneider, chair

Relevant Discussion Notes: 1,2,3,4

Group B: Social Issues – T. Wilbanks, chair

Relevant Discussion Notes: 2,4,5,6

Group C: Stakeholders and Communication – K. Jacobs, chair

Relevant Discussion Notes: 2,5,6,7

12:00 Breakout reports followed by Questions and Discussion

12:45 Working Lunch

1:00 Framing the second Working Group Sessions on "Evaluating the Assessment and Improving Next Time" – G. Morgan

1:15 Break into working groups

Group D: Purpose(s) of Assessment – B. Fischhoff, chair

Relevant Discussion Notes: 9,10,12

Group E: Organizing and Managing Future Assessments – B. Clark, chair

Relevant Discussion Notes: 8,10,11,12

Group F: Performing Assessment in an (Inevitably) Political Setting – R. Cantor, chair

Relevant Discussion Notes: 9,10,12

2:45 Breakout reports followed by Questions and Discussion

3:45 Break

4:00 Panel: What have we learned? - G. Morgan (chair), J. Jacoby, S. Kane, A. Kinzig, J. Mahoney (?), and R. Street

5:00 End of Workshop

From Observation to Action—

Achieving Comprehensive, Coordinated, and Sustained Earth Observations for the Benefit of Humankind

Framework for a 10-Year Implementation Plan

As adopted by Earth Observation Summit II
25 April 2004

1. Introduction

Understanding the Earth system—its weather, climate, oceans, land, geology, natural resources, ecosystems, and natural and human-induced hazards—is crucial to enhancing human health, safety and welfare, alleviating human suffering including poverty, protecting the global environment, and achieving sustainable development. Data collected and information created from Earth observations constitute critical input for advancing this understanding. In 2003, a consensus emerged among governments and international organizations that, while supporting and developing existing Earth observation systems, more can and must be done to strengthen global cooperation and Earth observations. This Framework Document, while not legally binding, marks a crucial step in developing the 10-Year Implementation Plan for the creation of a comprehensive, coordinated, and sustained Earth observation system or systems as envisioned by the Washington Declaration adopted at the Earth Observation Summit of 2003.

2. Benefits of Comprehensive, Coordinated and Sustained Earth Observations

2.1 Observing and understanding the Earth system more completely and comprehensively will expand worldwide capacity and means to achieve sustainable development and will yield advances in many specific areas of socio-economic benefit, including:

- Reducing loss of life and property from natural and human-induced disasters;
- Understanding environmental factors affecting human health and well being;
- Improving management of energy resources;

- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change;
- Improving water resource management through better understanding of the water cycle;
- Improving weather information, forecasting, and warning;
- Improving the management and protection of terrestrial, coastal, and marine ecosystems;
- Supporting sustainable agriculture and combating desertification;
- Understanding, monitoring, and conserving biodiversity.

2.2 Globally, these benefits will be realized by a broad range of user communities, including (1) national, regional, and local decision-makers, (2) relevant international organizations responsible for the implementation of international conventions, (3) business, industry, and service sectors, (4) scientists and educators, and (5) the general public. Realizing the benefits of coordinated, comprehensive, and sustained Earth observations (i.e. the improvement of decision-making and prediction abilities) represents a fundamental step toward addressing the challenges articulated in the declarations of the 2002 World Summit on Sustainable Development and fulfilling the Millennium Development Goals agreed at the Millennium Summit in 2000.

2.3 Full participation of developing country members will maximize their opportunities to derive real benefits in the above socio-economic areas. Such participation is supported as it enhances the capacity of the entire Earth observation community to address global sustainable development challenges.

3. Key Earth Observation Areas

3.1 Coordinated and sustained global cooperation on Earth observations is well established in the crucial area of weather. The World Meteorological Organization's World Weather Watch demonstrates the value of international collaboration in this arena. Improvements in observation

networks are still needed and will yield further success through improved accuracy in weather information and long-term prediction.

3.2 Cooperation is less advanced in the areas of land, water, climate, ice, and ocean observation. Nevertheless, some important work and guidance for future action has been developed in a number of areas, for example:

a. Natural hazard understanding through a range of international observing and early warning systems consistent with the International Strategy for Disaster Reduction (ISDR);

b. Climate understanding and research through the World Climate Research Program (WCRP), and climate monitoring consistent with the Global Climate Observing System (GCOS) in support of the Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC);

c. Ocean monitoring, modeling and forecasting through the Global Ocean Observing System (GOOS);

d. A range of observation themes addressed by the Integrated Global Observing Strategy Partnership (IGOS-P) including oceans; carbon; water cycle; solid earth processes, coastal zone (including coral reef); atmospheric chemistry; and land/biosphere.

3.3 In each of these areas, observation efforts to understand dynamic Earth processes have been identified and should be expanded to support action-oriented solutions in the areas of key socio-economic benefit.

4. Shortcomings of Current Observation Systems

4.1 Human knowledge of the Earth system, although advanced in certain areas, is far from complete. Current efforts to observe and understand the Earth system must progress from the separate observation systems and programs of today to coordinated, timely, quality, sustained, global information—developed in accordance with compatible standards—as a basis for future sound decisions and actions.

4.2 Many international organizations and programs are working to sustain and improve the coordination of Earth observations. However, current efforts to capture Earth observation data are limited by (1) a lack of access to data and associated benefits especially in the developing world, (2) eroding technical infrastructure, (3) large spatial and temporal gaps in specific data sets, (4) inadequate data integration and interoperability, (5) uncertainty over continuity of observations, (6) inadequate user involvement, (7) a lack of relevant processing systems to transform data into useful information, and (8) insufficient long term data archiving.

5. What is Needed - The 10-Year Implementation Plan for Earth Observations (2005-2014)

5.1 To achieve the many benefits of coordinated Earth observations and to move from principles to action, governments adopting this Framework Document set forth the primary components of a 10-Year Implementation Plan for establishing the Global Earth Observation System of Systems (GEOSS). GEOSS will be:

- *comprehensive,* by including observations and products gathered from all components required to serve the needs of participating members;
- *coordinated,* in terms of leveraging resources of individual contributing members to accomplish this system, whose total capacity is greater than the sum of its parts;
- *sustained,* by the collective and individual will and capacity of participating members.

5.2 GEOSS will be a distributed system of systems, building step-by-step on current cooperation efforts among existing observing and processing systems within their mandates, while encouraging and accommodating new components. Participating members will determine ways and means of their participation in GEOSS. The 10-Year Implementation Plan for GEOSS will be based on the following considerations:

a. With the socio-economic benefits identified in Section 2 as the roadmap, the 10-Year Implementation Plan will identify, document, and prioritize actions to address user requirements for current and future Earth observations. This process will be based on

appropriate dialogue and procedures, taking advantage of and building upon the experience of existing initiatives and infrastructures.

b. The architecture model will build incrementally on existing systems to create a distributed system of systems, incorporating an observation component, a data processing and archiving component, and a data exchange and dissemination component.

c. The 10-Year Implementation Plan will elucidate practical methods for filling critical gaps in, *inter alia*, observation parameters, geographical areas, observation specifications, and accessibility.

5.3 The GEOSS will address key challenges of data utilization, including the need for:

- Full and open exchange of observations with minimum time delay and minimum costs, recognizing relevant international instruments and national policies and legislation;
- Assured data utility and usability (including thresholds for validation, calibration, and spatial and temporal resolution);
- Assured continuity and availability of the many observations and products in place or planned;
- A robust regulatory framework for Earth observations (e.g. through protection of radio frequency bands that are uniquely essential for Earth observations)

5.4 The plan will facilitate both current and new capacity building efforts, particularly in developing countries, across the entire continuum of GEOSS activities, which will include education, training, institutional networks, communication, and outreach as fundamental to those efforts. Building on existing local, national, regional, and global capacity building initiatives, GEOSS will:

a. Focus on training and education for the development and/or utilization of existing human, institutional, and technical capacities for data utilization;

b. Develop the infrastructure resources necessary to meet research and operational requirements;

c. Build on globally accepted sustainable development principles – most notably those outlined in the World Summit on Sustainable Development Plan of Implementation.

5.5 The development of GEOSS should take maximum advantage of developments in research and technologies. Conversely it will enable the global scientific community to address key scientific questions concerning the functioning of the Earth system.

6. Outcomes

The success of the 10-Year Implementation Plan will be measured by the operational achievement of GEOSS. Specific outcomes for GEOSS, both short and long-term, will be elaborated in the 10-Year Implementation Plan, including but not limited to the following:

a. Enabling global, multi-system information capabilities for each of the following:
   - disaster reduction, including response and recovery;
   - integrated water resource management;
   - ocean monitoring and marine resources management;
   - air quality monitoring and forecasting;
   - biodiversity conservation;
   - sustainable land use and management.

b. Global tracking of invasive species;

c. Comprehensive monitoring of global and regional climate on annual, decadal, and longer time scales, and enabling information products related to climate variability and change;

d. Improving the coverage, quality, and availability of essential information from the *in situ* networks and improving the integration of *in situ* and satellite data;

e. Involvement of users from developed and developing countries, monitoring their needs and fulfillment over time;

f. An outreach mechanism to actively demonstrate the usefulness of Earth observation to decision makers in key user communities.

7. The Way Forward

7.1 The adoption of this Framework Document indicates a decision to proceed with the elaboration of the GEOSS 10-Year Implementation Plan along the lines set forth in this Document and a willingness to cooperate on, and participate in, the implementation of the plan. At present, the *ad hoc* Group on Earth Observations (GEO) is a "best efforts" activity with voluntary input from States and advice and support from international organizations.

7.2 For 2005 and beyond, the implementation of the "10-Year Implementation Plan" will require a ministerial-guided successor mechanism with maximum flexibility—a single intergovernmental group for Earth observations drawing on the experience of the *ad hoc* GEO, with membership open to all interested governments and the European Commission, and with representatives of relevant international organizations taking part.

7.3 The GEOSS 10-Year Implementation Plan will elaborate details for this Group, which will provide generally for:

a. Coordination and planning of GEOSS implementation (*in situ* and remotely sensed);

b. Opportunities for engagement of all members and relevant international and regional organizations;

c. Involvement of user communities;

d. Measuring, monitoring, and facilitating openness of GEOSS to improve cross-flow of observations and products;

e. Co-ordination and facilitation of the development and exchange of observations and products between members and relevant international and regional organizations.

1605 CEQ 453 PC

INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY

Meeting #04-1

Wednesday, February 11, 2004, 2:00 to 4:00 PM
Department of Commerce, Conference room (#5851)

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	US Card, DOE
2:05 – 2:15	Science Update • Program funding • FY04/05 priorities	Dpty Bodman, Commerce Ari Patrinos, DOE Acting
2:15 – 2:30	Science – NASA perspective	Adminstrator O'Keefe, NASA
2:30 – 2:45	Policy Update • Discussion of policy implications of recent events • Review of key dates and issues for CY04 o Voluntary programs annev Feb 11 o Climate strategy annev. Feb 14 o NEP annev, May o Energy bill o Clear Skies	Chm. Connaughton, CEQ
2:45 – 3:00	Technology Update • Program funding and CCTP cross cuts • Update in initiatives (IPHE, CSLF, Gen IV, ITER) • FY04/05 priorities and initiatives under consideration • Draft strategic plan	US Card / CCTP Dr. Conover, DOE
3:00 – 3:15	Registry (1605(b)) and Voluntary Programs • Review of draft guidelines and finalization schedule • Review of registry public comments following release of draft guidelines • Voluntary programs update (Climate Vision/DOE, Climate Leaders/EPA)	US Card, DOE Asst Admin, Holmstead, EPA
3:20 – 3:30	Agriculture Update • Sequestration guidelines • Farm Bill implementation	Dpty Moseley, AG
3:30 – 3:50	International • Review of key events and activities for CY04 o Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment plan • Other international developments	US Dobriansky, State
3:50 – 3:55	Cleanup Items • Discussion of meeting plan for the year • Discussion of inviting guest presentations	US Card, DOE
3:55 – 4:00	Next meeting plans and schedule contingency • Next meeting (at Energy) – proposed for Tuesday, April 13	US Card, DOE

2/12/2004

001930

CEQ 435 PC

Cooney, Phil

From: Conover, David [David.Conover@hq.doe.gov]

Sent: Tuesday, April 20, 2004 3:38 PM

To: Ted Kassinger (TKassinger@doc.gov); Anderson, Margot; Christina Beato; Conover, David; Conrad Lautenbacher (conrad.c.lautenbacher@noaa.gov); Dr. James E. Andrews (DOD); Olsen, Kathie L.; Emil Frankel (emil.frankel@ost.dot.gov); Gary Martin, Ghassem Asrar (gasrar@hq.nasa.gov); Harlan Watson; Connaughton, James; Jim Moseley (jrm@usda.gov); Marburger, John H.; Kyle McSlarrow; Peacock, Marcus; Patrinos, Ari; Paula Dobriansky (nelsondj2@state.gov); Rita Colwell (rcolwell@nsf.gov); Sam Bodman (sbodman@doc.gov); Simmons, Emmy; Stephen Johnson; Steve Griles (steven_griles@ios.doi.gov)

Cc: Yvonne Brown (yvonne.brown@ost.dot.gov); Ann Klee (ann_klee@ios.doi.gov); Bill Hohenstein (whohenst@OCE.USDA.gov); Granville Paules (gpaules@hq.nasa.gov); James Mahoney (James.R.Mahoney@noaa.gov); John Beale (Beale.john@epa.gov); Linda Lawson (linda lawson@ost.dot.gov); Margaret Leinen (Mleinen@nsf.gov); Mary Cleave (Mcleave@hq.nasa.gov); Cooney, Phil, Scott Rayder (Scott.Rayder@noaa.gov); Violanda Botet; Cobb, Al; Anderson, Margot; Barbara Diehl; Betty James; McDonald, Christine A.; Debra White; Dobriansky, Larisa; Burgeson, Eric; Sloan, Gwinnette; Jackie Krieger; Jacqueline Schafer; Parrish, Jobi A.; Joy Viars; Ko Barrett; Linda Catlett; Lu-ann Kleibacker; Lynn Scarlett; Margarita Conkright Gregg; Marlay, Robert; Melinda Moore; Pat Simms; Pat Thorne; Patrice Kortuem; Reifsynder, Daniel A. ; Sandoli, Robert; Conde, Roberta L.; Ron Bonjean; Sherron White; Eule, Stephen, Sue Stendebach; Vaughn Turekian; Viars, Joy; Vicki Horton; DeVito, Vincent

Subject: IWG meeting April 27 2-4pm at DOE

Importance: High

Attached please find the agenda for this meeting, to be chaired by DOE Deputy Secretary Kyle McSlarrow. Instructions for getting precleared into the building are on the attached. Regards, Dave

<<Agenda Mtng #2 Apr 04 doc>>

Dave Conover
Senior Policy Advisor, Office of the Secretary
Director, US Climate Change Technology Program
Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
202-586-3994 (voice)
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240-472-4264 (wireless)

INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY
Meeting #04-2

Tuesday, April 27, 2004, 2:00 to 4:00 PM
Department of Energy, Conference room 8E-089
Call or email Gwinette Sloan at 586-7131/Gwinnette.sloan@hq.doe.gov by cob Monday April 26 to be cleared into the building

Time	Item		Discussion Lead
2:00 – 2:05	Introductions		Dpty McSlarrow, DOE
2:05 – 2:20	Policy Update • NEP annev, May • Energy bill • Clear Skies		Chm Connaughton, CEQ
2:20 – 2:35	Science Update		Ari Patrinos, DOE Acting
2:35 – 2:45	Technology Update		Dave Conover, DOE
2:45 – 2:55	1605(b) Update		Dave Conover, DOE
2:55 – 3:20	Voluntary Programs • Climate Vision/DOE • Climate Leaders/EPA • SmartWay Transport/EPA		DAS Dobriansky, DOE; AA Holmstead, EPA
3.20 – 3:35	Agriculture Update		Dpty Moseley, AG
3:35 – 3:50	International • Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment • Other international developments		US Dobriansky, State
3:50 – 4:00	General Discussion/Next meeting • Topics for next meeting • Date for next meeting – proposed for Tuesday, June 29		Dpty McSlarrow, DOE

June 29 – next B Box
format of mtg & Kyle

CEQ 006210

Cooney, Phil

From: Conover, David [David.Conover@hq.doe.gov]

Sent: Tuesday, April 20, 2004 3:38 PM

To: Ted Kassinger (TKassinger@doc.gov); Anderson, Margot; Christina Beato; Conover, David; Conrad Lautenbacher (conrad.c.lautenbacher@noaa.gov); Dr. James E. Andrews (DOD); Olsen, Kathie L.; Emil Frankel (emil.frankel@ost.dot.gov); Gary Martin, Ghassem Asrar (gasrar@hq.nasa.gov); Harlan Watson; Connaughton, James; Jim Moseley (jrm@usda.gov); Marburger, John H.; Kyle McSlarrow; Peacock, Marcus; Patrinos, Ari; Paula Dobriansky (nelsondj2@state.gov); Rita Colwell (rcolwell@nsf.gov); Sam Bodman (sbodman@doc.gov); Simmons, Emmy; Stephen Johnson; Steve Griles (steven_griles@ios.doi.gov)

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Subject: IWG meeting April 27 2-4pm at DOE

Importance: High

Attached please find the agenda for this meeting, to be chaired by DOE Deputy Secretary Kyle McSlarrow. Instructions for getting precleared into the building are on the attached. Regards, Dave

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INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY
Meeting #04-2

Tuesday, April 27, 2004, 2:00 to 4:00 PM
Department of Energy, Conference room 8E-089
Call or email Gwinette Sloan at 586-7131/Gwinnette.sloan@hq.doe.gov by cob Monday April 26 to be cleared into the building

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2:45 – 2:55	1605(b) Update	Dave Conover, DOE
2:55 – 3:20	Voluntary Programs • Climate Vision/DOE • Climate Leaders/EPA • SmartWay Transport/EPA	DAS Dobriansky, DOE; AA Holmstead, EPA
3.20 – 3:35	Agriculture Update	Dpty Moseley, AG
3:35 – 3:50	International • Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment • Other international developments	US Dobriansky, State
3:50 – 4:00	General Discussion/Next meeting • Topics for next meeting • Date for next meeting – proposed for Tuesday, June 29	Dpty McSlarrow, DOE

June 29 – repl @ Box
@ Journet of mtg + Kyle

4/20/2004

Cooney, Phil

From: Conover, David [David Conover@hq.doe.gov]

Sent: Tuesday, April 27, 2004 12:20 PM

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Subject: Revised agenda for IWG/blue box meeting this afternoon

<<Agenda Mtng #2 Apr 04rev4.doc>>

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INTERAGENCY WORKING GROUP
on
CLIMATE CHANGE SCIENCE AND TECHNOLOGY

Meeting #04-2

Tuesday, April 27, 2004, 2:00 to 3:15 PM
Department of Energy, Conference room 8E-089

Time	Item	Discussion Lead
2:00 – 2:05	Introductions	Dpty McSlarrow, DOE; Gen Cnsl Kassinger, DOC
2:05 – 2:20	International Update • Bonn Renewable Energy Conf, June 1-4 • IPCC 4th Assessment • GEO 4/EOS 2 • Other international developments	US Dobriansky, State; VADM Lautenbacher, DOC
2:20- 2:35	Voluntary Programs • Climate Leaders/EPA • SmartWay Transport/EPA • Climate VISION/DOE	AA Holmstead, EPA; DAS Dobriansky, DOE
2:35 – 2:50	Science Update	Dir. Mahoney, DOC; Dr. Patrinos, DOE
2:50 – 3:00	Technology Update	Dave Conover, DOE
3:00 – 3:10	1605(b), Climate Calendar, IEA Climate Activities	Dave Conover, DOE
3:10 – 3:15	General Discussion/Next meeting • Topics for next meeting • Date for next meeting – proposed for Tuesday, June 29	Dpty McSlarrow, DOE

4/27/2004

Office of the Assistant Secretary of
Commerce for Oceans and Atmosphere
National Oceanic and Atmospheric Administration
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Washington, DC 20230
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Date: 4/28/04

FAX TRANSMITTAL

To: Dave Halpern
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Comments:

National Assessment Workshop materials

Hi Phil,

Kathie said that you need a copy.

Best regards.

Dave

Copies to
Jen Peel
Bryan Hannegan
me

Number of pages: 31

Background Materials for the Workshop

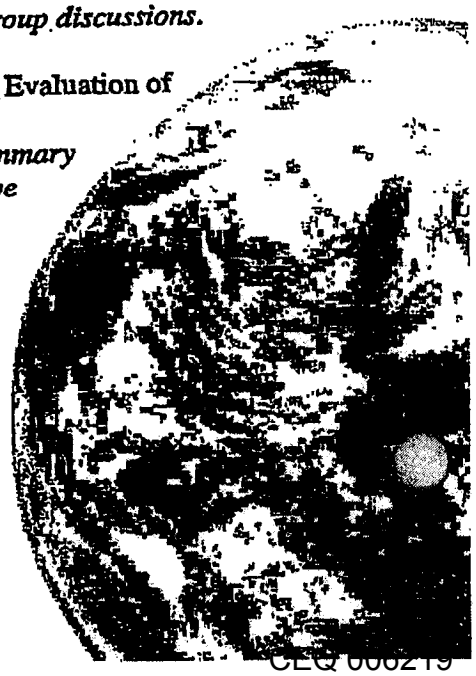
Learning from the National Assessment

AAAS Building, 1200 New York Avenue, NW
Washington, DC

April 29, 2004

Contents:

- Draft Agenda.
- Discussion Notes.
  IMPORTANT: please find time to read these notes prior to the workshop. They have been prepared to stimulate the working group discussions.
- Summary of Responses to the Survey for Participant Evaluation of the U.S. National Assessment.
  It is desirable but not essential that you read this summary before the workshop. The results of the survey will be summarized in a presentation at the beginning of the workshop.



Members of the Workshop Planning Committee: Robin Cantor, Bill Clark, Ann Fisher, Jake Jacoby, Tony Janetos, Ann Kinzig, Jerry Melillo, Granger Morgan (chair), Roger Street, and Tom Wilbanks.

Supported by NSF Cooperative Agreement SBR-9521914.

April 29, 2004

Workshop Agenda
Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

8:00 Registration

Coffee, tea and light breakfast snacks

8:30 Welcome and an explanation of the workshop's objectives – G. Morgan

8:40 Questions and Discussion

8:50 The National Assessment: An overview of the process – T. Janetos

9:10 The National Assessment: A view from the trenches – A. Fisher

9:20 Questions and Discussion

9:35 The survey of folks involved with the National Assessment – G. Morgan

9:45 Questions and Discussion

10:00 Break

10:15 Framing the first Working Group Sessions on "Performing the Assessment" -- G. Morgan

10:30 Break into working groups

Group A: Assessment Methods – S. Schneider, chair

Relevant Discussion Notes: 1,2,3,4

Group B: Social Issues -- T. Wilbanks, chair

Relevant Discussion Notes: 2,4,5,6

Group C: Stakeholders and Communication – K. Jacobs, chair

Relevant Discussion Notes: 2,5,6,7

12:00 Breakout reports followed by Questions and Discussion

12:45 Working Lunch

April 29, 2004

Workshop Agenda – Learning from the National Assessment

1:00 Framing the second Working Group Sessions on "Evaluating the Assessment and Improving Next Time" – G. Morgan

1:15 Break into working groups

Group D: Purpose(s) of Assessment – B. Fischhoff, chair

Relevant Discussion Notes: 9,10,12

Group E: Organizing and Managing Future Assessments – B. Clark, chair

Relevant Discussion Notes: 8,10,11,12

Group F: Performing Assessment in an (Inevitably) Political Setting – R. Cantor, chair

Relevant Discussion Notes: 9,10,12

2:45 Breakout reports followed by Questions and Discussion

3:45 Break

4:00 Panel: What have we learned? - G. Morgan (chair), J. Jacoby, S. Kane, A. Kinzig, J. Mahoney (?), and R. Street

5:00 End of Workshop

Discussion Notes Prepared for the Workshop:
Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

April 29, 2004

Discussion Note 1:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Choosing Possible Future Climates for Examination

Officially, the National Assessment adopted three strategies for characterizing possible future climates to be considered (see page 14 of the National Synthesis Report):

- Historical records of past climate variability and change;
- Scenario analysis using large-scale general circulation models (GCMs); and
- Sensitivity analysis that asks, "what degree of climate change would cause significant impacts to natural and human systems" of interest?

Responses to the survey of National Assessment participants suggest that all three approaches were used (see page 29 of the summary of survey responses[1]):

57% GCMs.
45% data on past climates.
44% "what if" analysis.
7% Other.
23% Not relevant to my involvement.

However, many observers would argue that two GCM runs, based on a single emissions scenario (the IPCC scenario IS92a) predominated as the vehicle used to explore possible future climate in the National Assessment. This impression is reinforced by an examination of the reports of the National Synthesis Team and a reading of the detailed responses to the participant survey (see pages 29 to 39 of the summary of survey responses).

There have been complaints about the specific GCM models used, and the fact that only one emission scenario was employed to drive those models. MacCracken et al. (2003) have responded arguing that these limitations have been exaggerated.

However, the question of whether the right GCMs were used, and whether they were driven by the right emissions scenario(s), is of second order importance compared with the more fundamental question of how an appropriate range of future climates should be identified and explored in national and regional assessments.

While they suffer from known, and probably unknown, limitations, do a poor job of modeling many details of regional climate and of estimating key variables such as precipitation, GCMs produce spatially consistent and visually compelling graphical output. Further, there is a large community of modelers heavily invested in their development and use. For these, and probably other reasons, there are strong pressures to use GCM outputs as the basis for climate impact assessments.

[1]Since more than one answer was allowed, these results sum to slightly more than 100%.

It is clear from the detailed survey responses that many participants in the National Assessment viewed the range of outputs from GCMs as providing a reasonable indication of the range of uncertainty about future climate. Even given outputs from a much wider set of GCM's, and a range of alternative emissions scenarios, this is unlikely to be true since the results would share assumptions and parameterizations that might be inadequate.

It was because of such considerations that the National Synthesis Team identified *three* different strategies for exploring future climate. In the event, however, the two strategies that do not depend on GCM's appear to have received relatively little attention. There was a strong inclination in most groups to approach the problem in a front-to-back manner (emissions → climate → impacts), rather than, for example, identifying key thresholds or non-linearities in natural and social systems of concern and letting those drive the work of the climate scientists and the choices of climates to be examined.

The above considerations led to the following questions for discussion:

- Q1.1: Is it in fact the case, as this discussion note has argued, that GCM output alone (even from a wider range of models and emissions scenarios) does not provide an adequate basis for exploring possible future climate, and associated vulnerabilities, in regional and national assessments?
- Q1.2: Is it the case, as this discussion note has argued, that GCM-based climate scenarios were privileged over other possible strategies in the National Assessment, and are likely to be similarly privileged in future assessments, as a strategy for selecting climates to be examined? If this is so, why?
- Q1.3: If the answer to questions Q1.1 and Q1.2 are yes, what might be done to assure that future climate assessments make much greater use of other methods for identifying or defining the climate futures whose impacts they will examine?

Reference:

Michael C. MacCracken, Eric J. Barron, David R. Easterling, Benjamin S. Felzer, and Thomas R. Karl, "Climate Change Scenarios for the U.S. National Assessment," *Bulletin of the American Meteorological Society*, pp.1711-1723, December, 2003.

Discussion Note 2:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Analysis of Social and Economic Impacts

While several teams involved in the National Assessment made extensive use of advanced analytical tools to model climate change (using the Canadian and Hadley GCMs), or to examine its likely large-scale ecological impacts (using models such as VEMAP and DISTRIB), the level of sophistication in analysis of social and economic impacts was considerably less sophisticated.

Population and economic projections were developed and distributed to all the assessment teams. Their use was uneven.

When asked to characterize the way in which their group dealt with social and economic impacts, those responding to the survey question provided the following responses.[2]

15% Dynamic social and/or economic models.
21% Projections from census and other data.
24% "what if" analysis.
8% Other.
43% Not relevant to my involvement.

There are a number of groups across the U.S. and around the world that have been building Integrated Assessment Models to study the climate problem. However, the National Synthesis Team concluded that given the limited time available, and the relatively limited experience of many participants in the assessment process, it was unrealistic to try to employ those models in the work of the assessment. Instead, as noted, a series of demographic and economic forecasts were commissioned and guidance was developed for the teams that suggested that they select one or two additional factors besides the demographic and economic scenarios which they judged would have the most direct effect on the impact of interest, and vary those factors through an uncertainty range they judged to be plausible (without spelling out the details of what social and other processes might lead to such changes). As the National Synthesis Report explains, "teams found the complexity of even this simplified approach challenging, and made limited use of it beyond the basic scenarios."

When asked, "did you ever see that guidance?" 21% of respondents said yes, 25% said no, and 54% did not respond. While most respondents apparently did not make use of this guidance, three-quarters of those who did try to follow the guidance reported that they considered the effort successful (63%) or partly successful (12%).

While there appears to be little agreement among respondents about how to improve the treatment of social and economic impacts in future assessments, almost 60% of respondents

[2]See page 39 of the summary of survey responses. Since more than one answer was allowed, these results sum to slightly more than 100%.

indicated that if another assessment were done, social and economic impacts should be handled differently from how they were handled in the part of the assessment in which they participated.

One important problem that first surfaced at the July 1998 workshop in Monterey, CA is the difficulty that many people appear to have in thinking about how socio-economic systems could evolve in the future. Many participants seemed intent on believing that the future would be pretty much like the present in all respects except for a changed climate. Other participants (mostly physical scientists) took the position that given the very high levels of uncertainty about socio-economic processes, there was no way to say anything at all that was useful more than a few years into the future. Under the circumstances, given the time constraints on the process, the assessment leadership concluded that they needed to shorten the time horizon on the socio-economic impact assessments.

The above considerations led to the following questions for discussion:

Q2.1: Was the National Assessment's treatment of socio-economic impacts inadequate? Note that despite the arguments outlined above, the grade given to the socio-economic impacts assessment by participants in the National Assessment (see page 53 of the summary of survey responses) is comparable to or only slightly lower than the grade given to other parts of the assessment.

Q2.2: Are there strategies that could be used to get non-expert participants more informed and comfortable in thinking about how social and economic systems might change over time periods of many decades?

Q2.3: What strategies might be adopted in future assessments to promote a more adequate and systematic treatment of possible socio-economic impacts? For example, are there ways to combine expert analysis, including the use of available integrated assessment models, with involvement by non-expert participants?

Discussion Note 3:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Analysis of Ecological Impacts

The National Assessment encouraged three general approaches to analyzing the potential impacts of climate variability and change on ecological systems:

- Consideration of past impacts attributed to climate variability and change;
- Exploration of possible future impacts in the context of scenarios based on linkages between general circulation models and ecological simulation models;
- Identification of ecological thresholds associated with climate variability and change, that when crossed, would lead to ecological consequences; some positive and some negative, some reversible and others not.

From its inception, the National Assessment sought to place climate variability and change in a "multiple stress" context, with an emphasis on how the context varied among regions and across sectors.

Responses to the survey of National Assessment participants suggest that the assessment of ecological impacts:

- was good (B-) overall;
- increased their familiarity with the subject – increased the % of participants in the top two categories of familiarity (very informed and expert) from 31% to 57%;
- but, did little to educate the general public about the subject.

Among the most important criticisms of the analysis of ecological impacts among participants and observers were:

- too much emphasis on the linked climate model-ecological model outputs;
- too much focus on the ecological effects of changes in mean climate conditions and not enough focus on the effects of changes in extreme events;
- limited success in placing the climate-change related impacts on ecosystems in the context of other stresses;
- poor connection between social and economic factors that govern phenomena such as land-cover and land-use change and ecological impacts.

A key issue with respect to overemphasis on the linked model outputs is the concern that the climate models cannot supply reliable information at the spatial and temporal scales needed for analyses of ecological impacts. The tension between the concepts of "predictions" *versus* "plausible alternative futures" is mixed into this concern.

Much of the discussion of extreme events and ecological impacts in the National Assessment was about past events or about general responses we might expect in the future. Little was done in the scenarios to incorporate regional and sub-regional climate extremes and so the ecological

analyses of extreme events were not represented in the outputs from the biogeochemistry and biogeography models used in the National Assessment.

The concept of global change includes, in addition to climate change, changes in land-cover and land-use, chemistry of the atmosphere and precipitation, and the deliberate and inadvertent redistribution of living organisms across the globe. While some knowledge is available on how these factors interact (sometimes synergistically and sometimes antagonistically), there will surely be many surprises. Appropriate representation of these interactions in an impacts assessment remains a challenge and must include a better way of dealing with the human dimensions of the problem.

Questions for discussion:

Q3.1: What role should quantitative, coupled (GCM, ecological and human dimensions) simulation modeling analyses play in any future assessments? Is this approach ready for "prime time" at various spatial scales – national, regional and sub-regional? If not, what alternative should be employed?

Q3.2: Does the science support a larger role for the concept of thresholds in future assessments of the ecological impacts of climate variability and change? Can we relate thresholds to rates as well as magnitudes of change?

Q3.3: Is there a way to consider the topic of ecological impacts of climate variability and change that will maximize our chances of meeting the combined goals of assessing, teaching and involving? For example, is this best done with a focus on "ecosystems services"; with a focus on the impacts on especially salient ecosystems and species; etc.?

Discussion Note 4:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Characterizing and Treating Uncertainty

Climate change and variability, and their impacts, inherently involve great uncertainty. So too do attempts to project how human societies are likely to change over coming decades. Thus, any national, regional, or sectoral assessment must deal in some way with uncertainty.

A reading of the various reports it produced by the National Assessment, as well as comments from several reviewers, suggest that the treatment of uncertainty was very uneven across the different groups involved in the National Assessment. This conclusion is supported by responses from assessment participants to the seventh section of the survey that asked about how each respondent's group dealt with uncertainty. Responses received broke down as follows (see page 46 of the summary of survey responses):

- 39% Not relevant to my involvement.
- 24% The group was not systematic, individual authors used the words they thought were best.
- 19% The group was somewhat systematic, in most cases our group had a qualitative discussion of which word to use as the text was edited.
- 5% The group was somewhat quantitative, our group assigned numerical probabilities to words and then individual authors used the words they thought were best.
- 8% The group was systematically quantitative, our group assigned numerical probabilities to words and then in most cases discussed which word to use as the text was edited.
- 5% Other.

Just under half of the survey respondents indicated that they were not aware of the effort made by the National Assessment Synthesis Team to assign numerical values to probability words and then use those words consistently throughout their report.

Documentation of what groups did was similarly diverse, and often very limited.

The reasons for this uneven treatment seem likely to include:

- Many assessment participants were new to this kind of activity and were unfamiliar both with the issues of thinking in a formal way about uncertainty or with analytical tools for dealing with uncertainty.
- Most respondents had no knowledge of the compelling evidence in experimental psychology that indicates that probability words (such as "likely" and "unlikely") can mean dramatically different things to different people, and to the same people in different contexts.
- No guidance document on how to deal with uncertainty (such as the one produced by Schneider and Moss for the IPCC) was distributed to participants in the National Assessment.

- The computer models used by some assessment teams did not lend themselves to probabilistic treatment or other forms of uncertainty analysis.
- So much time was spent on organizational and other issues that teams did not get around to thinking about issues of uncertainty until it was too late to do very much about it.

Whatever the reason, many observers believe that future assessments will need to adopt a more adequate and systematic characterization and treatment of uncertainty. This raises the following questions:

Q4.1: Was the characterization and treatment of uncertainty in the National Assessment in fact inadequate, or is a systematic treatment of uncertainty simply the esoteric and largely unimportant concern of expert analysts?

Q4.2: Are the objectives of wide involvement by non-experts, and the adequate characterization and treatment of uncertainty, inherently incompatible?

Q4.3: If not, what strategies might be adopted in future assessments to promote a more adequate and systematic treatment of uncertainty? For example, are there ways to combine expert analysis that deals systematically with uncertainty, with involvement by non-expert participants?

Discussion Note 5:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Mitigation and Adaptation

It is impossible to address possible impacts of climate change, positive or negative, without understanding the sensitivity of natural and human systems to such changes. Discussions of "vulnerability" and its more positive counterpart (i.e., potential synergies associated with changes) tend to emphasize three dimensions: exposure (the changes experienced, such as temperature or precipitation changes), sensitivity (the degree to which a system's performance is affected by such changes), and coping capacity (the degree to which a system can respond to changes in ways that reduce threats and enhance opportunities).

In general, the National Assessment made a strong start in identifying exposures to possible climate changes, at least in the longer run, and it took a somewhat weaker first cut at identifying sensitivities. Where it was weakest was in addressing responses to climate changes that might change the balance between opportunities and risks. In most cases where possible impacts were identified, a statement was simply added that adaptation to such impacts might be possible, although the feasibility and costs of such adaptations was not generally considered. As a result, it is impossible to evaluate, based on the content of the National Assessment, the degree to which possible exposures might be reduced by climate change *mitigation* (reductions in forcing) and/or the degree to which risks associated with such exposures might be reduced through *adaptation*. Since humans can be expected not to sit idly by in the face of significant climate change, this is a significant limitation in the results of the National Assessment.

There were two principal reasons for this gap. First, although mitigation is the response most prominently explored in many global climate change policy discussions, leaders of the National Assessment were instructed to avoid any connection with mitigation issues, which were viewed as too political at the time, even though some of the U.S. regions (especially the Appalachians) were seriously concerned about regional impacts of mitigation policy directions. Second, participants in the National Assessment found that too little is known about adaptation strategies, costs, and potentials to systematically assess the relative merits of alternative response strategies.

The assessment of mitigation and adaptation strategies require substantial technical and economic knowledge and analysis. Since the National Assessment did not address these matters, such skills were not very present among the folks who participated.

Survey responses suggest that many of those involved in the National Assessment concluded that the lack of consideration of mitigation and adaptation was a serious limitation.

Results reported on page 63 of the summary of responses read as follows:

There are a number of things the assessment did not try to do but might have. If the country wer do it again, which, if any, of these should be included as objectives?

Strategies for reducing greenhouse gas emissions. 16%na	strong "no" 15---16---19---42---52 9%- -9%--11%- 25%-30%	strong "yes"
Identification of climate-related "market opportunities" for business. 18%na	strong "no" 11---28---26---44---34 6%--16%--15%- 25%-20%	strong "yes"
Putting this issue in context when compared with other problems facing our communities and the nation. 19%na	strong "no" 10---12---26---47---45 6%-- 7%--15%- 27%- 26%	strong "yes"

An examination of the comments listed on pages 66-95 also reveal a number of participants who saw this absence as a serious problem.

Several questions arise:

- Q5.1: In what ways should possible and/or likely responses to climate change be incorporated in future national, regional, and sectoral assessments?
- Q5.2: Over coming decades, climate will not be the only thing that changes. In so cases the impacts of climate change will be of second order importance compared with the impacts of technical, social, economic and ecological changes. Given this fact, how feasible is it to perform assessments that incorporate mitigation and adaptation?
- Q5.3: What information and capabilities are needed for a satisfactory treatment of mitigation and adaptation, that were not present in the National Assessment?
- Q5.4: Is it feasible in future assessments to separate a consideration of adaptation responses from a consideration of mitigation responses?

Discussion Note 6:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Stakeholder Participation

The Global Change Research Act of 1990 says that the federal government "shall prepare and submit to the President and the Congress" an assessment of potential consequences of climate change for the United States, not just as a one-time exercise but as a continuing commitment. When the first such National Assessment was conceived early in 1997, Jerry Melillo laid out a dramatic vision of a strikingly new approach to environmental policy assessment in the United States, grounded in dialogues at the regional/local level between regional experts and regional stakeholders: farmers, ranchers, local business people, local government leaders, local interest groups, and citizens at large. Activated by regional workshops, this consultation would raise the level of awareness of local citizens of climate change issues, invite them to consider vulnerabilities to possible impacts, and then identify the major issues at the regional scale from the point of view of citizens and voters. Out of this democratic process of information exchange would come a picture of vulnerabilities of our country to impacts of climate change and variability – not merely as a function of scenarios or local climate change forecasts that could result simply in arguments about assumptions but as a strong, robust set of views from the grassroots across the country. Moreover, this would not be a one-time process. The regional workshops and subsequent regional assessments would catalyze the development of stakeholder networks that would support a continuing process of information exchange, education, and outreach related to climate change issues. In fact, it was thought, this approach might well serve as a model for addressing other thorny environmental policy issues in the United States in the future.

As the National Assessment moved along, this vision was complicated by a number of factors. A National Synthesis Team was added to the mix later in 1997, shifting toward a top-down assessment approach, creating tensions that came to a head at a national workshop in Monterey, CA, in mid-1998. Federal agencies supporting different aspects of the National Assessment provided significantly different levels of support and different marching orders regarding stakeholder involvement. Perhaps the most troublesome continuing issue, and one that continues to reverberate today, is that many of the stakeholder participants in the original workshops were persuaded to lend their time and legitimacy by a promise that their participation would be just the beginning of a long-term commitment and structure for involvement, linking regional and sectoral stakeholders with federal government deliberations. Within half a year, that commitment was in serious question; and, despite efforts by some assessment leaders and agency representatives, there has been very little follow-up beyond a few of the regions, such as the Middle Atlantic.

A number of proposals were developed to assure that the National Assessment public participation experience would be observed, recorded, and evaluated in a comprehensive manner, but no support was forthcoming; and that opportunity was missed, although key participants such

as Ann Fisher (Penn State); Phil Mote (University of Washington), Dennis Ojima (Colorado State), Barry Rock (New Hampshire), and Eileen Shea (East-West Center) have shared their experiences and views in informal ways. For instance, these assessment leaders report that in many cases, the scientists learned more from the stakeholders than the other way around. In fact, in a number of cases, stakeholders contributed not only to scoping and reviewing regional and sectoral assessments but also to the assessment process itself.

A quick reading of responses to the survey do not appear to support these impressions. For instance, nearly 40% of the respondents considered the stakeholder involvement questions to be "not relevant," saying that it had no effect. Fifty percent said that for their aspects of the assessment there were specific goals for stakeholder involvement, while 57 said there were not. Regarding how well the goals were met, 13 said very well, 19 moderately well, and 14 not well.

However, in interpreting these results, it is important to observe that almost half of the respondents were involved in the assessment as reviewers, rather than as participants. A careful reading of the comments of those respondents identified as heavy participants (as denoted by bold respondent numbers) suggest a much more consistent and positive evaluation of the value of non-expert stakeholder involvement.

The following questions warrant further consideration:

- Q6.1: How effective was stakeholder participation in the various regional and sectoral assessments, and what factors and/or practices accounted for that effectiveness?
- Q6.2: What were the impacts of stakeholder participation in those cases where it was effective, and what lessons can be learned from those experiences?
- Q6.3: What strategies might be considered to make stakeholder participation in future assessments an ongoing process rather than a series of one-time encounters? Would doing this lead to more informed or effective assessments? Why?

Discussion Note 7:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Communicating Results to the Public and to Policy Makers

The National Assessment process occurred over several years, with the publication of the regional, sectoral, and national reports viewed as major milestones. During and after the assessment process, the effort to communicate about the assessment *process* and *findings* (with implications about what those findings mean for individual and collective decisions) was substantial, from the perspective of prior scientific research and assessment activities. However, the assessment had ambitious goals for inclusiveness in the assessment process to conduct science in the service of society, relatively little effort went into communication to the public and policy makers from that perspective. In the survey, (Q8) respondents gave an average grade of C- for educating the U.S. public about climate change, and C for informing local, regional, and national decision makers about climate change. They assigned C to communicating costs and risks, and C- to communicating benefits. Grades were higher than these for 13 of the remaining 15 evaluation categories).

Several reasons have been posited as causing the de-emphasis on communication with the public and with policy makers:

- Meager communication resources were built into most of the assessment activities.
- Delays and complexities in the assessment research led to shifting some of the meager communication resources to assessing what the potential consequences of climate change might be for a particular region or sector, or for the nation.
- As scientists, the assessors are more comfortable communicating about their research with peers than with the public and decision makers.
- The politics of climate change discouraged assessors from communicating, both because controversy can be uncomfortable to address and because of concerns about jeopardizing future research support.
- After the effort of getting the report completed, participants ran out of time and money to engage in follow-on communication activities.

Yet respondents emphasized the need for more –and more effective– communication with the public and policy makers.

These considerations suggest several questions for discussion:

Q7.1: Beyond publishing and distributing an assessment report, to what extent is communicating with the public and policy makers about the findings of an assessment and appropriate part of an assessment?

Q7.2: If communicating with the public and/or policy makers is an important component of future assessments, how can future performance be improved?

Q7.3: Communication activities are expensive and time consuming. Resources for communication will always be limited. In light of that fact, what, if any, innovative strategies can be identified to improve communication effectiveness?

Discussion Note 8:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

The Organization Plan for the National Assessment

As an organizational enterprise and a coordinating process, the National Assessment was a momentous undertaking. Through its organizational design, the National Assessment combined highly structured synthesis objectives with extensive input by experts and stakeholder participants at the local and regional levels. It involved the participation of hundreds of individuals and organizations in the regional and sectoral activities. It provided access to public and private decision makers, resource and environmental managers, and the general public in an important national environmental policy debate. It promoted the use of advanced methods, models, and results in dozens of regional analyses and national sector studies. It produced the Overview and Foundation reports, which provided a summary of the regional and sector studies. It provided a process where these summaries were subject to substantial peer review and public comment.

Given all of the effort and output related to the National Assessment, it is only reasonable to consider whether the organizational plan facilitated or hampered its success. From its inception, a key objective of the National Assessment was "[t]o assure a fully open process" including "both public and private sector partners across the spectrum of stakeholder interests in the U.S."[3] In retrospect, this objective seems particularly ambitious in combination with the scope and other analytical dimensions of the National Assessment (e.g., long time horizon, uncertain outcomes, system interdependencies, etc.). Meeting this objective on a national scale for a far more short-term and better understood science and policy question than climate variability and change would be challenging enough. Nonetheless, the National Assessment, largely organized around dozens of workshops and regional efforts, did involve large numbers of experts and stakeholders and did produce an impressive number of reports.

Important in the formal organizational structure were the National Science and Technology Council (NSTC) and its subsidiary, the Committee on Environment and Natural Resources (CENR). A subcommittee of CENR, the Subcommittee on Global Change Research (SGCR), was charged with overall coordination, implementation, and sponsorship of the National Assessment process.

Other key organizational elements created for the process included:

The National Assessment Synthesis Team (NAST) which "provided overall intellectual oversight of the National Assessment process and had specific responsibility for the Synthesis Report, for defining national scenarios, for providing advice and oversight of the sectoral analyses, and for recommending guidelines for the regional analysis templates. The Synthesis Team was a

[3] A summary of the organizational plan can be found at: http://www.usgcrp.gov/usgcrp/nacc/background/organization/.

committee chartered under the Federal Advisory Committee Act with members drawn from government, academia, and the private sector;"

The National Assessment Working Group (NAWG) for Federal Agency Coordination, which "had lead-responsibility for organizing and sponsoring the regions and sectors. The Working Group had primary oversight and coordination responsibility for the regional analyses which were sponsored by individual agencies."

In addition, an Inter-Regional Forum consisting of the leaders of the regional assessments was created to help address issues that transcended individual regions, a Review Panel was established to oversee the review process for the Overview and Foundation reports, and a National Assessment Coordination Office was established for logistical support.

Answers from the survey respondents related to the "Strengths and Weaknesses of the Process" and "additional comments" suggest that there were positive and negative aspects of the organizational plan. Many respondents applauded the process for its emphasis on involving diverse participants and bringing experts and stakeholders together. Similarly, many respondents praised the broad scientific involvement. The organizational design apparently achieved the goal of opening up the process. Note, however, that although respondents' written comments implied that the process was refreshingly open, they also indicated that they had little opportunity to participate in the choice of questions addressed (49% none at all) or the choice of procedures used (50% none at all).

Regarding the negative remarks on organizational structure, many respondents pointed out tensions that apparently existed between NAST, NAWG, and the activities supporting the regional and sectoral studies. In particular, respondents raised concerns about the role of the Office of Science and Technology Policy (OSTP) and the extent to which the process had become captured by political influences. Others spoke of a process that was too "top down," "rushed," poorly funded, and lacking in meaningful direction. In some cases, respondents recommended that the process should have been organized along the lines of the IPCC and NAS organizational models. These negative views, however, did not lead to overly negative ratings on the "Organization and Administration" question where only 4-6% of respondents rated any aspect of this category "poor" while 15-25% rated these aspects "excellent."

Q8.1: What large tradeoffs were involved by combining an open process with credible scientific analysis? Did the design force front-end direction on scenario analysis and methods to ensure that an open process could meet product and timing objectives? Is there an organizational structure that could address these tradeoffs more effectively?

Q8.2: How effective was the NAWG in organizing and sponsoring the regions and sectors? How might this process be improved in a future National Assessment?

Q8.3: How did the peer review process interact with the organization design? Did it help overcome problems caused by other components/features of the design?

Q8.4: Has the design helped or limited the process for learning from the experience? How is it contributing to continuity of the efforts or application to other large-scale assessments?

Discussion Note 9:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

The Purpose(s) of Assessment

Assessments can be undertaken for a variety of reasons, and to serve a variety of objectives. Broadly these might be characterized as:

1. Developing improved insight and understanding about impacts and what might be done to prevent them or adapt to them.
2. Educating and informing participants who are not familiar with possible changes, impacts, and responses.
3. Engaging, motivating and organizing constituencies to take actions. Actions can range from inducing improved private sector anticipatory decision making to promoting political action at a variety of levels.
4. Persuading people that the climate problem is being taken seriously.
5. Advancing the state of the assessment art in order to develop and demonstrate new and useful tools and approaches.

Motivations 1, 2 and 3 were quite explicitly motivations for the National Assessment. Motivation 4 probably was also important, though not explicitly stated. Motivation 5 was not an objective of the National Assessment but it has been a prime consideration in assessment work supported by NSF, DoE, NOAA and others.

Assessments can focus at a variety of different levels or scales such as national *versus* regional/sectoral. The National Assessment attempted to build up a national picture from a number of regional/sectoral assessments to construct a National Assessment.

In the survey administered to people who had some involvement with the National Assessment, respondents were asked to identify the relative weighting that they believe was and should be given to the objectives:

Assess – provide the most technically complete and accurate description of the likely impacts of climate change that is currently possible.
Teach – educate the participants in the assessment process about the science of climate change and its possible impacts.
Involve – involve as many people as possible in thinking about and urging that appropriate actions be taken in connection with climate change.

These categories correspond roughly to motivations 1-3 above.

Average results suggest that respondents believe that a greater emphasis was and should be given to the *assess* objective (was: 47% and should: 43%) relative to those efforts given to *teach* (was: 27% and should: 28%) and to *involvement* (was: 26% and should: 28%). Average grades assigned in the grading portion of the survey provide some indication of how well respondents believed the National Assessment did in dealing with specific tasks that fall in these broad areas:

Issue Evaluated	Average Grades on Associated Questions
Assessing (learning)	C+, B-, C, C, B-, B-, C, C+, B-, B-, C+, B-
Education (teaching) / Informing (communications)	B-, C-, C, C, C, C-
Engagement (involve)	B, B

In the National Assessment, many of the significant decisions about which questions to ask were made at a central, national level, and most of the significant decisions about methods and procedures of investigation were made centrally in order to maximize the opportunity for synthesis at the end of the process. There was some opportunity for regionally and sectorally specific questions to enter the process through workshops and the stakeholder networks established through funding from the federal agencies. Between 60-65% of the survey respondents reported that they had no or very little input into either the questions being asked or the methods used to address them. Approximately 25% reported a great deal or substantial amount of input into these issues.

There are obviously other ways in which future assessments could be conducted. For example:

With respect to problem focus:

- use a process that employs surveys, polling or similar methods to determine a broadly supported group of national or regional or sectoral questions;
- use a process in which national or regional or sectoral questions emerge during the course of a deliberative process among those actually performing the analysis;

With respect to performance of the analysis:

- settle for less than state-of-the-art assessment in the interests of wide stakeholder involvement in the performance of the analysis;
- have expert teams provide state-of-the-art analytical support for groups of stakeholders;
- have a small group of either national or regional experts perform state-of-the-art assessment after obtaining general guidance from stakeholders.

The above considerations led to the following questions for discussion:

Q9.1: If another assessment is done at the national level, what options for participation in the choice of questions and methods of analysis should be considered? If the focus is regional or sectoral are the same options equally relevant?

Q9.2: If they are not actually involved in grappling with the assessment through a deliberative process, can stakeholders be expected to identify a reasonably informed set of questions and issues? What advantages, if any, might their lack of involvement in the deliberative process hold?

Q9.3: What should be the role of the community of expert analysts and assessors in the performance of national and regional assessments? How feasible is it to combine objectives 1-4 with objective 5 of advancing the state of the assessment art? If they are not at least partly combined, how can we be sure that the expert community will address the right set of research questions?

Q9.4: In the space of inve-assess-teach, what should be the balance of objectives in regional and sectora assessments? Are there other objectives, which are not adequately captured by this characterization?

Discussion Note 10:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

National *versus* Regional Assessment

In discussions of the strategic plan for the U.S. Climate Change Science Program in late 2002 and early 2003, a central issue was whether impact assessments at a regional scale in the United States can be carried out scientifically enough to be worthwhile. Some reviewers of the draft strategic plan within the administration argued that, at the current state of the art, such regional assessments cannot be done scientifically; the uncertainties are simply too great. Other reviewers and participants in the discussion cited the experience of the National Assessment as clear evidence to the contrary. Their view, in fact, is that at least several of the regional assessments represented a very high standard of analysis, equivalent in their overall scientific quality to the best impact assessments taking place at a global scale. Even though not all regional assessments rose to this standard, these cases (where agency support was sufficient and regional leadership was strong) are strong evidence that regional assessments can be both valid and highly useful, not just in a hypothetical future but now.

In the survey of National Assessment participants, of the 136 individuals responding to a request to evaluate the performance of the National Assessment in assessing regional impacts, 53% graded it A or B, and 86% graded it A, B, or C. Sixty-six percent judged the products of the assessment to be scientifically defensible and persuasive. This collective judgment seems to suggest that dismissing regional-scale assessment as scientifically premature is not easily supportable.

The Survey also raised the question of whether the country would be better served in the future by:

a) reforming the centrally designed and coordinated but regionally/sectorally executed approach adopted by the National Assessment; or
b) encouraging (and funding) a number of regionally/sectorally conceived and organized assessments with the federal government serving a supporting but not coordinating role.

The potential advantages of a centrally designed and coordinated assessment are straightforward. At least in principle, such an approach facilitates at least the following:

- comparability and quantitative integration of the regional and sectoral analyses;
- economies of scale in assembling some of the basic data sets (e.g., GCM runs);
- engagement of national level decision makers;
- learning across regions/sectors.

The potential advantages of encouraging interested regions/sectors to design their own assessments are equally clear:

- the assessment design will more easily respond to the goals and objectives of "local" stakeholders;

- less likelihood that the assessment will be seen to be under the control of particular national leaders or powers;
- more likelihood that individuals trusted and respected by those in the region will be involved and listened to, rather than have their authority undermined by "national" experts;
- less chance that weaknesses in the assessment of one region/sector would "pull down" the perceived quality and clout of the whole assessment.

The survey results can be read as arguing strongly that in the real world, the benefits of a "bottom-up," regionally/sectorally driven process are substantially greater than those of the top-down process that the National Assessment was perceived by many to be. It is worth considering that the next round of efforts to improve the country's capacity to deal with the risks of climate change and variability should therefore be shaped by the regions and sectors, and supported but not directed or coordinated by the federal government.

By far the greatest success of the National Assessment, as perceived by the greatest number of respondents to the Survey was the National Assessment's strategic commitment to a bottom-up, regionally/sectorally centered approach open to a wide variety of stakeholders. Many respondents believe that the National Assessment in practice fell far short of realizing the potential of the "bottom up" approach. They bemoan the failure to actually listen to local stakeholders – especially when those stakeholders did not talk in the language of the universities and national labs. They cite too much influence by OSTP and the NAST – an influence not justified by an understanding of the local needs and realities that stakeholders most wanted to address. They complain about the dominance of the assessment process by global climate models and modelers – despite the inability of those "universal" experts to provide the kind, resolution or quality of information wanted by the regional groups.

Many of these same critics nonetheless praise the National Assessment as a needed and partially successful first attempt to get a bottoms-up, stakeholder driven effort to address vulnerability and adaptation. The survey did not ask respondents specific questions about regional/sectoral versus national assessment. But respondent's comments on a number of other questions suggest that many of them would agree that the ideal federal role in a "next" National Assessment would be to set aside its desire to coordinate and centralize and instead:

- provide core funding to regional/sectoral groups that would help those groups to conduct assessments of impacts, vulnerabilities, and options most relevant to them (note that these grants could be competitive, to get around the problem of inadequate quality, and could have a matching fund requirement to assure that local congressmen, governments and businesses really took them seriously);
- provide decision support for such regionally driven assessments, including giving them the ability to "order" a limited number of analyses or forecasts drawn from national resources (such as the GFDL, NCAR and GISS climate models; paleo data sets, etc.);
- encourage university and national lab scientists from around the country, as an obligation entailed in their receipt of federal funds for climate-related research, to make their expertise available (within reasonable limits) to assist such regional or

sectoral efforts, especially in regions or sectors that do not have "local" access to top expertise in some of the relevant research areas;

- provide or facilitate a national "synthesis" function, to draw together results from regional/sectoral assessments, not so much as "summations" across impact categories (which, due to the bottom-up approach, would not be consistent) but rather as critical discussions and comparisons of the findings of the individual efforts, together with the evaluation of the implications of those efforts for *national* action and research programs.

Such a bottom-up approach would recognize that the most important contribution of National Assessment-like activities may come through the process of engagement rather than any national "bottom line," and that the nation would therefore benefit from fomenting a large number of such dialogues. It would acknowledge that we don't know how to do good assessments of local impacts, vulnerability and adaptation, and would maximize the variety of experiments underway to do such assessments more effectively. It would utilize the work of the IPCC, NRC, and national GCMs for what they are best at, but would not presume that those institutions and models could possibly be attuned to the varied conditions and needs of particular local and sectoral constituencies. It would have a reasonable chance of side-stepping the divisive national and international political rhetoric on climate change, and focus scarce human and financial resources on "coalitions of the willing" who felt it worthwhile to explore making themselves less vulnerable to the risks of climate change, and more able to take advantage of any changes that do develop. The Survey results suggest that a true bottom-up approach would be worthy and logical successor to the pioneering efforts of the first National Assessment.

Questions for discussion include:

Q10.1: What is the feasibility of performing scientifically valid impact assessments at a regional scale? What are the most serious scientific challenges in regional and sectoral impact assessment, and how might these challenges be better met in future assessments?

Q10.2: Should future U.S. Assessment effort shift from a national focus to a bottom-up regional and sectoral focus as this discussion note has proposed? Why or why not?

Q10.3: How should regional and sectoral assessments be organized and funded? Who should be in charge? Who should foot the bill?

Discussion Note 11:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Training Assessors

One of the great strengths of the National Assessment reflected in the Survey was its success in bringing many individuals for the first time into a complex, interdisciplinary, problem-driven assessment. A substantial majority of those responding to the survey speak positively of the wisdom and dedication of the people they met working on the National Assessment. A few refer to the National Assessment as a life-changing experience.

That said, there is also a thread of what can only be called disdain running through a significant number of the Survey responses. Most of these are from natural scientists –especially climatologists– who are dismissive of the ignorance (of climatology, presumably) of many of those they had to deal with in the National Assessment. From the other side, some practitioners appear to make a blanket dismissal of the irrelevance of "academic" science (and, presumably, scientists). And a number of both academics and practitioners pound on the leaders of the National Assessment for making what are seen as compromises that "inappropriately" allowed the assessment to be too much of a compromise, too much of a mix of facts and values. Some of this criticism is doubtless justified. However, it's worth emphasizing that such criticisms are a minority view among the Survey respondents. Nonetheless, the minority is not so small that it can be safely ignored, and it represents a kind of response to assessments that is bound to resurface in future efforts to harness science in support of decisions bearing on global change. Understanding where the complaints come from, and what might be done to reduce them, therefore seems worthwhile.

Perhaps future efforts, such as the National Assessment, might do well to spend a bit more time training the assessors about what it means to do a complex, interdisciplinary, problem-driven assessment. Such assessments –especially when undertaken on a politically charged topic– are extraordinarily difficult to do well. They need to combine formal results from very sophisticated global research programs, with tacit knowledge drawn from experience in particular sectors and places. They need to do so in ways that respond to but are not derailed by stakeholders involved in a vigorous and high stakes political debate. In this case, as in most such cases, the whole exercise was made more difficult by acute constraints of time and money that undermined prospects for learning-while-doing.

No country has a good track record in carrying out such assessments, though the Canadians, Australians and some European countries are far ahead of the United States in trying to learn to do so. The result is that many of the respondents to the survey clearly misunderstood the nature of the "play" in which they had been asked to adopt supporting roles. This is less their fault, than the fault of the "directors" who clearly did not manage to convey to these disaffected individuals their vision of what the "play" was trying to accomplish, and how the various roles had to support one another if the overall production was going to be a success.

With the benefit of hindsight, it might have been worthwhile to spend more time getting buy-in on the goals of the assessment, and the multiple parts that had to work together and support one another if the goals were to be achieved. Perhaps the best way to do this is by teaching from a critical analysis of other relatively successful assessments. Past efforts to do this at Harvard's Kennedy School appear to have succeeded in getting across the message that successful assessments are not just about credibility, but also about *saliency* (i.e., relevance to decision) and *legitimacy* (i.e., fairness of process in hearing all sides and stakeholders in both the set up of questions and the analysis of data). Most successful assessments of hot issues succeed not by optimizing on one of these dimensions, but by balancing across them so as to create an assessment process and product that is seen to be credible and salient and legitimate by multiple stakeholders simultaneously. As hard as this dynamic balance is to accomplish in practice, the Survey results suggest that a goodly number of those involved in the National Assessment did not even see it as something that needed to be tried.

One thing such a short-course would need to discuss is the question of what kind of an organization should host an assessment like the National Assessment. A significant number of the respondents to the survey appear pretty certain that a better National Assessment would have to be better insulated from political intervention and direction than the first National Assessment appeared to them to be. This is surely true. But, that those respondents could casually suggest that credibility maximizers such as NSF or even NRC would "solve" the problem only illustrates how narrow and historically uninformed initial views on this important topic are likely to be.

The following are among the questions that should be discussed:

Q11.1: Should future assessments use training courses for the assessors that use the critical analysis and discussion of historical examples to develop a shared vision of what a given assessment is trying to accomplish, of who needs to avoid upstaging whom if it is to work, and what kinds of pitfalls are likely to derail things, and of what kinds of processes and tricks have been used by others to achieve effective outcomes?

Q11.2: How important are these process issues as compared with developing an understanding of the state of specific science or of analytical tools?

Q11.3: Many participants in the National Assessment found it difficult to remember that climate is not the only thing that will change over the course of coming decades? Are there training strategies that could be effective in helping participants develop a stronger sense of the "climate problem" as embedded in a much broader process of social, technical, economic, and ecological change?

Discussion Note 12:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Politics and Assessment

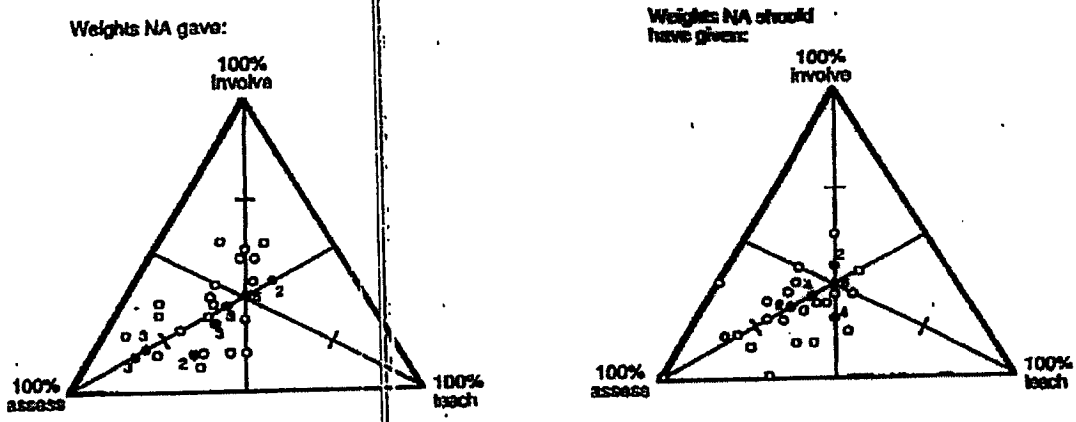
Given the history of the issue of climate change, it is inevitable that any national or regional assessment activity supported by government will have, or at least be perceived by some to have, significant political overtones.

The National Assessment was certainly no exception. Whatever the reality, there was the wide perception that the assessment was motivated in significant part by the presidential ambitions of Vice President Al Gore, and that the substantial focus on outreach and broad citizen involvement was part of a deliberate strategy by the Vice President's office to build a wider community of concern and a political ground swell of support for what might have been the climate policy of a subsequent Gore Administration.

Because it was done in something of a rush, and perhaps too because it might have been difficult to get a budget appropriation specifically for the assessment (even though it was mandated by a previous Congress), the assessment was largely funded by directing various Executive Branch agencies to take responsibility for the assessment of specific regions and/or sectors. Since Executive Branch agencies have their own agendas, some have argued that this administrative mechanism resulted in differing pressures and influences on different parts of the assessment. At the same time, some staff in the agencies have suggested in private that they came under considerable pressure from the Administration to shape parts of the assessment in specific ways.

Because outreach and involvement played a relatively large role in the activities of the assessment, in the evaluative survey administered to assessment participants, we asked respondents to both indicate what they thought the balance actually was, and what it should have been, between the three objectives of "assess," "teach," and "involve" (see page 56 of the summary of survey responses). The questions were posed by asking respondents to allocate 100 points across the three objectives. While individual respondents displayed some differences in their judgments between what they think occurred, and what they think should have occurred, overall the differences between the two sets of responses were negligible.

This is clearly indicated by plots of the responses of the first 50 respondents, reproduced below (solid dots with numbers indicate multiple responses):



However, believing that an Assessment should have a significant element of "teach" and "involve" is not the same as agreeing that it should advance any specific political agenda.

In the workshop discussions, it would be useful for participants to explore the following questions:

Q12.1: Are their alternative administrative and funding mechanisms for a National Assessment that could be used to reduce the perception and/or reality of a political agenda in the assessment process?

Q12.2: Do the potential advantages of wide involvement by Executive Branch Agencies, with the substantial expertise they can bring to bear, outweigh the actual or perceived risks of Agency agenda bias in the assessment process?

Virtually all major decisions by individuals (whether to: get married; buy a house; have kids; take a job; etc.) and societies (whether to: privatize a public service; subsidize a desired activity; go to war, etc.) are made as a leap of faith in the face of large and irreducible uncertainties. On this basis, one might argue that the objective of balanced, impartial, assessment is unrealistic, and not worth pursuing.

Q12.3: Does it make sense to strive for balanced, impartial, assessment even if that objective can never be perfectly achieved? Alternatively, should one abandon the search of objectivity and treat assessment as an inherently political process?

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Comments:

National Assessment Workshop materials

Hi Phil,

Kathie said that you need a copy.

Best regards.

Dave

Copies to
Jan Peel
Bryan Hannegan
me

Number of pages: 31

Background Materials for the Workshop

Learning from the National Assessment

AAAS Building, 1200 New York Avenue, NW
Washington, DC

April 29, 2004

Contents:

Members of the Workshop Planning Committee: Robin Cantor, Bill Clark, Ann Fisher, Jake Jacoby, Tony Janetos, Ann Kinzig, Jerry Melillo, Granger Morgan (chair), Roger Street, and Tom Wilbanks.

Supported by NSF Cooperative Agreement SBR-9521914.

April 29, 2004

Workshop Agenda
Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

8:00 Registration

Coffee, tea and light breakfast snacks

8:30 Welcome and an explanation of the workshop's objectives – G. Morgan

8:40 Questions and Discussion

8:50 The National Assessment: An overview of the process – T. Janetos

9:10 The National Assessment: A view from the trenches – A. Fisher

9:20 Questions and Discussion

9:35 The survey of folks involved with the National Assessment – G. Morgan

9:45 Questions and Discussion

10:00 Break

10:15 Framing the first Working Group Sessions on "Performing the Assessment" -- G. Morgan

10:30 Break into working groups

Group A: Assessment Methods – S. Schneider, chair

Relevant Discussion Notes: 1,2,3,4

Group B: Social Issues -- T. Wilbanks, chair

Relevant Discussion Notes: 2,4,5,6

Group C: Stakeholders and Communication – K. Jacobs, chair

Relevant Discussion Notes: 2,5,6,7

12:00 Breakout reports followed by Questions and Discussion

12:45 Working Lunch

April 29, 2004

Workshop Agenda – Learning from the National Assessment

1:00 Framing the second Working Group Sessions on "Evaluating the Assessment and Improving Next Time" – G. Morgan

1:15 Break into working groups

Group D: Purpose(s) of Assessment – B. Fischhoff, chair

Relevant Discussion Notes: 9,10,12

Group E: Organizing and Managing Future Assessments – B. Clark, chair

Relevant Discussion Notes: 8,10,11,12

Group F: Performing Assessment in an (Inevitably) Political Setting – R. Cantor, chair

Relevant Discussion Notes: 9,10,12

2:45 Breakout reports followed by Questions and Discussion

3:45 Break

4:00 Panel: What have we learned? - G. Morgan (chair), J. Jacoby, S. Kane, A. Kinzig, J. Mahoney (?), and R. Street

5:00 End of Workshop

Discussion Notes Prepared for the Workshop: Learning from the National Assessment AAAS Building, 1200 New York Avenue, NW Washington, DC

April 29, 2004

Discussion Note 1:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Choosing Possible Future Climates for Examination

Officially, the National Assessment adopted three strategies for characterizing possible future climates to be considered (see page 14 of the National Synthesis Report):

- Historical records of past climate variability and change;
- Scenario analysis using large-scale general circulation models (GCMs); and
- Sensitivity analysis that asks, "what degree of climate change would cause significant impacts to natural and human systems" of interest?

Responses to the survey of National Assessment participants suggest that all three approaches were used (see page 29 of the summary of survey responses[1]):

57% GCMs.
45% data on past climates.
44% "what if" analysis.
7% Other.
23% Not relevant to my involvement.

However, many observers would argue that two GCM runs, based on a single emissions scenario (the IPCC scenario IS92a) predominated as the vehicle used to explore possible future climate in the National Assessment. This impression is reinforced by an examination of the reports of the National Synthesis Team and a reading of the detailed responses to the participant survey (see pages 29 to 39 of the summary of survey responses).

There have been complaints about the specific GCM models used, and the fact that only one emission scenario was employed to drive those models. MacCracken et al. (2003) have responded arguing that these limitations have been exaggerated.

However, the question of whether the right GCMs were used, and whether they were driven by the right emissions scenario(s), is of second order importance compared with the more fundamental question of how an appropriate range of future climates should be identified and explored in national and regional assessments.

While they suffer from known, and probably unknown, limitations, do a poor job of modeling many details of regional climate and of estimating key variables such as precipitation, GCMs produce spatially consistent and visually compelling graphical output. Further, there is a large community of modelers heavily invested in their development and use. For these, and probably other reasons, there are strong pressures to use GCM outputs as the basis for climate impact assessments.

[1]Since more than one answer was allowed, these results sum to slightly more than 100%.

It is clear from the detailed survey responses that many participants in the National Assessment viewed the range of outputs from GCMs as providing a reasonable indication of the range of uncertainty about future climate. Even given outputs from a much wider set of GCM's, and a range of alternative emissions scenarios, this is unlikely to be true since the results would share assumptions and parameterizations that might be inadequate.

It was because of such considerations that the National Synthesis Team identified *three* different strategies for exploring future climate. In the event, however, the two strategies that do not depend on GCM's appear to have received relatively little attention. There was a strong inclination in most groups to approach the problem in a front-to-back manner (emissions → climate → impacts), rather than, for example, identifying key thresholds or non-linearities in natural and social systems of concern and letting those drive the work of the climate scientists and the choices of climates to be examined.

The above considerations led to the following questions for discussion:

Q1.1: Is it in fact the case, as this discussion note has argued, that GCM output alone (even from a wider range of models and emissions scenarios) does not provide an adequate basis for exploring possible future climate, and associated vulnerabilities, in regional and national assessments?

Q1.2: Is it the case, as this discussion note has argued, that GCM-based climate scenarios were privileged over other possible strategies in the National Assessment, and are likely to be similarly privileged in future assessments, as a strategy for selecting climates to be examined? If this is so, why?

Q1.3: If the answer to questions Q1.1 and Q1.2 are yes, what might be done to assure that future climate assessments make much greater use of other methods for identifying or defining the climate futures whose impacts they will examine?

Reference:
Michael C. MacCracken, Eric J. Barron, David R. Easterling, Benjamin S. Felzer, and Thomas R. Karl, "Climate Change Scenarios for the U.S. National Assessment," *Bulletin of the American Meteorological Society*, pp.1711-1723, December, 2003.

Discussion Note 2:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Analysis of Social and Economic Impacts

While several teams involved in the National Assessment made extensive use of advanced analytical tools to model climate change (using the Canadian and Hadley GCMs), or to examine its likely large-scale ecological impacts (using models such as VEMAP and DISTRIB), the level of sophistication in analysis of social and economic impacts was considerably less sophisticated.

Population and economic projections were developed and distributed to all the assessment teams. Their use was uneven.

When asked to characterize the way in which their group dealt with social and economic impacts, those responding to the survey question provided the following responses.[2]

- 15% Dynamic social and/or economic models.
- 21% Projections from census and other data.
- 24% "what if" analysis.
- 8% Other.
- 43% Not relevant to my involvement.

There are a number of groups across the U.S. and around the world that have been building Integrated Assessment Models to study the climate problem. However, the National Synthesis Team concluded that given the limited time available, and the relatively limited experience of many participants in the assessment process, it was unrealistic to try to employ those models in the work of the assessment. Instead, as noted, a series of demographic and economic forecasts were commissioned and guidance was developed for the teams that suggested that they select one or two additional factors besides the demographic and economic scenarios which they judged would have the most direct effect on the impact of interest, and vary those factors through an uncertainty range they judged to be plausible (without spelling out the details of what social and other processes might lead to such changes). As the National Synthesis Report explains, "teams found the complexity of even this simplified approach challenging, and made limited use of it beyond the basic scenarios."

When asked, "did you ever see that guidance?" 21% of respondents said yes, 25% said no, and 54% did not respond. While most respondents apparently did not make use of this guidance, three-quarters of those who did try to follow the guidance reported that they considered the effort successful (63%) or partly successful (12%).

While there appears to be little agreement among respondents about how to improve the treatment of social and economic impacts in future assessments, almost 60% of respondents

[2]See page 39 of the summary of survey responses. Since more than one answer was allowed, these results sum to slightly more than 100%.

indicated that if another assessment were done, social and economic impacts should be handled differently from how they were handled in the part of the assessment in which they participated.

One important problem that first surfaced at the July 1998 workshop in Monterey, CA is the difficulty that many people appear to have in thinking about how socio-economic systems could evolve in the future. Many participants seemed intent on believing that the future would be pretty much like the present in all respects except for a changed climate. Other participants (mostly physical scientists) took the position that given the very high levels of uncertainty about socio-economic processes, there was no way to say anything at all that was useful more than a few years into the future. Under the circumstances, given the time constraints on the process, the assessment leadership concluded that they needed to shorten the time horizon on the socio-economic impact assessments.

The above considerations led to the following questions for discussion:

Q2.1: Was the National Assessment's treatment of socio-economic impacts inadequate? Note that despite the arguments outlined above, the grade given to the socio-economic impacts assessment by participants in the National Assessment (see page 53 of the summary of survey responses) is comparable to or only slightly lower than the grade given to other parts of the assessment.

Q2.2: Are there strategies that could be used to get non-expert participants more informed and comfortable in thinking about how social and economic systems might change over time periods of many decades?

Q2.3: What strategies might be adopted in future assessments to promote a more adequate and systematic treatment of possible socio-economic impacts? For example, are there ways to combine expert analysis, including the use of available integrated assessment models, with involvement by non-expert participants?

Discussion Note 3:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Analysis of Ecological Impacts

The National Assessment encouraged three general approaches to analyzing the potential impacts of climate variability and change on ecological systems:

- Consideration of past impacts attributed to climate variability and change;
- Exploration of possible future impacts in the context of scenarios based on linkages between general circulation models and ecological simulation models;
- Identification of ecological thresholds associated with climate variability and change, that when crossed, would lead to ecological consequences; some positive and some negative, some reversible and others not.

From its inception, the National Assessment sought to place climate variability and change in a "multiple stress" context, with an emphasis on how the context varied among regions and across sectors.

Responses to the survey of National Assessment participants suggest that the assessment of ecological impacts:

- was good (B-) overall;
- increased their familiarity with the subject – increased the % of participants in the top two categories of familiarity (very informed and expert) from 31% to 57%;
- but, did little to educate the general public about the subject.

Among the most important criticisms of the analysis of ecological impacts among participants and observers were:

- too much emphasis on the linked climate model-ecological model outputs;
- too much focus on the ecological effects of changes in mean climate conditions and not enough focus on the effects of changes in extreme events;
- limited success in placing the climate-change related impacts on ecosystems in the context of other stresses;
- poor connection between social and economic factors that govern phenomena such as land-cover and land-use change and ecological impacts.

A key issue with respect to overemphasis on the linked model outputs is the concern that the climate models cannot supply reliable information at the spatial and temporal scales needed for analyses of ecological impacts. The tension between the concepts of "predictions" *versus* "plausible alternative futures" is mixed into this concern.

Much of the discussion of extreme events and ecological impacts in the National Assessment was about past events or about general responses we might expect in the future. Little was done in the scenarios to incorporate regional and sub-regional climate extremes and so the ecological

analyses of extreme events were not represented in the outputs from the biogeochemistry and biogeography models used in the National Assessment.

The concept of global change includes, in addition to climate change, changes in land-cover and land-use, chemistry of the atmosphere and precipitation, and the deliberate and inadvertent redistribution of living organisms across the globe. While some knowledge is available on how these factors interact (sometimes synergistically and sometimes antagonistically), there will surely be many surprises. Appropriate representation of these interactions in an impacts assessment remains a challenge and must include a better way of dealing with the human dimensions of the problem.

Questions for discussion:

Q3.1: What role should quantitative, coupled (GCM, ecological and human dimensions) simulation modeling analyses play in any future assessments? Is this approach ready for "prime time" at various spatial scales – national, regional and sub-regional? If not, what alternative should be employed?

Q3.2: Does the science support a larger role for the concept of thresholds in future assessments of the ecological impacts of climate variability and change? Can we relate thresholds to rates as well as magnitudes of change?

Q3.3: Is there a way to consider the topic of ecological impacts of climate variability and change that will maximize our chances of meeting the combined goals of assessing, teaching and involving? For example, is this best done with a focus on "ecosystems services"; with a focus on the impacts on especially salient ecosystems and species; etc.?

Discussion Note 4:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Characterizing and Treating Uncertainty

Climate change and variability, and their impacts, inherently involve great uncertainty. So too do attempts to project how human societies are likely to change over coming decades. Thus, any national, regional, or sectoral assessment must deal in some way with uncertainty.

A reading of the various reports it produced by the National Assessment, as well as comments from several reviewers, suggest that the treatment of uncertainty was very uneven across the different groups involved in the National Assessment. This conclusion is supported by responses from assessment participants to the seventh section of the survey that asked about how each respondent's group dealt with uncertainty. Responses received broke down as follows (see page 46 of the summary of survey responses):

- 39% Not relevant to my involvement.
- 24% The group was not systematic, individual authors used the words they thought were best.
- 19% The group was somewhat systematic, in most cases our group had a qualitative discussion of which word to use as the text was edited.
- 5% The group was somewhat quantitative, our group assigned numerical probabilities to words and then individual authors used the words they thought were best.
- 8% The group was systematically quantitative, our group assigned numerical probabilities to words and then in most cases discussed which word to use as the text was edited.
- 5% Other.

Just under half of the survey respondents indicated that they were not aware of the effort made by the National Assessment Synthesis Team to assign numerical values to probability words and then use those words consistently throughout their report.

Documentation of what groups did was similarly diverse, and often very limited.

The reasons for this uneven treatment seem likely to include:

- Many assessment participants were new to this kind of activity and were unfamiliar both with the issues of thinking in a formal way about uncertainty or with analytical tools for dealing with uncertainty.
- Most respondents had no knowledge of the compelling evidence in experimental psychology that indicates that probability words (such as "likely" and "unlikely") can mean dramatically different things to different people, and to the same people in different contexts.
- No guidance document on how to deal with uncertainty (such as the one produced by Schneider and Moss for the IPCC) was distributed to participants in the National Assessment.

- The computer models used by some assessment teams did not lend themselves to probabilistic treatment or other forms of uncertainty analysis.
- So much time was spent on organizational and other issues that teams did not get around to thinking about issues of uncertainty until it was too late to do very much about it.

Whatever the reason, many observers believe that future assessments will need to adopt a more adequate and systematic characterization and treatment of uncertainty. This raises the following questions:

Q4.1: Was the characterization and treatment of uncertainty in the National Assessment in fact inadequate, or is a systematic treatment of uncertainty simply the esoteric and largely unimportant concern of expert analysts?

Q4.2: Are the objectives of wide involvement by non-experts, and the adequate characterization and treatment of uncertainty, inherently incompatible?

Q4.3: If not, what strategies might be adopted in future assessments to promote a more adequate and systematic treatment of uncertainty? For example, are there ways to combine expert analysis that deals systematically with uncertainty, with involvement by non-expert participants?

Discussion Note 5:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Mitigation and Adaptation

It is impossible to address possible impacts of climate change, positive or negative, without understanding the sensitivity of natural and human systems to such changes. Discussions of "vulnerability" and its more positive counterpart (i.e., potential synergies associated with changes) tend to emphasize three dimensions: exposure (the changes experienced, such as temperature or precipitation changes), sensitivity (the degree to which a system's performance is affected by such changes), and coping capacity (the degree to which a system can respond to changes in ways that reduce threats and enhance opportunities).

In general, the National Assessment made a strong start in identifying exposures to possible climate changes, at least in the longer run, and it took a somewhat weaker first cut at identifying sensitivities. Where it was weakest was in addressing responses to climate changes that might change the balance between opportunities and risks. In most cases where possible impacts were identified, a statement was simply added that adaptation to such impacts might be possible, although the feasibility and costs of such adaptations was not generally considered. As a result, it is impossible to evaluate, based on the content of the National Assessment, the degree to which possible exposures might be reduced by climate change *mitigation* (reductions in forcing) and/or the degree to which risks associated with such exposures might be reduced through *adaptation*. Since humans can be expected not to sit idly by in the face of significant climate change, this is a significant limitation in the results of the National Assessment.

There were two principal reasons for this gap. First, although mitigation is the response most prominently explored in many global climate change policy discussions, leaders of the National Assessment were instructed to avoid any connection with mitigation issues, which were viewed as too political at the time, even though some of the U.S. regions (especially the Appalachians) were seriously concerned about regional impacts of mitigation policy directions. Second, participants in the National Assessment found that too little is known about adaptation strategies, costs, and potentials to systematically assess the relative merits of alternative response strategies.

The assessment of mitigation and adaptation strategies require substantial technical and economic knowledge and analysis. Since the National Assessment did not address these matters, such skills were not very present among the folks who participated.

Survey responses suggest that many of those involved in the National Assessment concluded that the lack of consideration of mitigation and adaptation was a serious limitation.

Results reported on page 63 of the summary of responses read as follows:

There are a number of things the assessment did not try to do but might have. If the country wer do it again, which, if any, of these should be included as objectives?

Strategies for reducing greenhouse gas emissions.
16%na

strong "no" strong "yes"
15---16---19---42---52
9%- -9%--11%- 25%-30%

Identification of climate-related "market opportunities" for business.
18%na

strong "no" strong "yes"
11---28---26---44---34
6%--16%--15%- 25%-20%

Putting this issue in context when compared with other problems facing our communities and the nation.
19%na

strong "no" strong "yes"
10---12---26---47---45
6%-- 7%--15%- 27%- 26%

An examination of the comments listed on pages 66-95 also reveal a number of participants who saw this absence as a serious problem.

Several questions arise:

- Q5.1: In what ways should possible and/or likely responses to climate change be incorporated in future national, regional, and sectoral assessments?
- Q5.2: Over coming decades, climate will not be the only thing that changes. In so cases the impacts of climate change will be of second order importance compared with the impacts of technical, social, economic and ecological changes. Given this fact, how feasible is it to perform assessments that incorporate mitigation and adaptation?
- Q5.3: What information and capabilities are needed for a satisfactory treatment of mitigation and adaptation, that were not present in the National Assessment?
- Q5.4: Is it feasible in future assessments to separate a consideration of adaptation responses from a consideration of mitigation responses?

Discussion Note 6:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
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Stakeholder Participation

The Global Change Research Act of 1990 says that the federal government "shall prepare and submit to the President and the Congress" an assessment of potential consequences of climate change for the United States, not just as a one-time exercise but as a continuing commitment. When the first such National Assessment was conceived early in 1997, Jerry Melillo laid out a dramatic vision of a strikingly new approach to environmental policy assessment in the United States, grounded in dialogues at the regional/local level between regional experts and regional stakeholders: farmers, ranchers, local business people, local government leaders, local interest groups, and citizens at large. Activated by regional workshops, this consultation would raise the level of awareness of local citizens of climate change issues, invite them to consider vulnerabilities to possible impacts, and then identify the major issues at the regional scale from the point of view of citizens and voters. Out of this democratic process of information exchange would come a picture of vulnerabilities of our country to impacts of climate change and variability -- not merely as a function of scenarios or local climate change forecasts that could result simply in arguments about assumptions but as a strong, robust set of views from the grassroots across the country. Moreover, this would not be a one-time process. The regional workshops and subsequent regional assessments would catalyze the development of stakeholder networks that would support a continuing process of information exchange, education, and outreach related to climate change issues. In fact, it was thought, this approach might well serve as a model for addressing other thorny environmental policy issues in the United States in the future.

As the National Assessment moved along, this vision was complicated by a number of factors. A National Synthesis Team was added to the mix later in 1997, shifting toward a top-down assessment approach, creating tensions that came to a head at a national workshop in Monterey, CA, in mid-1998. Federal agencies supporting different aspects of the National Assessment provided significantly different levels of support and different marching orders regarding stakeholder involvement. Perhaps the most troublesome continuing issue, and one that continues to reverberate today, is that many of the stakeholder participants in the original workshops were persuaded to lend their time and legitimacy by a promise that their participation would be just the beginning of a long-term commitment and structure for involvement, linking regional and sectoral stakeholders with federal government deliberations. Within half a year, that commitment was in serious question; and, despite efforts by some assessment leaders and agency representatives, there has been very little follow-up beyond a few of the regions, such as the Middle Atlantic.

A number of proposals were developed to assure that the National Assessment public participation experience would be observed, recorded, and evaluated in a comprehensive manner, but no support was forthcoming; and that opportunity was missed, although key participants such

as Ann Fisher (Penn State); Phil Mote (University of Washington), Dennis Ojima (Colorado State), Barry Rock (New Hampshire), and Eileen Shea (East-West Center) have shared their experiences and views in informal ways. For instance, these assessment leaders report that in many cases, the scientists learned more from the stakeholders than the other way around. In fact, in a number of cases, stakeholders contributed not only to scoping and reviewing regional and sectoral assessments but also to the assessment process itself.

A quick reading of responses to the survey do not appear to support these impressions. For instance, nearly 40% of the respondents considered the stakeholder involvement questions to be "not relevant," saying that it had no effect. Fifty percent said that for their aspects of the assessment there were specific goals for stakeholder involvement, while 57 said there were not. Regarding how well the goals were met, 13 said very well, 19 moderately well, and 14 not well.

However, in interpreting these results, it is important to observe that almost half of the respondents were involved in the assessment as reviewers, rather than as participants. A careful reading of the comments of those respondents identified as heavy participants (as denoted by bold respondent numbers) suggest a much more consistent and positive evaluation of the value of non-expert stakeholder involvement.

The following questions warrant further consideration:

- Q6.1: How effective was stakeholder participation in the various regional and sectoral assessments, and what factors and/or practices accounted for that effectiveness?
- Q6.2: What were the impacts of stakeholder participation in those cases where it was effective, and what lessons can be learned from those experiences?
- Q6.3: What strategies might be considered to make stakeholder participation in future assessments an ongoing process rather than a series of one-time encounters? Would doing this lead to more informed or effective assessments? Why?

Discussion Note 7:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
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Communicating Results to the Public and to Policy Makers

The National Assessment process occurred over several years, with the publication of the regional, sectoral, and national reports viewed as major milestones. During and after the assessment process, the effort to communicate about the assessment *process* and *findings* (with implications about what those findings mean for individual and collective decisions) was substantial, from the perspective of prior scientific research and assessment activities. However, the assessment had ambitious goals for inclusiveness in the assessment process to conduct science in the service of society, relatively little effort went into communication to the public and policy makers from that perspective. In the survey, (Q8) respondents gave an average grade of C- for educating the U.S. public about climate change, and C for informing local, regional, and national decision makers about climate change. They assigned C to communicating costs and risks, and C- to communicating benefits. Grades were higher than these for 13 of the remaining 15 evaluation categories).

Several reasons have been posited as causing the de-emphasis on communication with the public and with policy makers:

- Meager communication resources were built into most of the assessment activities.
- Delays and complexities in the assessment research led to shifting some of the meager communication resources to assessing what the potential consequences of climate change might be for a particular region or sector, or for the nation.
- As scientists, the assessors are more comfortable communicating about their research with peers than with the public and decision makers.
- The politics of climate change discouraged assessors from communicating, both because controversy can be uncomfortable to address and because of concerns about jeopardizing future research support.
- After the effort of getting the report completed, participants ran out of time and money to engage in follow-on communication activities.

Yet respondents emphasized the need for more –and more effective– communication with the public and policy makers.

These considerations suggest several questions for discussion:

Q7.1: Beyond publishing and distributing an assessment report, to what extent is communicating with the public and policy makers about the findings of an assessment and appropriate part of an assessment?

Q7.2: If communicating with the public and/or policy makers is an important component of future assessments, how can future performance be improved?

Q7.3: Communication activities are expensive and time consuming. Resources for communication will always be limited. In light of that fact, what, if any, innovative strategies can be identified to improve communication effectiveness?

Discussion Note 8:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

The Organization Plan for the National Assessment

As an organizational enterprise and a coordinating process, the National Assessment was a momentous undertaking. Through its organizational design, the National Assessment combined highly structured synthesis objectives with extensive input by experts and stakeholder participants at the local and regional levels. It involved the participation of hundreds of individuals and organizations in the regional and sectoral activities. It provided access to public and private decision makers, resource and environmental managers, and the general public in an important national environmental policy debate. It promoted the use of advanced methods, models, and results in dozens of regional analyses and national sector studies. It produced the Overview and Foundation reports, which provided a summary of the regional and sector studies. It provided a process where these summaries were subject to substantial peer review and public comment.

Given all of the effort and output related to the National Assessment, it is only reasonable to consider whether the organizational plan facilitated or hampered its success. From its inception, a key objective of the National Assessment was "[t]o assure a fully open process" including "both public and private sector partners across the spectrum of stakeholder interests in the U.S."[3] In retrospect, this objective seems particularly ambitious in combination with the scope and other analytical dimensions of the National Assessment (e.g., long time horizon, uncertain outcomes, system interdependencies, etc.). Meeting this objective on a national scale for a far more short-term and better understood science and policy question than climate variability and change would be challenging enough. Nonetheless, the National Assessment, largely organized around dozens of workshops and regional efforts, did involve large numbers of experts and stakeholders and did produce an impressive number of reports.

Important in the formal organizational structure were the National Science and Technology Council (NSTC) and its subsidiary, the Committee on Environment and Natural Resources (CENR). A subcommittee of CENR, the Subcommittee on Global Change Research (SGCR), was charged with overall coordination, implementation, and sponsorship of the National Assessment process.

Other key organizational elements created for the process included:

The National Assessment Synthesis Team (NAST) which "provided overall intellectual oversight of the National Assessment process and had specific responsibility for the Synthesis Report, for defining national scenarios, for providing advice and oversight of the sectoral analyses, and for recommending guidelines for the regional analysis templates. The Synthesis Team was a

[3] A summary of the organizational plan can be found at: http://www.usgcrp.gov/usgcrp/nacc/background/organization/.

committee chartered under the Federal Advisory Committee Act with members drawn from government, academia, and the private sector;"

The National Assessment Working Group (NAWG) for Federal Agency Coordination, which "had lead-responsibility for organizing and sponsoring the regions and sectors. The Working Group had primary oversight and coordination responsibility for the regional analyses which were sponsored by individual agencies."

In addition, an Inter-Regional Forum consisting of the leaders of the regional assessments was created to help address issues that transcended individual regions, a Review Panel was established to oversee the review process for the Overview and Foundation reports, and a National Assessment Coordination Office was established for logistical support.

Answers from the survey respondents related to the "Strengths and Weaknesses of the Process" and "additional comments" suggest that there were positive and negative aspects of the organizational plan. Many respondents applauded the process for its emphasis on involving diverse participants and bringing experts and stakeholders together. Similarly, many respondents praised the broad scientific involvement. The organizational design apparently achieved the goal of opening up the process. Note, however, that although respondents' written comments implied that the process was refreshingly open, they also indicated that they had little opportunity to participate in the choice of questions addressed (49% none at all) or the choice of procedures used (50% none at all).

Regarding the negative remarks on organizational structure, many respondents pointed out tensions that apparently existed between NAST, NAWG, and the activities supporting the regional and sectoral studies. In particular, respondents raised concerns about the role of the Office of Science and Technology Policy (OSTP) and the extent to which the process had become captured by political influences. Others spoke of a process that was too "top down," "rushed," poorly funded, and lacking in meaningful direction. In some cases, respondents recommended that the process should have been organized along the lines of the IPCC and NAS organizational models. These negative views, however, did not lead to overly negative ratings on the "Organization and Administration" question where only 4-6% of respondents rated any aspect of this category "poor" while 15-25% rated these aspects "excellent."

Q8.1: What large tradeoffs were involved by combining an open process with credible scientific analysis? Did the design force front-end direction on scenario analysis and methods to ensure that an open process could meet product and timing objectives? Is there an organizational structure that could address these tradeoffs more effectively?

Q8.2: How effective was the NAWG in organizing and sponsoring the regions and sectors? How might this process be improved in a future National Assessment?

Q8.3: How did the peer review process interact with the organization design? Did it help overcome problems caused by other components/features of the design?

Q8.4: Has the design helped or limited the process for learning from the experience? How is it contributing to continuity of the efforts or application to other large-scale assessments?

Discussion Note 9:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
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The Purpose(s) of Assessment

Assessments can be undertaken for a variety of reasons, and to serve a variety of objectives. Broadly these might be characterized as:

1. Developing improved insight and understanding about impacts and what might be done to prevent them or adapt to them.
2. Educating and informing participants who are not familiar with possible changes, impacts, and responses.
3. Engaging, motivating and organizing constituencies to take actions. Actions can range from inducing improved private sector anticipatory decision making to promoting political action at a variety of levels.
4. Persuading people that the climate problem is being taken seriously.
5. Advancing the state of the assessment art in order to develop and demonstrate new and useful tools and approaches.

Motivations 1, 2 and 3 were quite explicitly motivations for the National Assessment. Motivation 4 probably was also important, though not explicitly stated. Motivation 5 was not an objective of the National Assessment but it has been a prime consideration in assessment work supported by NSF, DoE, NOAA and others.

Assessments can focus at a variety of different levels or scales such as national *versus* regional/sectoral. The National Assessment attempted to build up a national picture from a number of regional/sectoral assessments to construct a National Assessment.

In the survey administered to people who had some involvement with the National Assessment, respondents were asked to identify the relative weighting that they believe was and should be given to the objectives:

Assess – provide the most technically complete and accurate description of the likely impacts of climate change that is currently possible.
Teach – educate the participants in the assessment process about the science of climate change and its possible impacts.
Involve – involve as many people as possible in thinking about and urging that appropriate actions be taken in connection with climate change.

These categories correspond roughly to motivations 1-3 above.

Average results suggest that respondents believe that a greater emphasis was and should be given to the *assess* objective (was: 47% and should: 43%) relative to those efforts given to *teach* (was: 27% and should: 28%) and to *involvement* (was: 26% and should: 28%). Average grades assigned in the grading portion of the survey provide some indication of how well respondents believed the National Assessment did in dealing with specific tasks that fall in these broad areas:

Issue Evaluated	Average Grades on Associated Questions
Assessing (learning)	C+, B-, C, C, B-, B-, C, C+, B-, B-, C+, B-
Education (teaching), Informing (communications)	B-, C-, C, C, C, C-
Engagement (involve)	B, B

In the National Assessment, many of the significant decisions about which questions to ask were made at a central, national level, and most of the significant decisions about methods and procedures of investigation were made centrally in order to maximize the opportunity for synthesis at the end of the process. There was some opportunity for regionally and sectorally specific questions to enter the process through workshops and the stakeholder networks established through funding from the federal agencies. Between 60-65% of the survey respondents reported that they had no or very little input into either the questions being asked or the methods used to address them. Approximately 25% reported a great deal or substantial amount of input into these issues.

There are obviously other ways in which future assessments could be conducted. For example:

With respect to problem focus:

- use a process that employs surveys, polling or similar methods to determine a broadly supported group of national or regional or sectoral questions;
- use a process in which national or regional or sectoral questions emerge during the course of a deliberative process among those actually performing the analysis;

With respect to performance of the analysis:

- settle for less than state-of-the-art assessment in the interests of wide stakeholder involvement in the performance of the analysis;
- have expert teams provide state-of-the-art analytical support for groups of stakeholders;
- have a small group of either national or regional experts perform state-of-the-art assessment after obtaining general guidance from stakeholders.

The above considerations led to the following questions for discussion:

Q9.1: If another assessment is done at the national level, what options for participation in the choice of questions and methods of analysis should be considered? If the focus is regional or sectoral are the same options equally relevant?

Q9.2: If they are not actually involved in grappling with the assessment through a deliberative process, can stakeholders be expected to identify a reasonably informed set of questions and issues? What advantages, if any, might their lack of involvement in the deliberative process hold?

Q9.3: What should be the role of the community of expert analysts and assessors in the performance of national and regional assessments? How feasible is it to combine objectives 1-4 with objective 5 of advancing the state of the assessment art? If they are not at least partly combined, how can we be sure that the expert community will address the right set of research questions?

Q9.4: In the space of involve-assess-teach, what should be the balance of objectives in regional and sectoral assessments? Are there other objectives, which are not adequately captured by this characterization?

Discussion Note 10:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
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National *versus* Regional Assessment:

In discussions of the strategic plan for the U.S. Climate Change Science Program in late 2002 and early 2003, a central issue was whether impact assessments at a regional scale in the United States can be carried out scientifically enough to be worthwhile. Some reviewers of the draft strategic plan within the administration argued that, at the current state of the art, such regional assessments cannot be done scientifically; the uncertainties are simply too great. Other reviewers and participants in the discussion cited the experience of the National Assessment as clear evidence to the contrary. Their view, in fact, is that at least several of the regional assessments represented a very high standard of analysis, equivalent in their overall scientific quality to the best impact assessments taking place at a global scale. Even though not all regional assessments rose to this standard, these cases (where agency support was sufficient and regional leadership was strong) are strong evidence that regional assessments can be both valid and highly useful, not just in a hypothetical future but now.

In the survey of National Assessment participants, of the 136 individuals responding to a request to evaluate the performance of the National Assessment in assessing regional impacts, 53% graded it A or B, and 86% graded it A, B, or C. Sixty-six percent judged the products of the assessment to be scientifically defensible and persuasive. This collective judgment seems to suggest that dismissing regional-scale assessment as scientifically premature is not easily supportable.

The Survey also raised the question of whether the country would be better served in the future by:

a) reforming the centrally designed and coordinated but regionally/sectorally executed approach adopted by the National Assessment; or
b) encouraging (and funding) a number of regionally/sectorally conceived and organized assessments with the federal government serving a supporting but not coordinating role.

The potential advantages of a centrally designed and coordinated assessment are straightforward. At least in principle, such an approach facilitates at least the following:

- comparability and quantitative integration of the regional and sectoral analyses;
- economies of scale in assembling some of the basic data sets (e.g., GCM runs);
- engagement of national level decision makers;
- learning across regions/sectors.

The potential advantages of encouraging interested regions/sectors to design their own assessments are equally clear:

- the assessment design will more easily respond to the goals and objectives of "local" stakeholders;

- less likelihood that the assessment will be seen to be under the control of particular national leaders or powers;
- more likelihood that individuals trusted and respected by those in the region will be involved and listened to, rather than have their authority undermined by "national" experts;
- less chance that weaknesses in the assessment of one region/sector would "pull down" the perceived quality and clout of the whole assessment.

The survey results can be read as arguing strongly that in the real world, the benefits of a "bottom-up," regionally/sectorally driven process are substantially greater than those of the top-down process that the National Assessment was perceived by many to be. It is worth considering that the next round of efforts to improve the country's capacity to deal with the risks of climate change and variability should therefore be shaped by the regions and sectors, and supported but not directed or coordinated by the federal government.

By far the greatest success of the National Assessment, as perceived by the greatest number of respondents to the Survey was the National Assessment's strategic commitment to a bottom-up, regionally/sectorally centered approach open to a wide variety of stakeholders. Many respondents believe that the National Assessment in practice fell far short of realizing the potential of the "bottom up" approach. They bemoan the failure to actually listen to local stakeholders – especially when those stakeholders did not talk in the language of the universities and national labs. They cite too much influence by OSTP and the NAST – an influence not justified by an understanding of the local needs and realities that stakeholders most wanted to address. They complain about the dominance of the assessment process by global climate models and modelers – despite the inability of those "universal" experts to provide the kind, resolution or quality of information wanted by the regional groups.

Many of these same critics nonetheless praise the National Assessment as a needed and partially successful first attempt to get a bottoms-up, stakeholder driven effort to address vulnerability and adaptation. The survey did not ask respondents specific questions about regional/sectoral versus national assessment. But respondent's comments on a number of other questions suggest that many of them would agree that the ideal federal role in a "next" National Assessment would be to set aside its desire to coordinate and centralize and instead:

- provide core funding to regional/sectoral groups that would help those groups to conduct assessments of impacts, vulnerabilities, and options most relevant to them (note that these grants could be competitive, to get around the problem of inadequate quality, and could have a matching fund requirement to assure that local congressmen, governments and businesses really took them seriously);
- provide decision support for such regionally driven assessments, including giving them the ability to "order" a limited number of analyses or forecasts drawn from national resources (such as the GFDL, NCAR and GISS climate models; paleo data sets, etc.);
- encourage university and national lab scientists from around the country, as an obligation entailed in their receipt of federal funds for climate-related research, to make their expertise available (within reasonable limits) to assist such regional or

sectoral efforts, especially in regions or sectors that do not have "local" access to top expertise in some of the relevant research areas;

- provide or facilitate a national "synthesis" function, to draw together results from regional/sectoral assessments, not so much as "summations" across impact categories (which, due to the bottom-up approach, would not be consistent) but rather as critical discussions and comparisons of the findings of the individual efforts, together with the evaluation of the implications of those efforts for *national* action and research programs.

Such a bottom-up approach would recognize that the most important contribution of National Assessment-like activities may come through the process of engagement rather than any national "bottom line," and that the nation would therefore benefit from fomenting a large number of such dialogues. It would acknowledge that we don't know how to do good assessments of local impacts, vulnerability and adaptation, and would maximize the variety of experiments underway to do such assessments more effectively. It would utilize the work of the IPCC, NRC, and national GCMs for what they are best at, but would not presume that those institutions and models could possibly be attuned to the varied conditions and needs of particular local and sectoral constituencies. It would have a reasonable chance of side-stepping the divisive national and international political rhetoric on climate change, and focus scarce human and financial resources on "coalitions of the willing" who felt it worthwhile to explore making themselves less vulnerable to the risks of climate change, and more able to take advantage of any changes that do develop. The Survey results suggest that a true bottom-up approach would be worthy and logical successor to the pioneering efforts of the first National Assessment.

Questions for discussion include:

Q10.1: What is the feasibility of performing scientifically valid impact assessments at a regional scale? What are the most serious scientific challenges in regional and sectoral impact assessment, and how might these challenges be better met in future assessments?

Q10.2: Should future U.S. Assessment effort shift from a national focus to a bottom-up regional and sectoral focus as this discussion note has proposed? Why or why not?

Q10.3: How should regional and sectoral assessments be organized and funded? Who should be in charge? Who should foot the bill?

Discussion Note 11:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Training Assessors

One of the great strengths of the National Assessment reflected in the Survey was its success in bringing many individuals for the first time into a complex, interdisciplinary, problem-driven assessment. A substantial majority of those responding to the survey speak positively of the wisdom and dedication of the people they met working on the National Assessment. A few refer to the National Assessment as a life-changing experience.

That said, there is also a thread of what can only be called disdain running through a significant number of the Survey responses. Most of these are from natural scientists –especially climatologists– who are dismissive of the ignorance (of climatology, presumably) of many of those they had to deal with in the National Assessment. From the other side, some practitioners appear to make a blanket dismissal of the irrelevance of "academic" science (and, presumably, scientists). And a number of both academics and practitioners pound on the leaders of the National Assessment for making what are seen as compromises that "inappropriately" allowed the assessment to be too much of a compromise, too much of a mix of facts and values. Some of this criticism is doubtless justified. However, it's worth emphasizing that such criticisms are a minority view among the Survey respondents. Nonetheless, the minority is not so small that it can be safely ignored, and it represents a kind of response to assessments that is bound to resurface in future efforts to harness science in support of decisions bearing on global change. Understanding where the complaints come from, and what might be done to reduce them, therefore seems worthwhile.

Perhaps future efforts, such as the National Assessment, might do well to spend a bit more time training the assessors about what it means to do a complex, interdisciplinary, problem-driven assessment. Such assessments –especially when undertaken on a politically charged topic– are extraordinarily difficult to do well. They need to combine formal results from very sophisticated global research programs, with tacit knowledge drawn from experience in particular sectors and places. They need to do so in ways that respond to but are not derailed by stakeholders involved in a vigorous and high stakes political debate. In this case, as in most such cases, the whole exercise was made more difficult by acute constraints of time and money that undermined prospects for learning-while-doing.

No country has a good track record in carrying out such assessments, though the Canadians, Australians and some European countries are far ahead of the United States in trying to learn to do so. The result is that many of the respondents to the survey clearly misunderstood the nature of the "play" in which they had been asked to adopt supporting roles. This is less their fault, than the fault of the "directors" who clearly did not manage to convey to these disaffected individuals their vision of what the "play" was trying to accomplish, and how the various roles had to support one another if the overall production was going to be a success.

With the benefit of hindsight, it might have been worthwhile to spend more time getting buy-in on the goals of the assessment, and the multiple parts that had to work together and support one another if the goals were to be achieved. Perhaps the best way to do this is by teaching from a critical analysis of other relatively successful assessments. Past efforts to do this at Harvard's Kennedy School appear to have succeeded in getting across the message that successful assessments are not just about credibility, but also about *saliency* (i.e., relevance to decision) and *legitimacy* (i.e., fairness of process in hearing all sides and stakeholders in both the set up of questions and the analysis of data). Most successful assessments of hot issues succeed not by optimizing on one of these dimensions, but by balancing across them so as to create an assessment process and product that is seen to be credible and salient and legitimate by multiple stakeholders simultaneously. As hard as this dynamic balance is to accomplish in practice, the Survey results suggest that a goodly number of those involved in the National Assessment did not even see it as something that needed to be tried.

One thing such a short-course would need to discuss is the question of what kind of an organization should host an assessment like the National Assessment. A significant number of the respondents to the survey appear pretty certain that a better National Assessment would have to be better insulated from political intervention and direction than the first National Assessment appeared to them to be. This is surely true. But, that those respondents could casually suggest that credibility maximizers such as NSF or even NRC would "solve" the problem only illustrates how narrow and historically uninformed initial views on this important topic are likely to be.

The following are among the questions that should be discussed:

- Q11.1: Should future assessments use training courses for the assessors that use the critical analysis and discussion of historical examples to develop a shared vision of what a given assessment is trying to accomplish, of who needs to avoid upstaging whom if it is to work, and what kinds of pitfalls are likely to derail things, and of what kinds of processes and tricks have been used by others to achieve effective outcomes?
- Q11.2: How important are these process issues as compared with developing an understanding of the state of specific science or of analytical tools?
- Q11.3: Many participants in the National Assessment found it difficult to remember that climate is not the only thing that will change over the course of coming decades? Are there training strategies that could be effective in helping participants develop a stronger sense of the "climate problem" as embedded in a much broader process of social, technical, economic, and ecological change?

Discussion Note 12:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Politics and Assessment

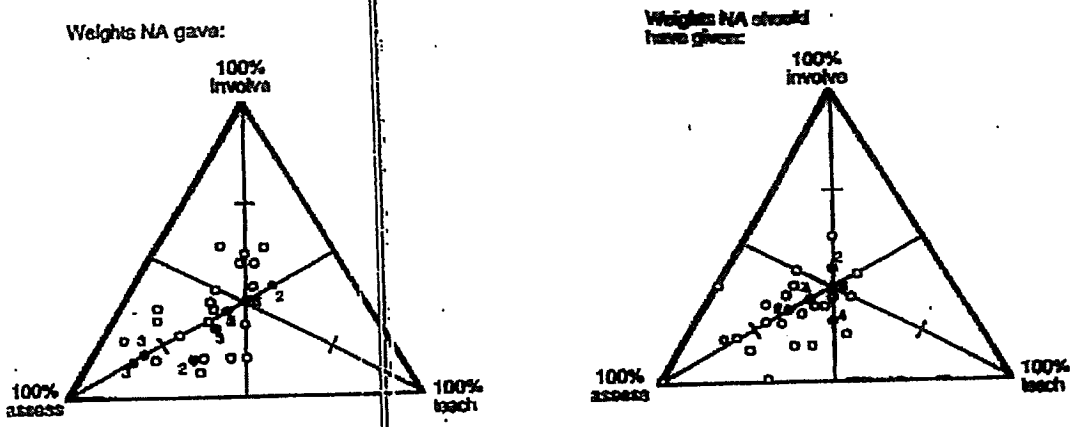
Given the history of the issue of climate change, it is inevitable that any national or regional assessment activity supported by government will have, or at least be perceived by some to have, significant political overtones.

The National Assessment was certainly no exception. Whatever the reality, there was the wide perception that the assessment was motivated in significant part by the presidential ambitions of Vice President Al Gore, and that the substantial focus on outreach and broad citizen involvement was part of a deliberate strategy by the Vice President's office to build a wider community of concern and a political ground swell of support for what might have been the climate policy of a subsequent Gore Administration.

Because it was done in something of a rush, and perhaps too because it might have been difficult to get a budget appropriation specifically for the assessment (even though it was mandated by a previous Congress), the assessment was largely funded by directing various Executive Branch agencies to take responsibility for the assessment of specific regions and/or sectors. Since Executive Branch agencies have their own agendas, some have argued that this administrative mechanism resulted in differing pressures and influences on different parts of the assessment. At the same time, some staff in the agencies have suggested in private that they came under considerable pressure from the Administration to shape parts of the assessment in specific ways.

Because outreach and involvement played a relatively large role in the activities of the assessment, in the evaluative survey administered to assessment participants, we asked respondents to both indicate what they thought the balance actually was, and what it should have been, between the three objectives of "assess," "teach," and "involve" (see page 56 of the summary of survey responses). The questions were posed by asking respondents to allocate 100 points across the three objectives. While individual respondents displayed some differences in their judgments between what they think occurred, and what they think should have occurred, overall the differences between the two sets of responses were negligible.

This is clearly indicated by plots of the responses of the first 50 respondents, reproduced below (solid dots with numbers indicate multiple responses):



However, believing that an Assessment should have a significant element of "teach" and "involve" is not the same as agreeing that it should advance any specific political agenda.

In the workshop discussions, it would be useful for participants to explore the following questions:

Q12.1: Are their alternative administrative and funding mechanisms for a National Assessment that could be used to reduce the perception and/or reality of a political agenda in the assessment process?

Q12.2: Do the potential advantages of wide involvement by Executive Branch Agencies, with the substantial expertise they can bring to bear, outweigh the actual or perceived risks of Agency agenda bias in the assessment process?

Virtually all major decisions by individuals (whether to: get married; buy a house; have kids; take a job; etc.) and societies (whether to: privatize a public service; subsidize a desired activity; go to war, etc.) are made as a leap of faith in the face of large and irreducible uncertainties. On this basis, one might argue that the objective of balanced, impartial, assessment is unrealistic, and not worth pursuing.

Q12.3: Does it make sense to strive for balanced, impartial, assessment even if that objective can never be perfectly achieved? Alternatively, should one abandon the search of objectivity and treat assessment as an inherently political process?

1:00 Framing the second Working Group Sessions on
"Evaluating the Assessment and Improving Next Time" – G. Morgan

1:15 Break into working groups

Group D: Purpose(s) of Assessment – B. Fischhoff, chair

Relevant Discussion Notes: 9,10,12

Group E: Organizing and Managing Future Assessments – B. Clark, chair

Relevant Discussion Notes: 8,10,11,12

Group F: Performing Assessment in an (Inevitably) Political Setting – R. Cantor, chair

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5:00 End of Workshop

1928A

April 29, 2004

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Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

CEQ 13

PC

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Relevant Discussion Notes: 2,4,5,6

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5:00 End of Workshop

From: ccsp-bounces@usgcrp.gov on behalf of Margarita Gregg [Margarita.Gregg@noaa.gov]
Sent: Thursday, April 29, 2004 12:20 PM
To: CCSP@usgcrp.gov; CCSP_INFO@usgcrp.gov; wgcc@usgcrp.gov
Subject: [ccsp] Decisions and Actions from CCSP Principals Teleconference 26April
Attached is a brief summary of the items discussed at the CCSP Principals Teleconference on Monday, April 26th. Please note the following actions which require a prompt response:

Briefing for House and Senate Staff on CCSP and NOAA FY05 Budget Requests

Briefing is scheduled for May 3, 10:30AM-12:30 P.M in 364 Dirksen, the Senate Energy and Natural Resources Room. Please plan to attend or designate a representative for your agency. We ask that you forward (1) the name of your agency representative, and (2) suggested Senate and House committees that should be contacted to attend the briefing. Please forward this information to Ahsha.Tribble@noaa.gov.

Development of interagency crosscut FY06 priorities from the CCSP Strategic Plan

Agencies who have not sent in input for the FY06 coordination and integration process need to respond to me by C.O.B. Friday, April 30th. Jim Connaughton emphasized the importance of this activity at the IWGCCST meeting held Tuesday, April 27th.

Margarita

M.E. Conkright Gregg, Ph.D.

Temporarily at:
Climate Change Science Program Office
1717 Pennsylvania Avenue
Suite 250
Washington, D.C. 20006
Phone: (202)419-3466
Fax: (202)223-3064
Email: Margarita.Gregg@noaa.gov

Cooney, Phil

From: Holbrook, William F.
Sent: Thursday, April 29, 2004 3:57 PM
To: Cooney, Phil
Subject: Inside EPA article today - GHG

UTILITIES DRAFT GREENHOUSE GAS PACT TO WIN NEW DOE COMMITMENTS

Date: April 30, 2004 -

The electric utility industry is circulating among its members a draft industry-government agreement on collaborative, voluntary steps to achieve the Bush administration's greenhouse gas (GHG) emissions goals in what utility sources call an effort to jump-start negotiations on terms favorable to the industry.

The draft memorandum of understanding (MOU), obtained by Inside EPA, demonstrates the electric utility industry's interest in winning major new government commitments supporting research on GHG reduction technologies. It also includes language calling for flexible provisions in upcoming changes to Department of Energy (DOE) emissions reporting guidelines.

Industry sources say the draft, prepared by the Edison Electric Institute (EEI), comes in response to pressure from the administration to complete detailed agreements to achieve the White House's goal of reducing GHG "intensity" by 18 percent. Emissions "intensity" measures environmental efficiency rather than absolute reductions. Sources say EEI is circulating the draft within the industry before sending it to DOE, though many elements of it likely reflect previous discussions between DOE and the industry.

The draft agreement outlines a plan under which DOE and the industry within six months would jointly identify high priority research, development and deployment areas for advanced emission reduction technology. This effort would include "evaluating potential new policy mechanisms to support early commercial uses of the technologies developed" under a power sector research, development and deployment program.

The draft comes as sources say high-level White House and DOE officials have been contacting individual companies in an effort to move along negotiations on GHG reduction agreements. Relevant documents are available on InsideEPA.com.

The administration is negotiating with a coalition of industry groups known as Power Partners, who have committed to participate in the administration's Climate Voluntary Innovative Sector Initiatives: Opportunities Now (VISION) program. Announced in February 2003, the program envisions partnerships with several industry sectors to achieve an economy-wide 18 percent reduction in GHG emissions per unit of economic output by 2012. Power Partners includes over half a dozen utility trade associations -- including EEI, the American Public Power Association and the Nuclear Energy Institute -- as well as the Tennessee Valley Authority.

Utility negotiations with the administration on the effort had slowed in recent months for several reasons, including the departure of DOE undersecretary Bob Card and industry concerns over changes to existing rules for reporting voluntary reductions of emissions under the DOE's 1605 (b) program, industry sources say.

The draft MOU appears to be an effort to revive the collaboration. According to an April 22 version of the plan, "The Power Partners and DOE view the development and use of advanced technologies as critical to the achievement of the President's goal" for reducing GHG emissions.

According to an attachment to the plan on technology efforts, DOE and the industry over a five year period would work to implement public-private partnerships for research, development and deployment of advanced technologies, beginning as soon as fiscal year 2006 or even earlier. In addition, the agreement envisions congressional authorization for

financial incentives to boost early commercial use of advanced technologies developed under the collaborative efforts.

A separate draft work plan accompanying the text discusses the potential for joint government-industry projects that could obtain pollution reductions both within the utility industry and in other sectors, including work on an electric utility hybrid "bucket" truck that could ultimately be used by several different sectors. "The goal is to develop a commercial hybrid work truck and meet 2010 emissions standards three years ahead of the federal goal while improving fuel economy 50 percent (and thereby reducing emissions)," the work plan states. The work plan also outlines a number of initiatives the industry has already begun for curbing emissions growth.

One industry source says a number of actions the draft documents call for have caused at least some concern within the industry, including a call for annual progress reports on activities and accomplishments under the climate VISION program, and development of a standardized metric for measuring progress in curbing GHG intensity. "This report and the accompanying analysis will reflect anticipated future trends and conditions within the power sector and other major sectors of the U.S. economy," the documents say. The source says the provisions could open the industry up to harsh scrutiny.

The documents also appear to include policy positions that echo industry criticism of administration efforts to reform the existing 1605 (b) emissions reporting program at DOE.

The draft work plan states that DOE and other federal agencies will consider allowing registration of specific "stand-alone, credible projects" that reduce emissions. DOE, in contrast, had floated revisions to 1605 (b) calling for facilities and companies to report their overall emissions reductions when registering the cuts, a standard the industry calls inflexible.

The work plan also says DOE will consider polices that allow registration of past as well as future actions to address climate change, another sticking point in the 1605 (b) reform process. The document does not specifically call for transferable credits to be awarded to companies that make emissions reductions -- a major unresolved issue under the 1605 (b) reform process -- but does call for "baseline protection or registration of past and future actions." -- Doug Obey

Source: Inside EPA via InsideEPA.com

Date: April 30, 2004

Issue: Vol. 25, No. 18

INSIDEEPA-25-18-2

April 29, 2004

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Contact Info

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Office of the Assistant Secretary of
Commerce for Oceans and Atmosphere
National Oceanic and Atmospheric Administration
HCHB, Room 5804
14th Street & Constitution Avenue, NW
Washington, DC 20230
Tel.: 202-482-3567 Fax: 202-482-6318

Date: 4/28/04

FAX TRANSMITTAL

To: Dave Halpern
From: Ahsha Tribble

Phone:
Phone: 202-482-5920

Fax: 202-456-6021
Fax: 202-482-6318

Comments:

National Assessment Workshop materials

Hi Phil,

Kathie said that you need a copy.

Best regards.

Dave

Copies to
Jean Peal
Bryan Hannegan
me

Number of pages: 31

Background Materials for the Workshop

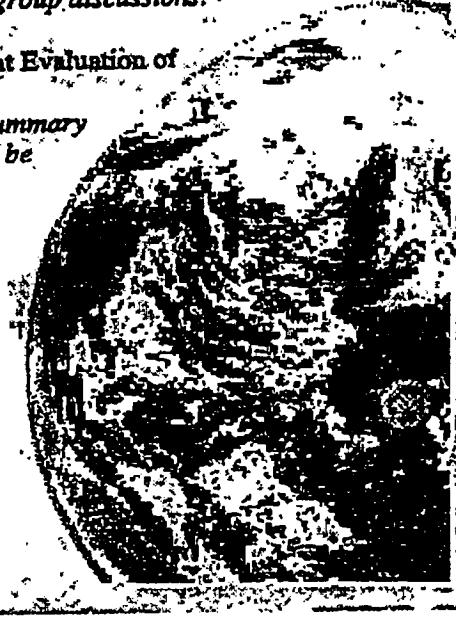
Learning from the National Assessment

AAAS Building, 1200 New York Avenue, NW
Washington, DC

April 29, 2004

Contents:

- Draft Agenda.
- Discussion Notes.
  IMPORTANT: please find time to read these notes prior to the workshop. They have been prepared to stimulate the working group discussions.
- Summary of Responses to the Survey for Participant Evaluation of the U.S. National Assessment.
  It is desirable but not essential that you read this summary before the workshop. The results of the survey will be summarized in a presentation at the beginning of the workshop.



Members of the Workshop Planning Committee: Robin Cantor, Bill Clark, Ann Fisher, Jake Jacoby, Tony Janetos, Ann Kinzig, Jerry Melillo, Granger Morgan (chair), Roger Street, and Tom Wilbanks.

Supported by NSF Cooperative Agreement SBR-9521914.

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April 29, 2004

Discussion Note 1:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Choosing Possible Future Climates for Examination

Officially, the National Assessment adopted three strategies for characterizing possible future climates to be considered (see page 14 of the National Synthesis Report):

- Historical records of past climate variability and change;
- Scenario analysis using large-scale general circulation models (GCMs); and
- Sensitivity analysis that asks, "what degree of climate change would cause significant impacts to natural and human systems" of interest?

Responses to the survey of National Assessment participants suggest that all three approaches were used (see page 29 of the summary of survey responses[1]):

57% GCMs.
45% data on past climates.
44% "what if" analysis.
7% Other.
23% Not relevant to my involvement.

However, many observers would argue that two GCM runs, based on a single emissions scenario (the IPCC scenario IS92a) predominated as the vehicle used to explore possible future climate in the National Assessment. This impression is reinforced by an examination of the reports of the National Synthesis Team and a reading of the detailed responses to the participant survey (see pages 29 to 39 of the summary of survey responses).

There have been complaints about the specific GCM models used, and the fact that only one emission scenario was employed to drive those models. MacCracken et al. (2003) have responded arguing that these limitations have been exaggerated.

However, the question of whether the right GCMs were used, and whether they were driven by the right emissions scenario(s), is of second order importance compared with the more fundamental question of how an appropriate range of future climates should be identified and explored in national and regional assessments.

While they suffer from known, and probably unknown, limitations, do a poor job of modeling many details of regional climate and of estimating key variables such as precipitation, GCMs produce spatially consistent and visually compelling graphical output. Further, there is a large community of modelers heavily invested in their development and use. For these, and probably other reasons, there are strong pressures to use GCM outputs as the basis for climate impact assessments.

[1] Since more than one answer was allowed, these results sum to slightly more than 100%.

It is clear from the detailed survey responses that many participants in the National Assessment viewed the range of outputs from GCMs as providing a reasonable indication of the range of uncertainty about future climate. Even given outputs from a much wider set of GCM's, and a range of alternative emissions scenarios, this is unlikely to be true since the results would share assumptions and parameterizations that might be inadequate.

It was because of such considerations that the National Synthesis Team identified *three* different strategies for exploring future climate. In the event, however, the two strategies that do not depend on GCM's appear to have received relatively little attention. There was a strong inclination in most groups to approach the problem in a front-to-back manner (emissions → climate → impacts), rather than, for example, identifying key thresholds or non-linearities in natural and social systems of concern and letting those drive the work of the climate scientists and the choices of climates to be examined.

The above considerations led to the following questions for discussion:

Q1.1: Is it in fact the case, as this discussion note has argued, that GCM output alone (even from a wider range of models and emissions scenarios) does not provide an adequate basis for exploring possible future climate, and associated vulnerabilities, in regional and national assessments?

Q1.2: Is it the case, as this discussion note has argued, that GCM-based climate scenarios were privileged over other possible strategies in the National Assessment, and are likely to be similarly privileged in future assessments, as a strategy for selecting climates to be examined? If this is so, why?

Q1.3: If the answer to questions Q1.1 and Q1.2 are yes, what might be done to assure that future climate assessments make much greater use of other methods for identifying or defining the climate futures whose impacts they will examine?

Reference:

Michael C. MacCracken, Eric J. Barron, David R. Easterling, Benjamin S. Felzer, and Thomas R. Karl, "Climate Change Scenarios for the U.S. National Assessment," *Bulletin of the American Meteorological Society*, pp.1711-1723, December, 2003.

Discussion Note 2:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Analysis of Social and Economic Impacts

While several teams involved in the National Assessment made extensive use of advanced analytical tools to model climate change (using the Canadian and Hadley GCMs), or to examine its likely large-scale ecological impacts (using models such as VEMAP and DISTRIB), the level of sophistication in analysis of social and economic impacts was considerably less sophisticated.

Population and economic projections were developed and distributed to all the assessment teams. Their use was uneven.

When asked to characterize the way in which their group dealt with social and economic impacts, those responding to the survey question provided the following responses.[2]

- 15% Dynamic social and/or economic models.
- 21% Projections from census and other data.
- 24% "what if" analysis.
- 8% Other.
- 43% Not relevant to my involvement.

There are a number of groups across the U.S. and around the world that have been building Integrated Assessment Models to study the climate problem. However, the National Synthesis Team concluded that given the limited time available, and the relatively limited experience of many participants in the assessment process, it was unrealistic to try to employ those models in the work of the assessment. Instead, as noted, a series of demographic and economic forecasts were commissioned and guidance was developed for the teams that suggested that they select one or two additional factors besides the demographic and economic scenarios which they judged would have the most direct effect on the impact of interest, and vary those factors through an uncertainty range they judged to be plausible (without spelling out the details of what social and other processes might lead to such changes). As the National Synthesis Report explains, "teams found the complexity of even this simplified approach challenging, and made limited use of it beyond the basic scenarios."

When asked, "did you ever see that guidance?" 21% of respondents said yes, 25% said no, and 54% did not respond. While most respondents apparently did not make use of this guidance, three-quarters of those who did try to follow the guidance reported that they considered the effort successful (63%) or partly successful (12%).

While there appears to be little agreement among respondents about how to improve the treatment of social and economic impacts in future assessments, almost 60% of respondents

[2] See page 39 of the summary of survey responses. Since more than one answer was allowed, these results sum to slightly more than 100%.

indicated that if another assessment were done, social and economic impacts should be handled differently from how they were handled in the part of the assessment in which they participated.

One important problem that first surfaced at the July 1998 workshop in Monterey, CA is the difficulty that many people appear to have in thinking about how socio-economic systems could evolve in the future. Many participants seemed intent on believing that the future would be pretty much like the present in all respects except for a changed climate. Other participants (mostly physical scientists) took the position that given the very high levels of uncertainty about socio-economic processes, there was no way to say anything at all that was useful more than a few years into the future. Under the circumstances, given the time constraints on the process, the assessment leadership concluded that they needed to shorten the time horizon on the socio-economic impact assessments.

The above considerations led to the following questions for discussion:

- Q2.1: Was the National Assessment's treatment of socio-economic impacts inadequate? Note that despite the arguments outlined above, the grade given to the socio-economic impacts assessment by participants in the National Assessment (see page 53 of the summary of survey responses) is comparable to or only slightly lower than the grade given to other parts of the assessment.
- Q2.2: Are there strategies that could be used to get non-expert participants more informed and comfortable in thinking about how social and economic systems might change over time periods of many decades?
- Q2.3: What strategies might be adopted in future assessments to promote a more adequate and systematic treatment of possible socio-economic impacts? For example, are there ways to combine expert analysis, including the use of available integrated assessment models, with involvement by non-expert participants?

Discussion Note 3:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC. - April 29, 2004

Analysis of Ecological Impacts

The National Assessment encouraged three general approaches to analyzing the potential impacts of climate variability and change on ecological systems:

- Consideration of past impacts attributed to climate variability and change;
- Exploration of possible future impacts in the context of scenarios based on linkages between general circulation models and ecological simulation models;
- Identification of ecological thresholds associated with climate variability and change, that when crossed, would lead to ecological consequences; some positive and some negative, some reversible and others not.

From its inception, the National Assessment sought to place climate variability and change in a "multiple stress" context, with an emphasis on how the context varied among regions and across sectors.

Responses to the survey of National Assessment participants suggest that the assessment of ecological impacts:

- was good (B-) overall;
- increased their familiarity with the subject – increased the % of participants in the top two categories of familiarity (very informed and expert) from 31% to 57%;
- but, did little to educate the general public about the subject.

Among the most important criticisms of the analysis of ecological impacts among participants and observers were:

- too much emphasis on the linked climate model-ecological model outputs;
- too much focus on the ecological effects of changes in mean climate conditions and not enough focus on the effects of changes in extreme events;
- limited success in placing the climate-change related impacts on ecosystems in the context of other stresses;
- poor connection between socio-economic factors that govern phenomena such as land-cover and land-use change and ecological impacts.

A key issue with respect to overemphasis on the linked model outputs is the concern that the climate models cannot supply reliable information at the spatial and temporal scales needed for analyses of ecological impacts. The tension between the concepts of "predictions" *versus* "plausible alternative futures" is mixed into this concern.

Much of the discussion of extreme events and ecological impacts in the National Assessment was about past events or about general responses we might expect in the future. Little was done in the scenarios to incorporate regional and sub-regional climate extremes and so the ecological

analyses of extreme events were not represented in the outputs from the biogeochemistry and biogeography models used in the National Assessment.

The concept of global change includes, in addition to climate change, changes in land-cover and land-use, chemistry of the atmosphere and precipitation, and the deliberate and inadvertent redistribution of living organisms across the globe. While some knowledge is available on how these factors interact (sometimes synergistically and sometimes antagonistically), there will surely be many surprises. Appropriate representation of these interactions in an impacts assessment remains a challenge and must include a better way of dealing with the human dimensions of the problem.

Questions for discussion:

Q3.1: What role should quantitative, coupled (GCM, ecological and human dimensions) simulation modeling analyses play in any future assessments? Is this approach ready for "prime time" at various spatial scales – national, regional and sub-regional? If not, what alternative should be employed?

Q3.2: Does the science support a larger role for the concept of thresholds in future assessments of the ecological impacts of climate variability and change? Can we relate thresholds to rates as well as magnitudes of change?

Q3.3: Is there a way to consider the topic of ecological impacts of climate variability and change that will maximize our chances of meeting the combined goals of assessing, teaching and involving? For example, is this best done with a focus on "ecosystems services"; with a focus on the impacts on especially salient ecosystems and species; etc.?

Discussion Note 4:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Characterizing and Treating Uncertainty

Climate change and variability, and their impacts, inherently involve great uncertainty. So too do attempts to project how human societies are likely to change over coming decades. Thus, any national, regional, or sectoral assessment must deal in some way with uncertainty.

A reading of the various reports it produced by the National Assessment, as well as comments from several reviewers, suggest that the treatment of uncertainty was very uneven across the different groups involved in the National Assessment. This conclusion is supported by responses from assessment participants to the seventh section of the survey that asked about how each respondent's group dealt with uncertainty. Responses received broke down as follows (see page 46 of the summary of survey responses):

- 39% Not relevant to my involvement.
- 24% The group was not systematic, individual authors used the words they thought were best.
- 19% The group was somewhat systematic, in most cases our group had a qualitative discussion of which word to use as the text was edited.
- 5% The group was somewhat quantitative, our group assigned numerical probabilities to words and then individual authors used the words they thought were best.
- 8% The group was systematically quantitative, our group assigned numerical probabilities to words and then in most cases discussed which word to use as the text was edited.
- 5% Other.

Just under half of the survey respondents indicated that they were not aware of the effort made by the National Assessment Synthesis Team to assign numerical values to probability words and then use those words consistently throughout their report.

Documentation of what groups did was similarly diverse, and often very limited.

The reasons for this uneven treatment seem likely to include:

- Many assessment participants were new to this kind of activity and were unfamiliar both with the issues of thinking in a formal way about uncertainty or with analytical tools for dealing with uncertainty.
- Most respondents had no knowledge of the compelling evidence in experimental psychology that indicates that probability words (such as "likely" and "unlikely") can mean dramatically different things to different people, and to the same people in different contexts.
- No guidance document on how to deal with uncertainty (such as the one produced by Schneider and Moss for the IPCC) was distributed to participants in the National Assessment.

- The computer models used by some assessment teams did not lend themselves to probabilistic treatment or other forms of uncertainty analysis.
- So much time was spent on organizational and other issues that teams did not get around to thinking about issues of uncertainty until it was too late to do very much about it.

Whatever the reason, many observers believe that future assessments will need to adopt a more adequate and systematic characterization and treatment of uncertainty. This raises the following questions:

Q4.1: Was the characterization and treatment of uncertainty in the National Assessment in fact inadequate, or is a systematic treatment of uncertainty simply the esoteric and largely unimportant concern of expert analysts?

Q4.2: Are the objectives of wide involvement by non-experts, and the adequate characterization and treatment of uncertainty, inherently incompatible?

Q4.3: If not, what strategies might be adopted in future assessments to promote a more adequate and systematic treatment of uncertainty? For example, are there ways to combine expert analysis that deals systematically with uncertainty, with involvement by non-expert participants?

Discussion Note 5:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Mitigation and Adaptation

It is impossible to address possible impacts of climate change, positive or negative, without understanding the sensitivity of natural and human systems to such changes. Discussions of "vulnerability" and its more positive counterpart (i.e., potential synergies associated with changes) tend to emphasize three dimensions: exposure (the changes experienced, such as temperature or precipitation changes), sensitivity (the degree to which a system's performance is affected by such changes), and coping capacity (the degree to which a system can respond to changes in ways that reduce threats and enhance opportunities).

In general, the National Assessment made a strong start in identifying exposures to possible climate changes, at least in the longer run, and it took a somewhat weaker first cut at identifying sensitivities. Where it was weakest was in addressing responses to climate changes that might change the balance between opportunities and risks. In most cases where possible impacts were identified, a statement was simply added that adaptation to such impacts might be possible, although the feasibility and costs of such adaptations was not generally considered. As a result, it is impossible to evaluate, based on the content of the National Assessment, the degree to which possible exposures might be reduced by climate change *mitigation* (reductions in forcing) and/or the degree to which risks associated with such exposures might be reduced through *adaptation*. Since humans can be expected not to sit idly by in the face of significant climate change, this is a significant limitation in the results of the National Assessment.

There were two principal reasons for this gap. First, although mitigation is the response most prominently explored in many global climate change policy discussions, leaders of the National Assessment were instructed to avoid any connection with mitigation issues, which were viewed as too political at the time, even though some of the U.S. regions (especially the Appalachians) were seriously concerned about regional impacts of mitigation policy directions. Second, participants in the National Assessment found that too little is known about adaptation strategies, costs, and potentials to systematically assess the relative merits of alternative response strategies.

The assessment of mitigation and adaptation strategies require substantial technical and economic knowledge and analysis. Since the National Assessment did not address these matters, such skills were not very present among the folks who participated.

Survey responses suggest that many of those involved in the National Assessment concluded that the lack of consideration of mitigation and adaptation was a serious limitation.

Results reported on page 63 of the summary of responses read as follows:

There are a number of things the assessment did not try to do but might have. If the country wer do it again, which, if any, of these should be included as objectives?

	strong "no"	strong "yes"
Strategies for reducing greenhouse gas emissions.	15---16---19---42---52	
16%na	9%- -9%--11%- 25%-30%	
Identification of climate-related "market opportunities" for business.	11---28---26---44---34	
18%na	6%--16%--15%- 25%-20%	
Putting this issue in context when compared with other problems facing our communities and the nation.	10---12---26---47---45	
19%na	6%-- 7%--15%- 27%- 26%	

An examination of the comments listed on pages 66-95 also reveal a number of participants who saw this absence as a serious problem.

Several questions arise:

- Q5.1: In what ways should possible and/or likely responses to climate change be incorporated in future national, regional, and sectoral assessments?
- Q5.2: Over coming decades, climate will not be the only thing that changes. In so cases the impacts of climate change will be of second order importance compared with the impacts of technical, social, economic and ecological changes. Given this fact, how feasible is it to perform assessments that incorporate mitigation and adaptation?
- Q5.3: What information and capabilities are needed for a satisfactory treatment of mitigation and adaptation, that were not present in the National Assessment?
- Q5.4: Is it feasible in future assessments to separate a consideration of adaptation responses from a consideration of mitigation responses?

Discussion Note 6:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Stakeholder Participation

The Global Change Research Act of 1990 says that the federal government "shall prepare and submit to the President and the Congress" an assessment of potential consequences of climate change for the United States, not just as a one-time exercise but as a continuing commitment. When the first such National Assessment was conceived early in 1997, Jerry Melillo laid out a dramatic vision of a strikingly new approach to environmental policy assessment in the United States, grounded in dialogues at the regional/local level between regional experts and regional stakeholders: farmers, ranchers, local business people, local government leaders, local interest groups, and citizens at large. Activated by regional workshops, this consultation would raise the level of awareness of local citizens of climate change issues, invite them to consider vulnerabilities to possible impacts, and then identify the major issues at the regional scale from the point of view of citizens and voters. Out of this democratic process of information exchange would come a picture of vulnerabilities of our country to impacts of climate change and variability – not merely as a function of scenarios or local climate change forecasts that could result simply in arguments about assumptions but as a strong, robust set of views from the grassroots across the country. Moreover, this would not be a one-time process. The regional workshops and subsequent regional assessments would catalyze the development of stakeholder networks that would support a continuing process of information exchange, education, and outreach related to climate change issues. In fact, it was thought, this approach might well serve as a model for addressing other thorny environmental policy issues in the United States in the future.

As the National Assessment moved along, this vision was complicated by a number of factors. A National Synthesis Team was added to the mix later in 1997, shifting toward a top-down assessment approach, creating tensions that came to a head at a national workshop in Monterey, CA, in mid-1998. Federal agencies supporting different aspects of the National Assessment provided significantly different levels of support and different marching orders regarding stakeholder involvement. Perhaps the most troublesome continuing issue, and one that continues to reverberate today, is that many of the stakeholder participants in the original workshops were persuaded to lend their time and legitimacy by a promise that their participation would be just the beginning of a long-term commitment and structure for involvement, linking regional and sectoral stakeholders with federal government deliberations. Within half a year, that commitment was in serious question; and, despite efforts by some assessment leaders and agency representatives, there has been very little follow-up beyond a few of the regions, such as the Middle Atlantic.

A number of proposals were developed to assure that the National Assessment public participation experience would be observed, recorded, and evaluated in a comprehensive manner, but no support was forthcoming; and that opportunity was missed, although key participants such

as Ann Fisher (Penn State); Phil Mote (University of Washington), Dennis Ojima (Colorado State), Barry Rock (New Hampshire), and Eileen Shea (East-West Center) have shared their experiences and views in informal ways. For instance, these assessment leaders report that in many cases, the scientists learned more from the stakeholders than the other way around. In fact, in a number of cases, stakeholders contributed not only to scoping and reviewing regional and sectoral assessments but also to the assessment process itself.

A quick reading of responses to the survey do not appear to support these impressions. For instance, nearly 40% of the respondents considered the stakeholder involvement questions to be "not relevant," saying that it had no effect. Fifty percent said that for their aspects of the assessment there were specific goals for stakeholder involvement, while 57 said there were not. Regarding how well the goals were met, 13 said very well, 19 moderately well, and 14 not well.

However, in interpreting these results, it is important to observe that almost half of the respondents were involved in the assessment as reviewers, rather than as participants. A careful reading of the comments of those respondents identified as heavy participants (as denoted by bold respondent numbers) suggest a much more consistent and positive evaluation of the value of non-expert stakeholder involvement.

The following questions warrant further consideration:

- Q6.1: How effective was stakeholder participation in the various regional and sectoral assessments, and what factors and/or practices accounted for that effectiveness?
- Q6.2: What were the impacts of stakeholder participation in those cases where it was effective, and what lessons can be learned from those experiences?
- Q6.3: What strategies might be considered to make stakeholder participation in future assessments an ongoing process rather than a series of one-time encounters? Would doing this lead to more informed or effective assessments? Why?

Discussion Note 7:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Communicating Results to the Public and to Policy Makers

The National Assessment process occurred over several years, with the publication of the regional, sectoral, and national reports viewed as major milestones. During and after the assessment process, the effort to communicate about the assessment *process* and *findings* (with implications about what those findings mean for individual and collective decisions) was substantial, from the perspective of prior scientific research and assessment activities. However, the assessment had ambitious goals for inclusiveness in the assessment process to conduct science in the service of society, relatively little effort went into communication to the public and policy makers from that perspective. In the survey, (Q8) respondents gave an average grade of C- for educating the U.S. public about climate change, and C for informing local, regional, and national decision makers about climate change. They assigned C to communicating costs and risks, and C- to communicating benefits. Grades were higher than these for 13 of the remaining 15 evaluation categories).

Several reasons have been posited as causing the de-emphasis on communication with the public and with policy makers:

- Meager communication resources were built into most of the assessment activities.
- Delays and complexities in the assessment research led to shifting some of the meager communication resources to assessing what the potential consequences of climate change might be for a particular region or sector, or for the nation.
- As scientists, the assessors are more comfortable communicating about their research with peers than with the public and decision makers.
- The politics of climate change discouraged assessors from communicating, both because controversy can be uncomfortable to address and because of concerns about jeopardizing future research support.
- After the effort of getting the report completed, participants ran out of time and money to engage in follow-on communication activities.

Yet respondents emphasized the need for more –and more effective– communication with the public and policy makers.

These considerations suggest several questions for discussion:

Q7.1: Beyond publishing and distributing an assessment report, to what extent is communicating with the public and policy makers about the findings of an assessment and appropriate part of an assessment?

Q7.2: If communicating with the public and/or policy makers is an important component of future assessments, how can future performance be improved?

Q7.3: Communication activities are expensive and time consuming. Resources for communication will always be limited. In light of that fact, what, if any, innovative strategies can be identified to improve communication effectiveness?

Discussion Note 8:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

The Organization Plan for the National Assessment

As an organizational enterprise and a coordinating process, the National Assessment was a momentous undertaking. Through its organizational design, the National Assessment combined highly structured synthesis objectives with extensive input by experts and stakeholder participants at the local and regional levels. It involved the participation of hundreds of individuals and organizations in the regional and sectoral activities. It provided access to public and private decision makers, resource and environmental managers, and the general public in an important national environmental policy debate. It promoted the use of advanced methods, models, and results in dozens of regional analyses and national sector studies. It produced the Overview and Foundation reports, which provided a summary of the regional and sector studies. It provided a process where these summaries were subject to substantial peer review and public comment.

Given all of the effort and output related to the National Assessment, it is only reasonable to consider whether the organizational plan facilitated or hampered its success. From its inception, a key objective of the National Assessment was "[t]o assure a fully open process" including "both public and private sector partners across the spectrum of stakeholder interests in the U.S."[3] In retrospect, this objective seems particularly ambitious in combination with the scope and other analytical dimensions of the National Assessment (e.g., long time horizon, uncertain outcomes, system interdependencies, etc.). Meeting this objective on a national scale for a far more short-term and better understood science and policy question than climate variability and change would be challenging enough. Nonetheless, the National Assessment, largely organized around dozens of workshops and regional efforts, did involve large numbers of experts and stakeholders and did produce an impressive number of reports.

Important in the formal organizational structure were the National Science and Technology Council (NSTC) and its subsidiary, the Committee on Environment and Natural Resources (CENR). A subcommittee of CENR, the Subcommittee on Global Change Research (SGCR), was charged with overall coordination, implementation, and sponsorship of the National Assessment process.

Other key organizational elements created for the process included:

The National Assessment Synthesis Team (NAST) which "provided overall intellectual oversight of the National Assessment process and had specific responsibility for the Synthesis Report, for defining national scenarios, for providing advice and oversight of the sectoral analyses, and for recommending guidelines for the regional analysis templates. The Synthesis Team was a

[3] A summary of the organizational plan can be found at: http://www.usgcrp.gov/usgcrp/nacc/background/organization/.

committee chartered under the Federal Advisory Committee Act with members drawn from government, academia, and the private sector;"

The National Assessment Working Group (NAWG) for Federal Agency Coordination, which "had lead-responsibility for organizing and sponsoring the regions and sectors. The Working Group had primary oversight and coordination responsibility for the regional analyses which were sponsored by individual agencies."

In addition, an Inter-Regional Forum consisting of the leaders of the regional assessments was created to help address issues that transcended individual regions, a Review Panel was established to oversee the review process for the Overview and Foundation reports, and a National Assessment Coordination Office was established for logistical support.

Answers from the survey respondents related to the "Strengths and Weaknesses of the Process" and "additional comments" suggest that there were positive and negative aspects of the organizational plan. Many respondents applauded the process for its emphasis on involving diverse participants and bringing experts and stakeholders together. Similarly, many respondents praised the broad scientific involvement. The organizational design apparently achieved the goal of opening up the process. Note, however, that although respondents' written comments implied that the process was refreshingly open, they also indicated that they had little opportunity to participate in the choice of questions addressed (49% none at all) or the choice of procedures used (50% none at all).

Regarding the negative remarks on organizational structure, many respondents pointed out tensions that apparently existed between NAST, NAWG, and the activities supporting the regional and sectoral studies. In particular, respondents raised concerns about the role of the Office of Science and Technology Policy (OSTP) and the extent to which the process had become captured by political influences. Others spoke of a process that was too "top down," "rushed," poorly funded, and lacking in meaningful direction. In some cases, respondents recommended that the process should have been organized along the lines of the IPCC and NAS organizational models. These negative views, however, did not lead to overly negative ratings on the "Organization and Administration" question where only 4-6% of respondents rated any aspect of this category "poor" while 15-25% rated these aspects "excellent."

- Q8.1: What large tradeoffs were involved by combining an open process with credible scientific analysis? Did the design force front-end direction on scenario analysis and methods to ensure that an open process could meet product and timing objectives? Is there an organizational structure that could address these tradeoffs more effectively?
- Q8.2: How effective was the NAWG in organizing and sponsoring the regions and sectors? How might this process be improved in a future National Assessment?
- Q8.3: How did the peer review process interact with the organization design? Did it help overcome problems caused by other components/features of the design?
- Q8.4: Has the design helped or limited the process for learning from the experience? How is it contributing to continuity of the efforts or application to other large-scale assessments?

Discussion Note 9:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

The Purpose(s) of Assessment

Assessments can be undertaken for a variety of reasons, and to serve a variety of objectives. Broadly these might be characterized as:

1. Developing improved insight and understanding about impacts and what might be done to prevent them or adapt to them.
2. Educating and informing participants who are not familiar with possible changes, impacts, and responses.
3. Engaging, motivating and organizing constituencies to take actions. Actions can range from inducing improved private sector anticipatory decision making to promoting political action at a variety of levels.
4. Persuading people that the climate problem is being taken seriously.
5. Advancing the state of the assessment art in order to develop and demonstrate new and useful tools and approaches.

Motivations 1, 2 and 3 were quite explicitly motivations for the National Assessment. Motivation 4 probably was also important, though not explicitly stated. Motivation 5 was not an objective of the National Assessment but it has been a prime consideration in assessment work supported by NSF, DoE, NOAA and others.

Assessments can focus at a variety of different levels or scales such as national *versus* regional/sectoral. The National Assessment attempted to build up a national picture from a number of regional/sectoral assessments to construct a National Assessment.

In the survey administered to people who had some involvement with the National Assessment, respondents were asked to identify the relative weighting that they believe was and should be given to the objectives:

Assess – provide the most technically complete and accurate description of the likely impacts of climate change that is currently possible.
Teach – educate the participants in the assessment process about the science of climate change and its possible impacts.
Involve – involve as many people as possible in thinking about and urging that appropriate actions be taken in connection with climate change.

These categories correspond roughly to motivations 1-3 above.

Average results suggest that respondents believe that a greater emphasis was and should be given to the *assess* objective (was: 47% and should: 43%) relative to those efforts given to *teach* (was: 27% and should: 28%) and to *involvement* (was: 26% and should: 28%). Average grades assigned in the grading portion of the survey provide some indication of how well respondents believed the National Assessment did in dealing with specific tasks that fall in these broad areas:

Issue Evaluated	Average Grades on Associated Questions
Assessing (learning)	C+, B-, C, C, B-, B-, C, C+, B-, B-, C+, B-
Education (teaching) Informing (communications)	B-, C-, C, C, C, C-
Engagement (involve)	B, B

In the National Assessment, many of the significant decisions about which questions to ask were made at a central, national level, and most of the significant decisions about methods and procedures of investigation were made centrally in order to maximize the opportunity for synthesis at the end of the process. There was some opportunity for regionally and sectorally specific questions to enter the process through workshops and the stakeholder networks established through funding from the federal agencies. Between 60-65% of the survey respondents reported that they had no or very little input into either the questions being asked or the methods used to address them. Approximately 25% reported a great deal or substantial amount of input into these issues.

There are obviously other ways in which future assessments could be conducted. For example:

With respect to problem focus:
- use a process that employs surveys, polling or similar methods to determine a broadly supported group of national or regional or sectoral questions;
- use a process in which national or regional or sectoral questions emerge during the course of a deliberative process among those actually performing the analysis;

With respect to performance of the analysis:
- settle for less than state-of-the-art assessment in the interests of wide stakeholder involvement in the performance of the analysis;
- have expert teams provide state-of-the-art analytical support for groups of stakeholders
- have a small group of either national or regional experts perform state-of-the-art assessment after obtaining general guidance from stakeholders.

The above considerations led to the following questions for discussion:

Q9.1: If another assessment is done at the national level, what options for participation in the choice of questions and methods of analysis should be considered? If the focus is regional or sectoral are the same options equally relevant?

Q9.2: If they are not actually involved in grappling with the assessment through a deliberative process, can stakeholders be expected to identify a reasonably informed set of questions and issues? What advantages, if any, might their lack of involvement in the deliberative process hold?

Q9.3: What should be the role of the community of expert analysts and assessors in the performance of national and regional assessments? How feasible is it to combine objectives 1-4 with objective 5 of advancing the state of the assessment art? If they are not at least partly combined, how can we be sure that the expert community will address the right set of research questions?

Q9.4: In the space of invo ve-assess-teach, what should be the balance of objectives in regional and sectora assessments? Are there other objectives, which are not adequately captured by this characterization?

Discussion Note 10:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

National *versus* Regional Assessment

In discussions of the strategic plan for the U.S. Climate Change Science Program in late 2002 and early 2003, a central issue was whether impact assessments at a regional scale in the United States can be carried out scientifically enough to be worthwhile. Some reviewers of the draft strategic plan within the administration argued that, at the current state of the art, such regional assessments cannot be done scientifically; the uncertainties are simply too great. Other reviewers and participants in the discussion cited the experience of the National Assessment as clear evidence to the contrary. Their view, in fact, is that at least several of the regional assessments represented a very high standard of analysis, equivalent in their overall scientific quality to the best impact assessments taking place at a global scale. Even though not all regional assessments rose to this standard, these cases (where agency support was sufficient and regional leadership was strong) are strong evidence that regional assessments can be both valid and highly useful, not just in a hypothetical future but now.

In the survey of National Assessment participants, of the 136 individuals responding to a request to evaluate the performance of the National Assessment in assessing regional impacts, 53% graded it A or B, and 86% graded it A, B, or C. Sixty-six percent judged the products of the assessment to be scientifically defensible and persuasive. This collective judgment seems to suggest that dismissing regional-scale assessment as scientifically premature is not easily supportable.

The Survey also raised the question of whether the country would be better served in the future by:

a) reforming the centrally designed and coordinated but regionally/sectorally executed approach adopted by the National Assessment; or
b) encouraging (and funding) a number of regionally/sectorally conceived and organized assessments with the federal government serving a supporting but not coordinating role.

The potential advantages of a centrally designed and coordinated assessment are straightforward. At least in principle, such an approach facilitates at least the following:

- comparability and quantitative integration of the regional and sectoral analyses;
- economies of scale in assembling some of the basic data sets (e.g., GCM runs);
- engagement of national level decision makers;
- learning across regions/sectors.

The potential advantages of encouraging interested regions/sectors to design their own assessments are equally clear:

- the assessment design will more easily respond to the goals and objectives of "local" stakeholders;

- less likelihood that the assessment will be seen to be under the control of particular national leaders or powers;
- more likelihood that individuals trusted and respected by those in the region will be involved and listened to, rather than have their authority undermined by "national" experts;
- less chance that weaknesses in the assessment of one region/sector would "pull down" the perceived quality and clout of the whole assessment.

The survey results can be read as arguing strongly that in the real world, the benefits of a "bottom-up," regionally/sectorally driven process are substantially greater than those of the top-down process that the National Assessment was perceived by many to be. It is worth considering that the next round of efforts to improve the country's capacity to deal with the risks of climate change and variability should therefore be shaped by the regions and sectors, and supported but not directed or coordinated by the federal government.

By far the greatest success of the National Assessment, as perceived by the greatest number of respondents to the Survey, was the National Assessment's strategic commitment to a bottom-up, regionally/sectorally centered approach open to a wide variety of stakeholders. Many respondents believe that the National Assessment in practice fell far short of realizing the potential of the "bottom up" approach. They bemoan the failure to actually listen to local stakeholders – especially when those stakeholders did not talk in the language of the universities and national labs. They cite too much influence by OSTP and the NAST – an influence not justified by an understanding of the local needs and realities that stakeholders most wanted to address. They complain about the dominance of the assessment process by global climate models and modelers – despite the inability of those "universal" experts to provide the kind, resolution or quality of information wanted by the regional groups.

Many of these same critics nonetheless praise the National Assessment as a needed and partially successful first attempt to get a bottoms-up, stakeholder driven effort to address vulnerability and adaptation. The survey did not ask respondents specific questions about regional/sectoral versus national assessment. But respondent's comments on a number of other questions suggest that many of them would agree that the ideal federal role in a "next" National Assessment would be to set aside its desire to coordinate and centralize and instead:

- provide core funding to regional/sectoral groups that would help those groups to conduct assessments of impacts, vulnerabilities, and options most relevant to them (note that these grants could be competitive, to get around the problem of inadequate quality, and could have a matching fund requirement to assure that local congressmen, governments and businesses really took them seriously);
- provide decision support for such regionally driven assessments, including giving them the ability to "order" a limited number of analyses or forecasts drawn from national resources (such as the GFDL, NCAR and GISS climate models; paleo data sets, etc.);
- encourage university and national lab scientists from around the country, as an obligation entailed in their receipt of federal funds for climate-related research, to make their expertise available (within reasonable limits) to assist such regional or

sectoral efforts, especially in regions or sectors that do not have "local" access to top expertise in some of the relevant research areas;

- provide or facilitate a national "synthesis" function, to draw together results from regional/sectoral assessments, not so much as "summations" across impact categories (which, due to the bottom-up approach, would not be consistent) but rather as critical discussions and comparisons of the findings of the individual efforts, together with the evaluation of the implications of those efforts for *national* action and research programs.

Such a bottom-up approach would recognize that the most important contribution of National Assessment-like activities may come through the process of engagement rather than any national "bottom line," and that the nation would therefore benefit from fomenting a large number of such dialogues. It would acknowledge that we don't know how to do good assessments of local impacts, vulnerability and adaptation, and would maximize the variety of experiments underway to do such assessments more effectively. It would utilize the work of the IPCC, NRC, and national GCMs for what they are best at, but would not presume that those institutions and models could possibly be attuned to the varied conditions and needs of particular local and sectoral constituencies. It would have a reasonable chance of side-stepping the divisive national and international political rhetoric on climate change, and focus scarce human and financial resources on "coalitions of the willing" who felt it worthwhile to explore making themselves less vulnerable to the risks of climate change, and more able to take advantage of any changes that do develop. The Survey results suggest that a true bottom-up approach would be worthy and logical successor to the pioneering efforts of the first National Assessment.

Questions for discussion include:

Q10.1: What is the feasibility of performing scientifically valid impact assessments at a regional scale? What are the most serious scientific challenges in regional and sectoral impact assessment, and how might these challenges be better met in future assessments?

Q10.2: Should future U.S. Assessment effort shift from a national focus to a bottom-up regional and sectoral focus as this discussion note has proposed? Why or why not?

Q10.3: How should regional and sectoral assessments be organized and funded? Who should be in charge? Who should foot the bill?

Discussion Note 11:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Training Assessors

One of the great strengths of the National Assessment reflected in the Survey was its success in bringing many individuals for the first time into a complex, interdisciplinary, problem-driven assessment. A substantial majority of those responding to the survey speak positively of the wisdom and dedication of the people they met working on the National Assessment. A few refer to the National Assessment as a life-changing experience.

That said, there is also a thread of what can only be called disdain running through a significant number of the Survey responses. Most of these are from natural scientists –especially climatologists– who are dismissive of the ignorance (of climatology, presumably) of many of those they had to deal with in the National Assessment. From the other side, some practitioners appear to make a blanket dismissal of the irrelevance of "academic" science (and, presumably, scientists). And a number of both academics and practitioners pound on the leaders of the National Assessment for making what are seen as compromises that "inappropriately" allowed the assessment to be too much of a compromise, too much of a mix of facts and values. Some of this criticism is doubtless justified. However, it's worth emphasizing that such criticisms are a minority view among the Survey respondents. Nonetheless, the minority is not so small that it can be safely ignored, and it represents a kind of response to assessments that is bound to resurface in future efforts to harness science in support of decisions bearing on global change. Understanding where the complaints come from, and what might be done to reduce them, therefore seems worthwhile.

Perhaps future efforts, such as the National Assessment, might do well to spend a bit more time training the assessors about what it means to do a complex, interdisciplinary, problem-driven assessment. Such assessments –especially when undertaken on a politically charged topic– are extraordinarily difficult to do well. They need to combine formal results from very sophisticated global research programs, with tacit knowledge drawn from experience in particular sectors and places. They need to do so in ways that respond to but are not derailed by stakeholders involved in a vigorous and high stakes political debate. In this case, as in most such cases, the whole exercise was made more difficult by acute constraints of time and money that undermined prospects for learning-while-doing.

No country has a good track record in carrying out such assessments, though the Canadians, Australians and some European countries are far ahead of the United States in trying to learn to do so. The result is that many of the respondents to the survey clearly misunderstood the nature of the "play" in which they had been asked to adopt supporting roles. This is less their fault, than the fault of the "directors" who clearly did not manage to convey to these disaffected individuals their vision of what the "play" was trying to accomplish, and how the various roles had to support one another if the overall production was going to be a success.

With the benefit of hindsight, it might have been worthwhile to spend more time getting buy-in on the goals of the assessment, and the multiple parts that had to work together and support one another if the goals were to be achieved. Perhaps the best way to do this is by teaching from a critical analysis of other relatively successful assessments. Past efforts to do this at Harvard's Kennedy School appear to have succeeded in getting across the message that successful assessments are not just about credibility, but also about *saliency* (i.e., relevance to decision) and *legitimacy* (i.e., fairness of process in hearing all sides and stakeholders in both the set up of questions and the analysis of data). Most successful assessments of hot issues succeed not by optimizing on one of these dimensions, but by balancing across them so as to create an assessment process and product that is seen to be credible and salient and legitimate by multiple stakeholders simultaneously. As hard as this dynamic balance is to accomplish in practice, the Survey results suggest that a goodly number of those involved in the National Assessment did not even see it as something that needed to be tried.

One thing such a short-course would need to discuss is the question of what kind of an organization should host an assessment like the National Assessment. A significant number of the respondents to the survey appear pretty certain that a better National Assessment would have to be better insulated from political intervention and direction than the first National Assessment appeared to them to be. This is surely true. But, that those respondents could casually suggest that credibility maximizers such as NSF or even NRC would "solve" the problem only illustrates how narrow and historically uninformed initial views on this important topic are likely to be.

The following are among the questions that should be discussed:

- Q11.1: Should future assessments use training courses for the assessors that use the critical analysis and discussion of historical examples to develop a shared vision of what a given assessment is trying to accomplish, of who needs to avoid upstaging whom if it is to work, and what kinds of pitfalls are likely to derail things, and of what kinds of processes and tricks have been used by others to achieve effective outcomes?
- Q11.2: How important are these process issues as compared with developing an understanding of the state of specific science or of analytical tools?
- Q11.3: Many participants in the National Assessment found it difficult to remember that climate is not the only thing that will change over the course of coming decades? Are there training strategies that could be effective in helping participants develop a stronger sense of the "climate problem" as embedded in a much broader process of social, technical, economic, and ecological change?

Discussion Note 12:
Prepared to stimulate discussion at the workshop:
Learning from the National Assessment
Washington, DC - April 29, 2004

Politics and Assessment

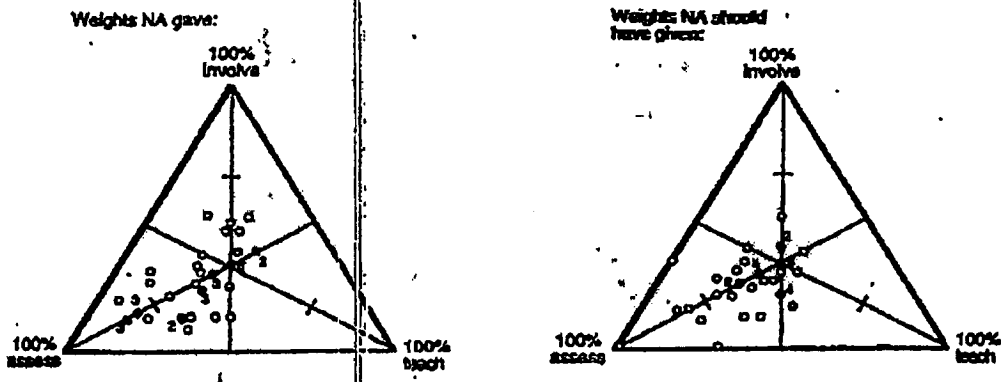
Given the history of the issue of climate change, it is inevitable that any national or regional assessment activity supported by government will have, or at least be perceived by some to have, significant political overtones.

The National Assessment was certainly no exception. Whatever the reality, there was the wide perception that the assessment was motivated in significant part by the presidential ambitions of Vice President Al Gore, and that the substantial focus on outreach and broad citizen involvement was part of a deliberate strategy by the Vice President's office to build a wider community of concern and a political ground swell of support for what might have been the climate policy of a subsequent Gore Administration.

Because it was done in something of a rush, and perhaps too because it might have been difficult to get a budget appropriation specifically for the assessment (even though it was mandated by a previous Congress), the assessment was largely funded by directing various Executive Branch agencies to take responsibility for the assessment of specific regions and/or sectors. Since Executive Branch agencies have their own agendas, some have argued that this administrative mechanism resulted in differing pressures and influences on different parts of the assessment. At the same time, some staff in the agencies have suggested in private that they came under considerable pressure from the Administration to shape parts of the assessment in specific ways.

Because outreach and involvement played a relatively large role in the activities of the assessment, in the evaluative survey administered to assessment participants, we asked respondents to both indicate what they thought the balance actually was, and what it should have been, between the three objectives of "assess," "teach," and "involve" (see page 56 of the summary of survey responses). The questions were posed by asking respondents to allocate 100 points across the three objectives. While individual respondents displayed some differences in their judgments between what they think occurred, and what they think should have occurred, overall the differences between the two sets of responses were negligible.

This is clearly indicated by plots of the responses of the first 50 respondents, reproduced below (solid dots with numbers indicate multiple responses):



However, believing that an Assessment should have a significant element of "teach" and "involve" is not the same as agreeing that it should advance any specific political agenda.

In the workshop discussions, it would be useful for participants to explore the following questions:

Q12.1: Are their alternative administrative and funding mechanisms for a National Assessment that could be used to reduce the perception and/or reality of a political agenda in the assessment process?

Q12.2: Do the potential advantages of wide involvement by Executive Branch Agencies, with the substantial expertise they can bring to bear, outweigh the actual or perceived risks of Agency agenda bias in the assessment process?

Virtually all major decisions by individuals (whether to: get married; buy a house; have kids; take a job; etc.) and societies (whether to: privatize a public service; subsidize a desired activity; go to war, etc.) are made as a leap of faith in the face of large and irreducible uncertainties. On this basis, one might argue that the objective of balanced, impartial, assessment is unrealistic, and not worth pursuing.

Q12.3: Does it make sense to strive for balanced, impartial, assessment even if that objective can never be perfectly achieved? Alternatively, should one abandon the search of objectivity and treat assessment as an inherently political process?

April 29, 2004

Workshop Agenda
Learning from the National Assessment
AAAS Building, 1200 New York Avenue, NW
Washington, DC

CEQ 13

PC

8:00 Registration

Coffee, tea and light breakfast snacks

8:30 Welcome and an explanation of the workshop's objectives – G. Morgan

8:40 Questions and Discussion

8:50 The National Assessment: An overview of the process – T. Janetos

9:10 The National Assessment: A view from the trenches – A. Fisher

9:20 Questions and Discussion

9:35 The survey of folks involved with the National Assessment – G. Morgan

9:45 Questions and Discussion

10:00 Break

10:15 Framing the first Working Group Sessions on "Performing the Assessment" – G. Morgan

10:30 Break into working groups

Group A: Assessment Methods – S. Schneider, chair

Relevant Discussion Notes: 1,2,3,4

Group B: Social Issues – T. Wilbanks, chair

Relevant Discussion Notes: 2,4,5,6

Group C: Stakeholders and Communication – K. Jacobs, chair

Relevant Discussion Notes: 2,5,6,7

12:00 Breakout reports followed by Questions and Discussion

12:45 Working Lunch

ccsp Draft Prospectus SA Product 3.1review requested by 18 May 2004.txt
From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Tuesday, May 04, 2004 3:12 PM
To: ccsp@usgcrp.gov
Cc: wgcc@usgcrp.gov; ipo@usgcrp.gov; JAmthor; ccsp_info@usgcrp.gov
Subject: [ccsp] Draft Prospectus, S&A Product 3.1,review requested by 18 May 2004

TO: CCSP Principals
CC: Interagency Working Group Co-Chairs

Attached please find the draft prospectus for CCSP S&A Product 3.1--"Climate models and their uses and limitations, including sensitivity, feedbacks, and uncertainty analysis."

Please send your comments on this prospectus to Sandy MacCracken (smaccrac@usgcrp.gov) by COB on Tuesday, 18 April. This is only an internal government review--please do not circulate the prospectus to those outside of government. You are being asked to comment on the suitability of this draft for public review. CCSP Principals will have a second opportunity to review and give final approval to the prospectus after the public comments are received and the document is revised accordingly.

Please follow these simple formatting steps to ensure that CCSPO collates the comments correctly:

1) Include prospectus number and a short product qualifier in the subject line of the e-mail you use to submit your comments (e.g., "3.1 Climate Model Uses and Limitations").

2) Refer to page and line numbering for each discrete comment.

3) Include your contact info in case we need to reach you for clarification.

CCSPO will collate all the comments and provide them to the product leads. Let me know if you have any questions.

THANK YOU.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

Cooney, Phil

From: Peel, Kenneth L.

Sent: Thursday, May 06, 2004 8:07 AM

To: Vaughan Turekian (turekianvc@state.gov); Harlan L. Watson (watsonhl@state.gov); Kenneth L. Peel (Kenneth_L._Peel@ceq.eop.gov); Kenneth L. Peel (KLPeel@msn.com); Strong, Martina A.; Boyd, Allison; Conde, Roberta L.; Connaughton, James; Cooney, Phil; Fiddelke, Debbie S.; Graham, Thomas E.; Hannegan, Bryan J.; Holbrook, William F.; Joseffer, Daryl L.; Karp, Richard S.; Nelson, David; Noe, Paul R.; O'Donovan, Kevin M.; Onley, Kameran L.; Pearce, Heather S.; Perino, Dana M.; Sell, Clay; Shirzad, Faryar; Silverberg, Kristen

Subject: FW: UK Secretary of State for Environment Speech on Climate Change

FYI

-----Original Message-----
From: Christian.Turner@fco.gov.uk [mailto:Christian.Turner@fco.gov.uk]
Sent: Wednesday, May 05, 2004 8:22 PM
To: Christian.Turner@fco.gov.uk
Subject: Secretary of State speech on Climate Change

Please find attached a link to the speech given by Rt Hon Margaret Beckett MP, UK Secretary of State for Environment at Columbia University's Earth Institute on 3 May, entitled "Strengthening the Transatlantic Partnership on Climate Change: Good Business?".

http://www.defra.gov.uk/corporate/ministers/speeches/mb040503.htm

In sum, the Secretary of State set out the scientific case for action on climate change, outlining the policies through which the UK is currently taking international leadership on the issue. She emphasised the urgency of the challenge, and outlined the UK experience & analysis showing that GDP and emissions reduction can be "decoupled": "a 60% reduction in carbon emissions would be of the order of 0.5 - 2% of total GDP by *2050*. Put more simply, it would be equivalent to the loss of six months growth over 50 years against a backdrop in which wealth had tripled in those 50 years." She stressed the costs of inaction, the business opportunities that were giving the UK and others a "first mover advantage", and pointed to her interest in steps being taken by NE US states to reduce emissions.

If you would like any more information, please let us know.

Christian Turner
1st Secretary Energy & Environment
British Embassy Washington
Tel: (202) 588 6682
Fax: (202) 588 7915
www.britainusa.com

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GAO
Accountability • Integrity • Reliability
United States General Accounting Office
Washington, DC 20548

May 7, 2004

Mr. Otto J. Wolff
Chief Financial Officer and
Assistant Secretary for Administration
Department of Commerce

Dear Mr. Wolff:

This is to notify you that the U.S. General Accounting Office is initiating a review of three issues relating to climate change. This work responds to a request from the Chairman and Ranking Member of the Senate Committee on Commerce, Science, and Transportation.

Specifically, we plan to examine (1) efforts by the U.S. Climate Change Science Program to comply with the reporting requirements of the 1990 Global Change Research Act; (2) the possible effect of climate change on federal lands during the past 50 years and available literature on the potential impact of climate change on federal lands in the next 50 years; and (3) trends in federal spending on climate change over the past decade. The study will be conducted under engagement code 360457.

During the course of our work, we plan to contact the U.S. Climate Change Science Office and the National Oceanic and Atmospheric Administration, under the Assistant Secretary of Commerce for Oceans and Atmosphere.

This work will begin immediately and will be performed by staff from our Natural Resources and Environment team in Washington, D.C. We will be contacting you soon to set up an entrance conference.

We would appreciate your notifying the appropriate offices in your agency and identifying a point of contact for this engagement. If you have any questions, please contact John Stephenson, Director, at (202) 512-6225, stephensonj@gao.gov; David Marwick, Assistant Director, at (202) 512-6775, marwicke@gao.gov; or Anne Johnson, Analyst–in-Charge, at (202) 512-6188, johnsonak@gao.gov.

Sincerely yours,

(signed)

Thomas J. McCool
Managing Director, Financial Markets
and Community Investment

cc: Mr. Johnnie Frazier, Inspector General
Ms. Mary Mozingo, GAO Liaison Officer

Cooney, Phil

From: ccsp-bounces@usgcrp.gov on behalf of James R Mahoney [James.R.Mahoney@noaa.gov]

Sent: Friday, May 14, 2004 3:37 PM

To: ccsp@usgcrp.gov; ccspinfo@usgcrp.gov

Cc: Rick Rosen; vicki horton; Scott Rayder; TED KASSINGER; Mary Glackin; Chester J Koblinsky; Robert W Connors; Ahsha Tribble; Otto Wolff; Conrad C Lautenbacher

Subject: [ccsp] GAO Initiates an Inquiry on CCSP and NOAA

To all:

I am attaching a PDF file with a letter from Thomas McCool at GAO to Otto Woolf at DOC notifying us about a GAO review of three issues related to climate change.

GAO representatives have already contacted NOAA administrative personnel suggesting dates for an initial meeting. The suggested dates are

Monday, May 24 at 2:00 PM
Tuesday, May 25 at 10:00 AM

I invite CCSP agency, department and EOP representatives attend the initial meeting, whether it is held at one of the suggested dates or at a later time.

I propose that we have a conference call next Wednesday, May 19 from 10:30 to 11:15 AM to discuss our response to the GAO initiative.. Call setup details will be sent to you next Monday. Please plan to participate in the call, or designate a representative if necessary.

NOAA's audit staff will provide administrative support for our interactions with GAO. Our responses will be developed and reviewed on behalf of the interagency CCSP program when requested by GAO, and by NOAA directly when specified by GAO.

I have asked Dr. Ahsha Tribble (202-482-5920) to coordinate our communications on this matter. If you respond to this email, please copy both Ahsha and myself.

Thank you

Jim Mahoney

Cooney, Phil

From: ccsp-bounces@usgcrp.gov on behalf of Sandy MacCracken [smaccrac@usgcrp.gov]
Sent: Monday, May 17, 2004 1:36 PM
To: ccsp@usgcrp.gov; Robert.W.Connors@noaa.gov; Chester.J.Koblinsky@noaa.gov
Cc: ccsp_info@usgcrp.gov
Subject: [ccsp] Call-in procedure for Wednesday telecon

Good Afternoon -

Dr. Mahoney has asked me to send the call-in procedure for the proposed conference call on Wednesday, May 19 from 10:30 to 11:15am. The purpose of the conference call will be to discuss the response to the GAO initiative.

For participants, please call: 800-516-9896, and use 888503 as your code number.

If you have any questions regarding this call, please contact Ahsha (Ahsha.Tribble@noaa.gov), as I will be on leave until June 1.

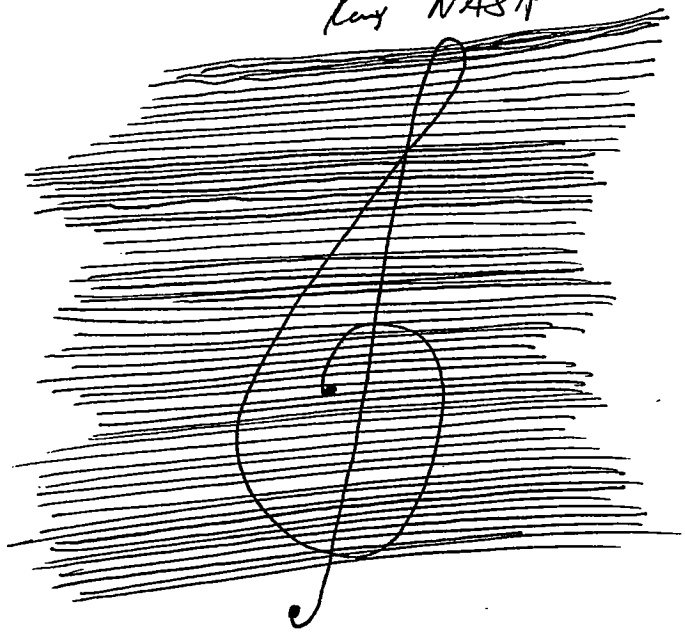
call notes:

Thank you,
Sandy
--
Sandy MacCracken
Administrator
Climate Change Science Program Office
U.S. Global Change Research Program
1717 Pennsylvania Avenue NW
Suite 250
Washington, DC 20006
Tel: 202-419-3483
Fax: 202-223-3065
Email: smaccrac@usgcrp.gov

Connor NOAA
Holgren
Gloeckler
Elwood DOE
Baer DOE
Shimek EPA
Lerner/Spence NSF
Andrews DOD
Kaye NASA

Torel - State
Ko Barrett - AID
Keegan Burke - DOT

counsel?
schedule for completion



Towards a Transatlantic Consensus on Climate Change

Villa Vigoni
VIII, 2 / May 2004

VILLA VIGONI

COMUNICAZIONI / MITTEILUNGEN

VIII, 2 May 2004

Towards a transatlantic consensus on climate change

High-Level Transatlantic Dialogue on Climate Change

Villa Vigoni, 16th-18th October 2003

Edited by
Alexander Ochs and Aldo Venturelli

Villa Vigoni

CEQ 48 PC II M.6

LETTERS

Future Global Warming Scenarios

IN A STUDY COMMISSIONED BY THE PENTAGON, Peter Schwartz and Doug Randall (1) present a very alarming scenario regarding the short-term consequences of global warming. This scenario, which predicts a shutdown of the Atlantic Ocean's conveyor circulation in the next 10 to 15 years, is based on analogies to two large and abrupt climate changes, which occurred 12,700 and 8200 years ago. Both are thought to have been triggered by catastrophic releases of meltwater stored in lakes that formed along the southern margin of the retreating Canadian ice sheet. These floods appear to have squelched deep water formation in the North Atlantic and, by as yet unknown mechanisms, caused Earth's climate to plunge back toward its glacial condition. Clearly, if global warming were to cause a repeat of such an abrupt change, the consequences would be akin to those alluded to in the warning to the Pentagon, namely, a large cooling of northern Europe. But there is no reason to believe that the impacts could occur in a mere decade, nor would they be so awesome.

"Exaggerated scenarios serve only to intensify the existing polarization over global warming. What is needed is not more words but rather a means to shut down CO_2 emissions to the atmosphere."

As the one who first pointed out the link between the Atlantic's conveyor circulation and abrupt climate changes, I take serious issue with both the timing and the severity of changes proposed in the Pentagon scenario. Computer simulations do suggest that a greenhouse-induced warming would increase the delivery of precipitation and river runoff to the North Atlantic and, further, that given a large enough warming, this excess fresh water could cause the conveyor to sag and, in the extreme, shut down. However, the time required for this to happen is more likely a century, not a decade. Further, no full-fledged global model has yet reproduced the immense impacts coincident with the two meltwater floods. We suspect that the required amplifier involves sea ice formation in the North Atlantic. If indeed this is the case, then as the globe warms, amplification by this mechanism becomes ever less likely.

Exaggerated scenarios serve only to intensify the existing polarization over global warming. What is needed is not more words but rather a means to shut down CO_2 emissions to the atmosphere. Although we are powerless to accomplish this by 2015, we certainly have the wherewithal to do it by 2075.

WALLACE S. BROECKER
Lamont-Doherty Earth Observatory of Columbia University, Post Office Box 1000, Palisades, NY 10964–8000, USA. E-mail: broecker@ldeo.columbia.edu

Reference
1. P. Schwartz, D. Randall, "Abrupt climate change," report prepared by Global Business Network (GBN) for the Department of Defense, available at www.gbn.org/ArticleDisplayServlet.srv?aid=26231

Human Being Redux

TWO YEARS AGO, AS ONE OF THE MEMBERS OF the President's Council on Bioethics, I and others on the Council outlined a logic for letting therapeutic cloning go forward. Then, as now, few favor reproductive cloning—cloning for baby-making. But cloning for biomedical research, a process that only involves cells in a petri dish and may well ultimately relieve human suffering, is another matter.

Now South Korean scientists have made a major advance in biomedical cloning ("Evidence of a pluripotent human embryonic stem cell line derived from a cloned blastocyst," W. S. Hwang *et al.*, Reports, 12 March, p. 1669; published online 12 Feb., 10.1126/science.1094515). They have shown the world that therapeutic cloning that allows for the production of stem cells, which may lead to remedies for human diseases, is possible. The hopes raised by this advance belie the fear, raised 2 years ago by those against letting the American biomedical community into this scientific hunt, that biomedical cloning would undermine the dignity of the human race. Indeed, the one million Americans who suffer from Parkinson's disease would undoubtedly feel more affronted if these advances had not taken place.

How did we get to the point where the United States, one of the world's great scientific powers, is sitting on the sidelines while this work is being done? At the center of the discussion is the belief on the part of some that a blastocyst, the entity in the petri dish, is morally equivalent to a living postnatal human being. The human embryo, the entity created by the union of an egg and sperm, carries all the genetic information of a member of the human species. Thus, those opposed to therapeutic cloning consider the embryo a human being. Of course, to develop into a human being, the embryo must be implanted into the uterus of a woman and be allowed to develop. This potential to become a human being is what sticks in the minds of the supporters of the moral equivalence argument and persuades them that manipulation of embryos for anything but normal reproduction is not acceptable.

Looking at a miniscule ball of cells in a petri dish, so small that it could rest on the head of a pin, one may be hard pressed to think of it as a human being. After all, it has no brain or capacity to think and feel. Merely possessing the genetic material for a future human being does not make a ball of cells a human being. The developing embryo that becomes a fetus that becomes a baby is the product of a dynamic interaction with its in vivo environment, its postnatal experiences, and a host of other factors. A pure genetic description of the human species does not describe a human being. A human being represents a more complex level of organization, as distinct from a simple embryo as an embryo is distinct from an egg and sperm. It is the dynamics between genes and environment that make a human being.

The South Korean scientists seem to understand these distinctions. They are not in the baby-making business. They have constructed a fence around developing embryos through a cloning process unfolding in a petri dish. Their embryos are allowed to develop for only a few days, at which time the all-important stem cells are harvested for possible therapeutic use, and simultaneously the rest of the cell mass dies. There is no slippery slope here; there is no beginning of the much-feared world of cloned humans. The South Korean scientists have found a way to let biomedical cloning go forward with all of its spectacular promise for restoring human dignity to the seriously diseased and infirm patients of the world, while avoiding the creation of a social atmosphere that might use such advances for baby making. What could be better?

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted through the Web (www.letter2science.org) or by regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

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roughly similar to the stellar mass density of the star bursting population at similar redshifts (*11*). Determining how common these massive, possibly evolved, galaxies are will require deeper and wider near-infrared imaging and spectroscopic surveys that are just now becoming feasible.

Massive galaxies may also not be easily visible or identifiable in optical or near-infrared surveys because of high amounts of light extinction by dust. In the past decade, a large population of bright galaxies emitting submillimeter radiation were found at redshifts $z > 2$ that are potential precursors of contemporary massive galaxies (*14*).

These galaxies were discovered in deep submillimeter surveys that sample rest-frame far-infrared radiation, which originates from dust grains heated by photons from massive young stars. The dust in these galaxies absorbs energetic photons, and it is not clear how much light from stars in these galaxies should be seen. However, the internal kinematics of these systems, based on the velocity width of the CO emission line, suggests that they are massive galaxies (*15*).

It is not yet known whether these systems represent a phase of evolution that relates to galaxies chosen in ultraviolet-selected and near-infrared selected samples. In addition to understanding when massive galaxies formed, astronomers are also investigating how this formation occurred. If we assume that we are not missing a large population of massive galaxies at high redshift, the higher number density of these systems at lower redshifts suggests that massive galaxies must have formed gradually through time.

How does this formation occur? There are several possibilities, including major mergers between galaxies of similar mass to build larger galaxies, minor mergers of smaller satellites, and the accretion of intergalactic gas that is converted to stars. Understanding which of these modes is responsible for forming massive galaxies is a fundamental problem that is just now being addressed.

Perhaps the most popular explanation is that the most massive galaxies formed through multiple major merger events. Major galaxy mergers are in fact a prediction of the Cold Dark Matter cosmology and are predicted to occur in simulations of galaxy formation (*1*). But understanding and tracing the extent of major mergers in the early universe is difficult. Recently it was shown that high-resolution Hubble Space Telescope imaging can enable us to determine the formation modes of galaxies. Specifically, we can identify systems undergoing major mergers by their peculiar and distorted structures. Within the Hubble Deep Field North, the merger rate and history have been traced in detail as a function of galaxy luminosity and stellar mass (*16*). Galaxies undergoing the most merging at high redshift, $z > 2$, are the most luminous and massive galaxies (see the figure). By tracing the merger history for the most massive galaxies, it appears that very few mergers occur in massive galaxies at lower redshifts (*16*). This is consistent with finding massive evolved galaxies at modest redshifts (*12*) and is in direct conflict with the predictions of Cold Dark Matter models. On the basis of these observations, it appears that massive galaxies did not form rapidly early in the universe, as in the traditional early monolithic collapse picture but neither are they forming gradually throughout time, as in Cold Dark Matter simulations.

However, it is still not clear how the merging ultraviolet bright systems at $z > 2.5$ relate to the submillimeter and near-infrared selected galaxies found at similar redshifts. It is likely that these represent various phases of galaxy evolution whose time scales are still unknown. It is also likely that the environment of galaxies is an important factor in their evolution (*13*), such that those in denser areas are forming earlier than galaxies in lower density environments. Little is understood of this effect at high redshift, but future deep-infrared surveys should address this problem in the coming years.

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OCEAN SCIENCE

Global Warming and the Next Ice Age

Andrew J. Weaver and Claude Hillaire-Marcel

A popular idea in the media, exemplified by the soon-to-be-released movie *The Day After Tomorrow*, is that human-induced global warming will cause another ice age. But where did this idea come from? Several recent magazine articles (*1*–*3*) report that abrupt climate change was prevalent in the recent geological history of Earth and that there was some early, albeit controversial, evidence from the last interglacial—thought to be slightly warmer than preindustrial times (*4*)—that abrupt climate change was the norm (*5*). Consequently, the articles postulate a sequence of events that goes something like this: If global warming were to boost the hydrological cycle, enhanced freshwater discharge into the North Atlantic would shut down the AMO (Atlantic Meridional Overturning), the North Atlantic component of global ocean overturning circulation. This would result in downstream cooling over Europe, leading to the slow growth of glaciers and the onset of the next ice age.

This view prevails in the popular press despite a relatively solid understanding of glacial inception and growth. What glacier formation and growth require is, of course, a change in seasonal incoming solar radiation (warmer winters and colder summers) associated with changes in Earth's axial tilt, its longitude of perihelion, and the precession of its elliptical orbit around the Sun. These small changes must then be amplified by feedback from reflected light associated with enhanced snow/ice cover, vegetation associated with the expansion of tundra, and greenhouse gases associated with the uptake (not release) of carbon dioxide and methane.

Several modeling studies provide outputs to support this progression. These studies show that with elevated levels of carbon dioxide, such as those that exist to-

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day, no permanent snow can exist over land in August (as temperatures are too warm), a necessary prerequisite for the growth of glaciers in the Northern Hemisphere [e.g., (*6*)]. These same models show that if the AMO were to be artificially shut down, there would be regions of substantial cooling in and around the North Atlantic. Berger and Loutre (*7*) specifically noted that "most CO_2 scenarios led to an exceptionally long interglacial from 5000 years before the present to 50,000 years from now . . . with the next glacial maximum in 100,000 years. Only for CO_2 concentrations less than 220 ppmv was an early entrance into glaciation simulated." They further argued that the next glaciation would be unlikely to occur for another 50,000 years.

Although most paleoclimatologists would agree that the past is unlikely to provide true analogs of the future, past climate synopses are valuable for confronting the results of modeling experiments or for illustrating global warming. A reduction of the AMO due to a global warming–induced increase in freshwater supplies to the North Atlantic is often discussed in relation to a short event that occurred some 8200 years ago (8.2 ka). During this event, one of the largest glacial lakes of the Laurentide Ice Sheet, Lake Ojibway, drained into the North Atlantic through Hudson Strait, quickly releasing enormous quantities of fresh water (*8*). However, to our knowledge, unequivocal evidence that this event resulted in a substantial reduction of the AMO has not yet been obtained. Notably, the Western Boundary UnderCurrent (WBUC)—which carries North Atlantic Deep Water masses (originating from the Norwegian and Greenland seas) along the continental slopes of Greenland and eastern North America—apparently remained unchanged during this episode [for example, (*9*)]. Because we cannot possibly foresee increases in freshwater inputs to the North Atlantic that could approach the magnitude of the Lake Ojibway discharge peak (the present Arctic river cumulative discharge rate is about two orders of magnitude lower), and because the effect of this event on the AMO is still unclear, further reference to the 8.2-ka event with respect to a reduction of the AMO in the near future seems irrelevant (also see letter by Broecker, page 388 of this issue).

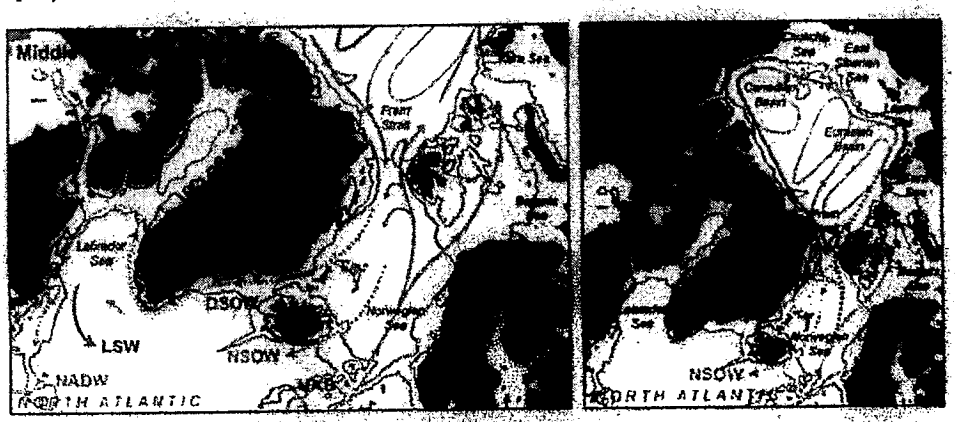
Unquestionable evidence for a substantial reduction of AMO has been found only for intervals such as the Last Glacial Maximum (LGM) and some short, particularly cold, intervals of the last ice ages (such as those during Heinrich events). During these time periods, vast ice sheets occupied the Northern Hemisphere, providing a large freshwater source to the North Atlantic through either the dispersal of huge quantities of icebergs (Heinrich events) or the direct release of meltwater into the most critical sector associated with the AMO—the northeast Atlantic. On the other hand, the most critical site with respect to sensitivity to enhanced freshwater supplies from the Arctic has been, and would be, the Labrador Sea (*10*). Indeed, convection could stop there in response to global warming, as demonstrated by recent modeling experiments, apparently without any major effect on the overall rate of AMO (*11*). Worthy of mention is the fact that the strong east-west salinity gradient of the North Atlantic, with more saline waters eastward, seems a robust and permanent feature that was maintained even during the Last Glacial Maximum, when the rate of AMO was considerably reduced (*12*).

A clear picture of the North Atlantic under high freshwater supply rates arises from its recent history. High freshwater supplies may indeed impede convection in the Labrador Sea because of their routing along western North Atlantic margins, but this would result in an increased eastward branch of AMO (see the figure). Further indication for such behavior is found in records of the Last Interglacial Interval. Relatively dilute surface water existed in the Labrador Sea, preventing intermediate water formation. However, a high-velocity WBUC existed throughout the whole period, indicating a high AMO along the "eastern route" (*10*).

The observed rate of global sea level rise during the 20th century is estimated to be in the range 1.0 to 2.2 mm/year (*3*). If one makes the clearly incorrect assumption that the entire maximum rate of observed sea level rise is a consequence of fresh water being added to the North Atlantic between 50° and 70°N, then this equates to a rate of freshwater forcing of 0.022 Sv (2.2×10^4 m^3 s^{-1}). This rate in itself is certainly too small to cause a major shutdown of the AMO, although it may be large enough to cause cessation of convection in the Labrador Sea [for example, (*6*)].

It is certainly true that if the AMO were to become inactive, substantial short-term cooling would result in western Europe, especially during the winter. However, it is important to emphasize that not a single coupled model assessed by the 2001 IPCC Working Group I on Climate Change Science (*4*) predicted a collapse in the AMO during the 21st century. Even in those models where the AMO was found to weaken during the 21st century, there would still be warming over Europe due to the radiative forcing associated with increased levels of greenhouse gases.

Models that eventually lead to a collapse of the AMO under global warming conditions typically fall into two categories: (i) flux-adjusted coupled general



Going with the flow. The behavior of the Atlantic thermohaline circulation (AMO) during the Middle and Late (Modern) Holocene (left) and the Early Holocene (right). Intermediate or deep water masses are orange; the incoming North Atlantic warm and saline water mass (NAW) is red. Cold and dilute surface currents evacuating Arctic fresh waters westward are not shown (that is, East and West Greenland Current, Labrador Current). Note the strong opposition between a high-salinity northeast North Atlantic and a low-salinity northwest North Atlantic. Maximum outflow of Norwegian Sea Overflow Water (NSOW) occurred during the early Holocene, whereas Denmark Strait Overflow Water (DSOW) peaked during the mid-Holocene and Labrador Sea Water (LSW) formation reached a maximum during the late Holocene. This east-west temporal shift is linked to increasing density of surface waters westward. Under the condition of increasing freshwater fluxes from the Arctic, the most sensitive sector of deep-intermediate formation would thus be the Labrador Sea, as also indicated by recent modeling experiments [for example, (*11*, *16*)]. The NAW pathway in the Arctic is from (*17*). NAD, North Atlantic Drift.

circulation models, and (ii) intermediate-complexity models with zonally averaged ocean components. Both suites of models are known to be more sensitive to freshwater perturbations. In the first class of models, a small perturbation away from the present climate leads to large systematic errors in the salinity fields (as large flux adjustments are applied) that then build up to cause dramatic AMO transitions. In the second class of models, the convection and sinking of water masses are coupled (there is no horizontal structure). In contrast, newer non–flux-adjusted models find a more stable AMO under future conditions of climate change (*11*, *13*, *14*).

Even the recent observations of freshening in the North Atlantic (*15*) (a reduction of salinity due to the addition of freshwater) appear to be consistent with the projections of perhaps the most sophisticated non–flux-adjusted model (*11*). Ironically, this model suggests that such freshening is associated with an increased AMO (*16*). This same model proposes that it is only Labrador Sea Water formation that is susceptible to collapse in response to global warming.

In light of the paleoclimate record and our understanding of the contemporary climate system, it is safe to say that global warming will not lead to the onset of a new ice age. These same records suggest that it is highly unlikely that global warming will lead to a widespread collapse of the AMO—despite the appealing possibility raised in two recent studies (*18*, *19*)—although it is possible that deep convection in the Labrador Sea will cease. Such an event would have much more minor consequences on the climate downstream over Europe.

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ECOLOGY

How "Virgin" Is Virgin Rainforest?

K. J. Willis, L. Gillson, T. M. Brncic

Conservation biologists increasingly use the term "wild nature" rather than "high biodiversity" to identify blocks of biodiverse habitats that have been relatively undisturbed by human activity (*1*). Their preference for this term is driven by frustration that vast swathes of biodiverse habitats continue to be lost at unprecedented rates while biologists argue about which "currency" is best for measuring the value of biodiversity—genetics, species, family, rarity, endemicity—and which regions should be selected for conservation efforts. This is especially true for the tropical rainforests which, according to current estimates, are disappearing at a rate of ~6 million ha per year (*2*). Alongside these depressing rates of destruction, evidence has started to emerge from archaeological and paleoecological investigations that many of these so-called "virgin" rainforest blocks might not be as pristine as originally thought and have in fact undergone substantial prehistoric modification. The implications of such studies for understanding the resilience and recovery of tropical rainforests following human disturbance are far-reaching and should not be overlooked by conservation biologists.

The three largest undisturbed rainforest blocks are in the Amazon basin, lowland Congo basin, and the Indo-Malay region of Southeast Asia (see the figure). Yet a number of case studies in each of these regions now suggest that prehistoric human activities were far more extensive than originally thought. In the Amazon basin, for example, recent studies indicate that regions with the most fertile soils in the lowland rainforest are those with "terra preta" soils (*3*). Formation of these soils is attributed to prehistoric burning and agricultural activities from around 2500 years ago, and in central Amazonia, estimates suggest that terra preta soils cover up to 50,000 ha. In addition, emerging archaeological evidence from the Upper Xingu region of Brazil indicates extensive late prehistoric settlements dating between ~1250 to ~1600 A.D., covering regions up to 40 to 80 ha, and supporting populations between 6 and 12.5 persons per km^2 (*4*). These were complex regional settlements indicating intensive management and development of the landscape and resulting in large-scale transformation of the forest to agricultural land and parkland. Interestingly, abandonment of the land following catastrophic depopulation between 1600 and 1700 A.D. resulted in extensive reforestation in many areas. The Upper Xingu region of Brazil now comprises the largest contiguous tract of tropical forest in the southern peripheries of the Amazon.

A combination of archaeological and paleoecological studies reveals a similar story in the lowland Congo basin. Here, there have been extensive finds of stone tools, oil palm nuts, charcoal horizons (subsoil layers of charcoal), banana phytoliths (silica bodies found in plants that are preserved in sediments and permit identification of the source plant), and pottery fragments (*5*, *6*). These discoveries have led to the conclusion that much of this region underwent extensive habitation, clearance, and cultivation beginning ~3000 years ago and ending ~1600 years ago, following a population crash. In western central Africa there is also archaeological evidence for iron-working furnaces dating from ~650 B.C., another activity that would have had a serious impact on the forest through the extraction of wood for charcoal production and smelting. A population crash in the fifth century A.D. resulted in abandonment of the land and widespread forest regeneration throughout these regions (*7*). Many forest types resulting from this former human occupation are still to be found in the lowland Congo basin. In some areas, often considered "virgin," the forests may still be undergoing a process of secondary succession (*8*).

There is even earlier evidence of prehistoric modification of the tropical rainforest in the Indo-Malay rainforest block. This dis-

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REVIEW OF DRAFT GUIDELINES
CCSP SYNTHESIS AND ASSESSMENT PRODUCTS
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General Comments

Abbott, Nat'l Assoc. of State Universities and Land-Grant Colleges

On behalf of the National Association of State Universities and Land-Grant Colleges (NASULGC), thank you for the opportunity to comment. We commend the open procedures CCSP has followed in each phase of the planning process. The pains taken to solicit public input and ensure accountability will maximize stakeholder support and scientific integrity. We trust that a similar level of openness will be maintained in preparing the CCSP synthesis and assessment products. These draft guidelines are a very positive step in that direction.

We support the inclusion of rigorous peer review and public comment periods for each product's draft prospectus and draft document. NASULGC wishes to assist the CCSP in preparing high quality products in whatever ways possible. The academic research community should be involved in every step of the process, both to provide scientific expertise and to help shield CCSP from perceptions that political bias will affect the process.

American Petroleum Institute, Feldman

The Draft Guidelines generally describe a reasoned approach to producing the identified products and ensuring their appropriate review.

Table 2-1 indicates that a large number of synthesis and assessment products will be developed and released within two years and an additional pulse of products will be released in the subsequent two years. It is likely that many of these products will be out for public comment simultaneously. Given the importance of the products, the valuable input that may be obtained through public review, and the potential volume of the material to be reviewed, it would be preferable to extend the public comment period to a minimum of 60 days.

Barlow, Atmospheric and Environmental Research, Inc.

COMMENT: If the draft prospectus were publicized more widely, more advantage could be taken of the climate community's expertise. The only specified posting is on the CCSP website and Federal Register. While no doubt the distribution will be wider, a targeted campaign to inform, e.g., AMS and AGU members would garner more and better comments and, hopefully, better engage the climate community. Broad engagement of the community is crucial to the "scientific integrity and credibility" mentioned in the first paragraph.

COMMENT: Who are the "interested parties" who select authors? Are these the same people as the "CCSP Principals" (also undefined)? This is an important role and it would be helpful to see it clearly defined. If the interest parties include anyone with relevant expertise who views the document, then a broader dissemination than just the CCSP website and Federal Register would seem to be in order. Clarity on this point is quite relevant to the "scientific integrity and credibility" mentioned in the first paragraph.

COMMENT: The specified review process does not sound like "peer review" to me, in that the traditional review process usually involves a third party, the editor, making final adjudications between reviewers and authors whereas here, as far as I can tell, the final decision on reviewers comments is made by the (unspecified) CCSP Principals, who are not disinterested parties. If the CCSP Principals include government employees, as appears to be the case, political pressures may make it difficult for them to provide an unbiased assessment of reviewer comments and author responses, potentially seriously undermining the credibility of the process.

Dilling, NCAR

One of the most important lessons that we have learned from previous assessments and syntheses is that the process is as important as the information in the formulation of a successful product. The GEA group at Harvard has summarized it thus: credibility, saliency and legitimacy all must be balanced in every assessment process in order that the assessment achieves its presumed target—of providing useful, timely and relevant scientific information to decision-makers. I believe that certain aspects of each of these features are missing from the current draft guidelines for producing CCSP Synthesis and Assessment Products.

Let me first address legitimacy. Legitimacy can be defined as the "perceived fairness of the assessment process." In this case, it means involving in as fair a way as possible as many participants as possible who hold a stake in the information and how it is conveyed. This might mean scientists, federal and state agencies, businesses, non-governmental organizations, etc. I am concerned that the description of the development of a prospectus and author selection (under Phase I) does not adequately address this issue of legitimacy. The description of Phase I does state that the lead agencies for each product will involve the public and scientific community to define the prospectus. However, given the extreme time constraint that many agency folks are working under, this could devolve simply into agency preparation of a prospectus and then 30-day circulation and peer review of a draft for public comment as required in line 37. This is not an adequate process for involving stakeholders. The questions, potential authors, overall goals etc. must be jointly defined with the groups most heavily affected by the information for the documents to be seen as legitimate. Setting the agenda and the questions is generally seen as the most important phase of the assessment process, and therefore the most critical phase for creating joint ownership by involving multiple stakeholders. A comment period is simply not interactive enough. Adequate time must also be allowed in order to build up the level of trust between participants in the process. The reason that the prospectus is so important is that the rest of the whole process and ultimate end product flows from that prospectus (page 2 line 9 and 10).

Credibility in this case will stem from the authority and position of the authors involved and the source of data. I am concerned that author selection remains only in the purview of the lead agencies (page 2, line 1). While agencies certainly are a major stakeholder in the assessment process, they are not the only stakeholders. Selection of authors is another key part of the process that should involve multiple stakeholders, so that the legitimacy

will be enhanced. I suggest that authors be selected after an open process involving stakeholders from several groups. If the Federal Government is seen as the only "owner" of the assessment report process, the credibility of the product will be reduced.

Saliency is the third generally accepted criteria for producing a successful assessment process. Saliency is how relevant the information is to the audience. Again, this is an area that could be improved by making a stronger commitment to involving those outside the Federal government or scientific communities. If the questions are defined partly in the public, business, state and local government, and non-governmental organization realms, then the results of the assessment process will be much more relevant to them.

Second general comment: There are too many assessment reports promised in the CCSP.

Third general comment: The time for production of reports is very short, almost too short to do the process properly if you actually involve stakeholders. Reconsider which reports are really needed (maybe through an open stakeholder dialogue process??) and prioritize.

Fourth general comment: The role of Scientific Steering Groups (SSGs) is not mentioned. SSGs would be very helpful in representing the scientific community in these dialogues and processes.

Fifth general comment: The agencies are listed as the major entities responsible for the production of these assessments (page 4 line 18-22; page 4 line 26-38). It is not clear that the agencies have the time or mandate to play such a role. While responsibility certainly must be assigned, again, the CCSP might consider an alternate process that gives a wider range of stakeholders a role in these products, including of course the Federal agencies. Independent assessments, and processes that receive open debate and participation almost always have greater credibility.

Edison Electric Institute

According to the March 29, 2004, "Dear Colleague" letter on the U.S. Climate Change Science Program (CCSP) Website titled "Invitation to Submit Comments on Draft Guidelines for Producing CCSP Synthesis and Assessment Products," the expected "products are described" in Chapter 2 of the July 2003 Strategic Plan and are "intended to provide useful information for a variety of end users about key climate change topics." The letter added, "The products include reports, data sets, and evaluations of the uses and limits of climate information in decision support."

Chapter 2 of the Strategic Plan sets forth five CCSP "Goals" and provides in Table 2-1 a summary of 21 "Synthesis and Assessment Products -- Topics to be Covered" by 13 federal lead or supporting agencies over a period of four years starting October 2003 (according to the Website document). According to the Strategic Plan, these agencies are: Agriculture, Commerce, Defense, Energy, Health and Human Services, Interior, State and Transportation, together with the Agency for International Development, Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, and Smithsonian Institution. As explained in Chapter 2 of

the Strategic Plan, the table provides a "target time frame for completion of each product" that ranges from two to four years and indicates that products "will fulfill the requirements for updated synthesis and assessment" contained in section 106 ("Scientific Assessment") of the 1990 Global Change Research Act.

The Draft Guidelines appear to integrate, in part, some of the details set forth in the Principles and Procedures of the Intergovernmental Panel on Climate Change (IPCC) for the preparation, review, acceptance, adoption, approval and publication of IPCC reports with the requirements of applicable federal statutes, such as the 1990 Global Change Research Act, Federal Advisory Committee Act, Information Quality Act and those statutes specifically applicable to the lead and supporting agencies, such as the Department of Energy Organization Act of 1977, and their applicable regulations, guidelines and policies. Indeed, Dr. Susan Solomon – a senior scientist of the National Oceanic and Atmospheric Administration (NOAA) and co-chair of IPCC Working Group I – gave a presentation about the draft guidelines in the context of the IPCC procedures at an April 8, 2004, "Workshop on Issues in Global Change" held by the Global Change Coordinating Committee at the National Academies. She pointed out that the IPCC "takes more than 2 years to produce a major report" that involves developing a "zero-order draft, informal review, first order draft," etc.; that the IPCC "assessment conclusions are fully grounded in well documented peer-reviewed literature"; and that this "IPCC system . . . means that the structure and content of the report is determined by scientists." She said there is "a clear demarcation of roles and procedures between the stakeholders/Governments and the scientists who produce the report," which "gives credibility to the process and allows scientists to become involved without fear their work will be manipulated." In specifically addressing the guidelines, Dr. Solomon said that there is a need to "[c]larify and document exact roles of all involved in CCSP assessments and procedures to be followed, especially in the review process"; that the "CCSP review proposal does not appear to be staged to address its audiences sequentially"; that "rushed reports pay the price in quality"; and that the "CCSP would benefit from defining the process for stakeholder inputs."

Since EEI participated in the development of the "Principles and Procedures Governing IPCC Work" over several years, culminating in their final adoption in April 1999 in San Jose, Costa Rica, we are quite familiar with them. These draft guidelines appear to be an attempt selectively to borrow some portions of the IPCC provisions, which are well integrated in the IPCC process, while leaving aside many of the other parts of the IPCC provisions. The "CCSP Guidelines" cannot and should not attempt to emulate portions of the IPCC procedures, which were developed after long debate primarily to address the roles and responsibilities of authors and governments of the IPCC in that process. In short, the IPCC process is not well suited for these U.S.-only guidelines, which must comport with applicable federal law.

The underlying assessments are the work of the authors (*i.e.*, scientists and technical experts). They are reviewed by the appropriate IPCC Working Group and accepted by the IPCC, while the Synthesis Report is reviewed and approved by the governments

acting as the intergovernmental panel. The only opportunity for stakeholder input is through their governments, not directly at the IPCC sessions.

Nevertheless, Dr. Solomon's comments are generally on point with respect to the "roles" of all involved, including stakeholders from business, industry, agriculture, labor, environment, the public, government and non-government scientists, and other technical experts. Their roles, the timing of their roles, and input opportunities need to be better clarified in the guidelines, taking into account the several statutes and related statutory requirements referred to above that are applicable to federal departments and agencies, but not to the IPCC.

Similarly, the draft guidelines need to better explain the roles of the CCSP, CCSP Principals, and working groups and various committees and subcommittees vis-à-vis the lead agency (or agencies) and the authors for each product. The CCSP, the Principals, the groups, etc. seem to have a review/approval role as well as a drafting and coordination role, both of which seem to overlap with the responsibilities of the lead agency (or agencies) and the authors. However, except for the selection of authors, the role of the lead agency (or agencies) is not well-defined, and they do not appear to have any role in the review/approval process, which is unusual.

It is our understanding that in the case of a number of products, the lead agency (or agencies) will not, unlike the IPCC, have the luxury of taking more than two years to produce a final product; that they are to collaborate with interagency groups and committees; and that their product, also unlike the IPCC, is not to be based solely on peer-reviewed literature, but will include, as noted in chapter 2 of the Strategic Plan, research results.

Indeed, chapter 2 explains that "[i]ntegration of research from agency programs and research elements is an essential component of the development of synthesis products and assessments that address CCSP goals." For each goal, the chapter includes "Examples of Key Research Activities" that "are not meant to constitute exhaustive lists" and explains that each of chapters 3-9 "describes research questions; provides an overview of the current state of knowledge"; and, among other things, "outlines milestones, products, and benefits from the research." The "completion dates" or "milestones" "range from 2004 to 2007 (greater than 4 years)," which are similar to the 2-4 year targets for the 21 listed products for chapter 2. However, the guidelines apparently are not applicable to the research "products" in chapters 3-9, and they do not discuss how and to what extent the lead agency (or agencies) and the authors are to integrate such research results in the products. If, as the Strategic Plan suggests, such "integration" is important and, as Dr. Solomon points out, "rushed reports pay the price in quality," at the very least the prospectus should address how this "integration" is to be reasonably achieved. It should include reasonable limits, as appropriate, on the research to be integrated, considering the 2-4 year targets established for the 21 products, although it is our understanding is that these time frames or milestones are not rigid deadlines.

We also note that the guidelines and the Strategic Plan apparently do not provide an opportunity for stakeholders, like EEI, to offer suggestions, possibly as part of the prospectus review, for additional issues to be considered by the lead agency (or agencies) in the development of the products. Consideration should be given to providing such opportunity during the public comment period for the prospectus.

Second General Comment

The role of the lead agency (or agencies) under the draft guidelines needs to be clarified in light of applicable statutes. In Phase IV, the guidelines state in one place that the lead agency (or agencies) "are responsible for developing products in conformance with these guidelines," but adds that the lead agency (or agencies) "will" report "regularly to the CCSP Office" and in other Phases that CCSP Principles have a review and approval function. In the case of the Interagency Working groups, Phase IV states on the one hand that they "may play a limited role related to scoping and/or reviewing," but then indicates they may have a role in drafting the "reports." The guidelines need to define clearly these roles. The lack of such a clear definition leads to conflicts or ambiguous authorities.

The Guidelines should reflect careful consideration of each point in the process of product development where there may be conflict with the roles and responsibilities of the lead federal agencies. The involved federal agencies should have ultimate responsibility for the CCSP synthesis and assessment products. For example, it does not seem appropriate for the guidelines to provide authority to the CCSP Principals (expressly or by reason of ambiguity) that could undermine the authority of the federal agencies to carry out their respective responsibilities under applicable statutes. It is fine for the CCSP Principals to perform functions that facilitate a comprehensive and consistent approach to product development, but it is quite another thing to cloak CCSP Principals with express or implied ability to second-guess federal agencies in carrying out their responsibilities.

Knowlton, Columbia University

-First general comment: A flow chart would be very helpful in clarifying the process steps for "Phase III: Review and Revision."

-Second general comment: In 2 cases (CCSP Goal 2.1 and CCSP Goal 3.1) the US DOE is designated as the sole lead agency. These two topics (updating greenhouse gas emission scenarios and concentrations for 2.1; limitations of climate models including uncertainty, 3.1) are among the most controversial and most highly politicized aspects of climate change science. While DOE has expertise in energy utilization and emissions inventory analyses appropriate to Goal 2.1, there are other more biological components of emissions (forest cover, agricultural sources, etc.) for which other agencies would be appropriate as co-leads (EPA, USGS, NOAA). For Goal 3.1, EPA or NOAA aew suggested as a co-lead agency, owing to their expertise in risk assessment and uncertainty analysis. In both cases this additional expertise would contribute to DOE's review strengths, and could help reduce possible public perception that DOE has been charged as lead agency on the two topics that are most sensitive with the current administration.

Neuman, Preserve Our Climate Coalition
"Scientists must feel confident that their participation in these assessment processes and the resulting products will be free from political interference."

"The CCSP's ambitious research plan overlaps considerably with the IPCC Fourth Assessment Report process. The US scientific community must be able to reasonably contribute to both efforts."

"Assessments should ideally be reasonably balanced on both results and process, such as engaging stakeholders through a variety of interactive approaches and ensuring that decision support needs are identified and met."

MacCracken, Climate Institute
1. The Proposed Guidelines Seem Unlikely to Meet FACA Requirements: Based on the discussions that went on in organizing the US National Assessment and its various activities, investigation needs to be done to determine whether the proposed guidelines meet the requirements of the Federal Advisory Committee Act (FACA). Any time that an agency or set of agencies plans to formally convene a designated set of individuals more than one time (as would seem to be necessary to generate the types of products that the CCSP is proposing), FACA requires that an advisory committee be formed and the FACA requirements on procedures and notifications be met. For the US National Assessment, the National Assessment Synthesis Team was formed as an advisory committee under NSF auspices on behalf of all of the USGCRP agencies, and the FACA guidelines for operating procedures applied (including about how members be chosen, etc.). It is not at all clear to me that the draft guidelines meet the FACA requirements for how the group would be legally required to operate.

Forming an advisory committee was not required for the regional teams as these were based in universities. In basing responsibility for an assessment in a university, however, the agency cannot then come in and exert the types of controls and reviews that are proposed in the draft guidelines—depending on the type of funding arrangement, up to full control must be given to the university team. For the sectoral teams, which were co-chaired by a scientist from a university and one from a federal agency laboratory or center, the FACA question did arise, but because the funding for these efforts was again generally handled through a university, an advisory committee arrangement was not deemed necessary. Again, control over the report was granted to the sectoral author teams and the types of reviews and controls envisioned in the guidelines would not have been allowed. For both the regional and sectoral reports, there was an expectation that there would be expert and stakeholder reviews, and this occurred, with the authors retaining control of the reports.

The issue of needing to form an advisory committee also came up with regard to the "blue ribbon" review committee that OSTP wanted to have watch over the process. Ultimately, this was done by having two members of the President's Council of Advisers on Science and Technology (PCAST), which was chartered as an advisory committee, co-chair an ad hoc panel that also involved some other experts in the review process. The

meetings of this ad hoc panel, which did not include a majority of the PCAST members, were permitted as long as the results of the meetings were presented to the full PCAST at an open, FACA-qualified meeting.

In that this issue of meeting the FACA guidelines was one of the matters raised in the first lawsuit about the National Assessment, I would very much urge that the legal counsels of the agencies be consulted to make sure that what is proposed meets the legal requirements.

The guidelines already start to point toward what might be a pathway for dealing with this FACA requirement. In particular, on page 1, lines 10-12, agencies are allowed to ask outside scientific entities to take on this task. This might be done under the auspices of one advisory committee that the CCSP agencies might jointly form (a suggestion of the NRC Graedel report for advising on the research effort)—again, it would have to meet all the various requirements. In that the advisory committee would now be the responsible entity for the reports, the agencies would need to cede many of their indicated responsibilities to this scientific advisory committee, such as being the final arbiter about whether the authors of the assessment reports had satisfactorily addressed matters raised in the various review processes, and whether an agency set of comments might be trying to force an unjustified change in the science. Such a path to dealing with the FACA issue would, of course, require a total rewriting of these guidelines and a conceptual change in how the documents are to be prepared.

While setting up all panels as FACA-qualified entities might seem an option, agencies are generally reluctant to set up advisory committees and the government-wide coordination office for advisory committees actively limits the overall number of committees and the number for each agency. Thus, doing the reports in this manner might well be problematic.

2. Over-involvement of the Agencies in the Process: While the intent of those who prepared the guidelines may have been more benign, the guidelines as written and read literally would seem to allow for significant over-reaching by the agencies, and in particular by political appointees. Involving the agencies so fully in the preparation of the report (e.g., going so far as to decide what references are and are not acceptable) and in the final reviewing and approval of the report will seriously compromise the scientific credibility of the report. Just as for the chapters and the technical summary in the IPCC process and for all the reports in the US National Assessment process, the reports of the scientific experts need to be accepted, with the agencies (or governments) certifying that they have gone through the proper process rather than attempting to get all agencies to agree to every word in the whole report.

For the US National Assessment process, we recognized that each agency would have its particular interests and priorities and perspectives, and that it would therefore be virtually impossible to get all agencies to formally approve the reports, especially in the event of a formal government-wide NSTC review. In addition to being impractical, imposing the type of a process proposed in the guidelines will legitimately bring the credibility of the reports into serious question (recall that many now in the Administration charged that National Assessment reports that did not even have a political review were politically controlled). The reviews by both the CCSP principals and even more by the NSTC mean that politically appointed officials would be

controlling what is in what are said to be scientific reports. In my view, both personally and as president of an international scientific association, the guidelines would permit completely unacceptable interference with the independent expert role that scientists are expected to fulfill.

Were these reports to instead be the equivalent of the summaries for policymakers (SPMs) that are prepared by the IPCC, involvement of the levels of officials that are named would be acceptable, provided that it is made clear, as is the case in the IPCC process, that both the report's scientific authors and the officials must be in complete accord with regard to the content. In particular, the IPCC is very careful to say that the scientific experts can refuse to accept any suggested change if it is not technically correct. Their SPMs are intended to be like the type of conversation a doctor (analogous to the scientist) and an interested patient (analogous to a government official) might have—the content of the discussion must be technically correct, but in terms that a non-expert can understand, covering the questions and issues that the non-expert is interested in, and framed in terms of levels of confidence, likelihood, and uncertainty with which the non-expert is experienced. So, jargon and concepts of scientific certainty and uncertainty need to be translated into terms that a non-expert is comfortable with, and the expert needs to be willing to convey their best judgment and prognosis—not simply hide behind obscure summarizations of the scientific literature. For this process to work, however, the process must be an open dialogue rather than being closed and done through an arms-length exchange of information controlled by just one side of the conversation.

Thus, it seems to me that in this context, the guidelines, as they are, are unacceptable, and they need to be refined to ensure that the scientific findings cannot be changed from those that are scientifically justified in the view of the expert authors, not the agency principals. This type of relationship should also be more comfortable for agencies, as, while individuals in agencies may be quite knowledgeable and have views, the research agencies should not be taking stands on scientific issues, but rather should be supporting the necessary, high-quality research needed to make sure that experts can come together to state key issues in a responsible and useful way. Agencies should be deciding if the evidence provided is sufficient to prompt action of various kinds, but should not be deciding that, for example, the climate sensitivity is really between 2.5°C and 4°C rather than 1.5°C and 4.5°C, or something similarly technical. If the evidence is not sufficient, the agencies should be supporting the types of research to get the scientific community to be able to get to that point—and the scientific community can be a source of information about what types of research might be needed if provided some indication of the degree of confidence that is needed. But, to repeat, agencies should not be deciding the scientific questions; yet the way these guidelines are set up, that appears to be how the agencies are to be involved. The situation unfortunately seems somewhat analogous to the way the Catholic Church's Roman Curia of several centuries ago was set up when dealing with Galileo; this approach for agencies coming to findings on scientific matters—that is, with the agency principals or higher levels in charge of deciding what can be said—has been widely recognized as a mistake in the past, and should continue to be considered unacceptable.

3. Overlap with the IPCC Process: Given the set of topics proposed, the indication that the panels appointed can be international, and the indication that the review will be such

that the results will essentially be, or at least could be perceived to be, government policy (in that the results are being approved at the political level), the proposed activity and process is a serious intrusion into areas that have previously been delegated to the Intergovernmental panel on Climate Change (IPCC) by the governments of the US and the many other countries that are party to the UNFCCC. As such, the CCSP process would seem likely to seem offensive to other countries (will the US be coming to the IPCC with an open mind or with a foreordained position that it will not under any circumstances change?), will be seriously intrusive on the time of the scientific community presuming both approaches are to proceed (thereby meaning that the US scientific community will be able to do less than its best for both), and will cloud public and international understanding by returning to a situation where there is, at least in principle, more than one source of authoritative information (which is just the reason that the IPCC was formed to avoid). While it would be quite helpful to sponsor scientific reviews of various topics in addition to those that the IPCC is supporting, both beyond the area of climate change and in thinking about how the findings about climate change and its impacts apply to the specific situation facing the US and its environment and society, having the US Government producing what appear to be official (politically correct—or at least approved at that level) government positions on topics that the US and other countries have already delegated to the IPCC, will be detrimental to international relations, the scientific community, and public understanding.

4. **Underinvolvement of Stakeholders in the Process:** For many of the proposed topics, government leaders are not the only ones, and maybe not even the primary ones, interested in the outcome. For such stakeholders (e.g., state land and water managers, etc.), involvement in the process of preparing the assessment is absolutely vital. To really gain the confidence and participation of stakeholders, which is indicated as something to be encouraged in the research plan, the stakeholders have to have an opportunity for real involvement in the process, and this means with respect to every stage from outlining the need to reviewing and commenting on the final product. While there are currently a number of opportunities for such involvement and participation, that the final decisions are all elevated to the agency level, and with no indication that the reasons for any of the decisions will be publicly released and explained, the participation of stakeholders looks to be more *pro forma* than real.

With the Administration currently using the excuse that Executive Office comments on the CCSP's draft plan are part of the government deliberative process and are therefore not available through the FOIA process, it is not at all clear that the comments made by the agency principals and agencies would be made part of the public record. For the public, and particularly for important stakeholders, to have confidence in the credibility of the assessments and syntheses, it is important that all inputs leading to changes in the text be open for all to see so that stakeholders (including the scientific community) can know that their findings are not being altered for political purposes. The research plan at present very much gives the impression that it will be the agency leaders who decide, for example, when some finding is certain enough to be useful to stakeholders rather than letting each stakeholder decide for themselves whether the level of confidence is enough for their particular situation. The present set of arrangements seems to be making the agency principals the "lords of the manor" with everyone else

being court attendants or serfs. This is not the way to design a system that will win stakeholders to your side.

5. Reviews and Assessments by Other Entities: In proposing that agencies could collaborate with other entities on these studies, it is not at all clear what types of collaborations are being allowed. There is an indication that one example could be collaboration with the NRC, and this might be a very appropriate choice in some instances; however, in doing so, I would presume that the NRC would insist on its complete independence from agency involvement in the process of the choice of authors, report content, the review process, etc. Mention is also made of doing studies with international organizations, and it may be that what might be envisioned is the Department of State collaborating with the IPCC. If this is the case, it should be realized that the IPCC process would then govern. Under IPCC guidelines, US agency and political oversight on preparation of the IPCC chapters and technical summary would be limited to submitting review comments so as not to interfere with the independence of the IPCC demanded by all the world's nations. The IPCC properly ensures that the scientific expert authors have the final word with regard to the content of their chapters.

If such delegations of responsibility to the NRC and IPCC are to be considered acceptable, and I would encourage this, then it does raise the question of why these guidelines should be vesting control of assessments about other issues in the hands of agencies and political appointees, as is proposed.

6. Assessment Must be an Author-Controlled Process: The present guidelines seem particularly inhibiting, indicating that all that is going to be done is to prepare a report that is under the strong control of the CCSP principals. Experience has very clearly taught that assessment needs to be viewed not just as a periodic report, but, at least importantly, as a learning process for the participants (and one that often goes beyond preparation of one report). To really advance scientific understanding, the author teams need to be allowed reasonable flexibility so that what is learned as they are assembling information can help to shape how the questions are posed and explained. The present guidelines seem to impose a rigid and time-consuming oversight process that will stifle productive scientific efforts to expand understanding. The agencies need to pose the general question they want to have addressed and then let the experts in the field (and coupled fields) work to formulate and reformulate the detailed structure and questions in order to find the best way of summarizing expert understanding and insights. If instead, the agencies predefine the entire scope and then allow only the changes that they approve, the process will be stiff and unproductive.

7. An Active or Passive Assessment: Assessment is generally considered to be more than simply a review of the literature—if all one wants is a summary of what is in the literature, go to a professional writer/compiler. An assessment requires making judgments and integrating knowledge. At times there may not be enough information to make a judgment because the right type of analysis has not been done, even though all the information is there to do it. In such cases, it is not uncommon that an existing, peer-reviewed capability (e.g., a model or data set) might be used to evaluate or explore a somewhat related question or issue. The guidelines need to make clear that the scientific

authors are empowered to undertake such additional analyses and evaluations (some may be as limited as replotting information in different ways, others may require using peer-reviewed models in alternative simulations, others may require comparing the results of different models on the same test problem, requesting an author to run an alternative case or to further explain some point, to inquire into why different authors might get different answers to the same question, etc.)—that is, the authors really need to be allowed to have the power to assess, synthesize, and evaluate. These assessments are only likely to be of real value if such an active type of effort to assess is provided for; limiting the authors to passively combining and condensing only what is in the literature will not move scientific understanding forward any faster than does simple publication of articles in journals and being provided a bibliography. To undertake such efforts will require some financial support, and this is likely to mean more than simply the cost of traveling to meetings. The program needs to find a way to support the time of the authors to actually do some of this work.

8. Review Process: The drafters of the guidelines are to be commended for wanting there to be a full review process, including, especially for important reports, a Federal Register review process. Reports in the area of climate change need to communicate to such a wide community with such a variety of experiences and interests that having a full review process is necessary to make sure that findings and conclusions are clearly expressed, that all relevant research and evidence has been considered and evaluated, that experts and stakeholders both have opportunities to indicate their concerns, and that the right questions and issues are being posed. While such openness can make the process somewhat burdensome to authors, it has been my experience that the IPCC review process and the National Assessment review process, both of which involved multiple stages, led to significant improvements of the respective reports at all stages along the way. It has been my impression that doing anything less, and this includes doing only the very limited review that is carried out in confidence by the NRC, does not ensure that all of the various aspects that need attention get the attention that they deserve. For reasons of credibility, ensuring that everyone who might be interested has an opportunity to comment is also critical, and the attempt of the draft OMB guidelines on peer review to ensure adequate review make a mistake, in my opinion, in proposing to limit the set of potential reviewers—it should not matter from where a comment comes; what should matter is whether a comment makes a sensible point or not. So, I would encourage the CCSP leadership to revise the guidelines to ensure that reports are exposed to wide review, that all review comments are made public, and that the responses of the author teams are prepared and promptly made public.

9. Public Availability of All Information: If indeed the intent is to ensure the most credible summarization of an issue or question, then the full process must be open and documented. This will necessarily be accomplished if the FACA guidelines are applicable, but whatever system is utilized, there needs to be full public disclosure of the various drafts and of all comments made (including whom they are made by) and full documentation of why changes are or are not made. The IPCC has pioneered this effort, and this was done for the National Assessment process via the FACA and FOIA process requirements.

10. Time Required for an Assessment or Synthesis, and Narrowing the Set of Products to Subject to this Process: Given the structure that is being set up, the many stages and review requirements, this is going to be a quite time-consuming process. Even with diligent work, it seems unlikely that the various steps could be gone through in less than two years for any significant topic. For this reason, it really does seem that such efforts should be limited to the larger and more encompassing of the various topics, leaving the scientific reviews and syntheses on narrower issues to alternative mechanisms that do not necessitate such intense agency involvement. For example, while it would be nice to have a summary report on the detection and attribution of climate change, or on temperature change in the lower troposphere, such reviews should be left to the IPCC process or to articles prepared for journals. On the other hand, topics such as developing scenarios for the United States, much less for the world, do need a full effort that involves a wide array of inputs and reviews. And of course, the next assessment of the importance of climate change (or other aspects of global change) for the US should be done through such a structured (but open) process. Thus, I would urge the CCSP to select only a few reports from its list of near-term deliverables to be subject to the guidelines that are finally adopted. On purely scientific issues, leave out all the agency involvement and encourage the scientific community (including the IPCC) to instead carry out the synthesis, as is done today.

Making thoughtful choices of topics is also going to be important because it is very unlikely than any of the proposed assessments will completely and finally resolve an issue. As for the IPCC assessments, there will be a need to go back over a topic again and again as scientific understanding advances. Such assessments may not be needed every 2 or 4 years, but with new topics likely to arise and the need to update and redo various of the assessments, keeping the set of assessments to a manageable number will require very careful selection.

Moser, NCAR

1. ***While a clear delineation of rules governing the production of CCSP synthesis and assessment (S&A) products is welcome, it is yet again disappointing that the guidelines reflect only (but strongly) a traditional focus on <u>products</u> while understating the <u>process</u> component of assessment efforts.*** It is as if the CCSP had not learn from the First US National Assessment (though the shear fact that you define rules before engaging in any further synthesis and assessments (S&A) is progress!). It is as if you had not listened to the NRC Final Review of the CCSP Strategic Plan, which stated repeatedly that the lessons learned from the NA have been entirely neglected in the plan. I suggest several ways (here and in the specific comments section below) to improve on this overall impression:
    a. ***Include an explicit statement that lead authors have the liberty to engage stakeholders in additional ways*** to the ones delineated in these draft guidelines (for examples see the NRC Review);
    b. ***Greatly improve on your ideas about communication***. Currently, this is something organized and implemented apart from the S&A process, conducted by lead agencies, and only at the very end of the process. That's too late to begin, and raises serious doubts as to whether the product will

be effective decision-support (see NRC Review, Chapter 2, "Decision Support")

2. ***The document current lacks any specific guidance to lead authors on linking the product with CCSP goals that each product is intended to have.*** The guidance on p.1 is far too vague and should be improved. This will give Congress (the funders!) and the general stakeholder public some confidence that the products will actually reflect and respond to the identified needs in the Strategic Plan.

3. ***The guidelines need to emphasize more strongly that and how S&A products will respond to the specific, and purposefully identified needs of decision- and policy-makers.*** This comment echoes the NRC recommendation in its review of the Final Strategic Plan (Chapter 2, "Synthesis and Assessment Products"). Again, this obviously can only be done through careful, sincere and intentional (and frequently only in face-to-face) interaction with the decision-makers the product is meant to serve, and should be done from the get-go, not only at the very end of the process. What is needed in these guidelines is greater specificity (through examples) and simply greater freedom for lead authors to conduct full scoping exercises. Many stakeholders will not read announcements on the CCSP website or in the Federal Register, thus mere public comment periods will not satisfy the need to engage, jointly explore and learn what stakeholders truly have at stake, and what their information and decision-support needs are. As the NRC Review stated:

   > *"An additional benefit of conducting assessments is that they can serve to build and sustain constituencies, educate stakeholders, and build capacity in affected communities, while ensuring that communication channels between the scientific and decision-making communities remain effective avenues for decision support."*

   To truly accomplish this, more than written input from stakeholders is required. Trust-building through direct involvement throughout a process is the key to success. Thus, these guidelines should reflect encouragement of such interactive processes.

4. ***Shielding from political influence of scientific S&A products breaks down at final stage of review process.*** Again, my comment echoes a recommendation made by the NRC in its review of the Final Strategic Plan (see Executive Summary Recommendation on "Maintaining Scientific Credibility of the Program"). The two main ways in which independence from political motivations breaks down are:
   a. Government experts/scientists as peer-reviewers – by these rules – are not free and independent from political pressures (see Specific Comments below, incl. suggestion on how to fix this).

b. The final reviews by CCSP Principals and the NSTC (especially with its closeness to the White House and cabinet members) are completely unspecified and offer ample opportunity for political twists on scientifically peer-reviewed S&A products (see Specific Comments below and recommendations on how to fix this).

Many scientists – especially during a Bush Administration – will be reluctant to participate in any synthesis/assessment process unless you can guarantee freedom from interference of the political process. This is obviously highly problematic, given the ambitious nature and goals of the CCSP.

5. ***As the NRC warned, the ambitious goal of producing 21 S&A reports over the next four years may well lead to major capacity problems or at the very least assessment "fatigue"*** (see NRC Review of Final Strategic Plan, Chapter 2, "Synthesis and Assessment Products"). Heeding this warning and accounting for that very likely problem, the guidelines should include a statement that gives the lead agencies, in consultation with potential lead and contributing authors, the leverage to make a recommendation that only limited, scaled-down, partial or preliminary S&A products be produced, including a clear recommendation at what time a fuller S&A product can be expected.

Mutter, The Earth Institute at Columbia University (NOTE: Mostly commenting on the Strategic Plan itself – not the Guidelines)

I was very pleased to see that the final draft of the US CCSP Strategic Plan included most of the comments and suggestions submitted during review of the first draft by members of the Earth Institute at Columbia University. I greatly appreciate you using our input. I was particularly pleased to see the increased emphasis on capacity building and partnerships with developing countries.

I would, however, like to encourage you to recognize and make appropriate emphasis in your efforts going forward that climate variability and change, regardless of its origins is sure to have disproportionate effects on poorest nations of the world. In these countries millions of people live on the edge of survival, barely meeting basic needs for life. Even small changes that could be managed in rich countries will send these poor regions into disaster and collapse. Humanitarian crises could follow. In the rich world, where our needs are met and considerably exceeded, we make the largest contribution to climate forcing through greenhouse gas emissions but have adaptive capacities that greatly exceed those in poorer countries.

The leadership position that we must take in climate science here in the United States must focus efforts on understanding the effects that climate change will have on poorer countries, in building adaptive capacity there and in mitigating the effects.

As the CCSP moves forward with the Synthesis and Assessment Reports listed in chapter 2, it is extremely important that the very great differences in the way climate variability does and will effect rich and poor countries is acknowledged and addressed in a focused

program of directed research. This can be done by obtaining input from developing countries, themselves and from organizations that work in those countries.

These issues were recently tackled in depth at two major conferences hosted here at Columbia University: the State of the Planet and Earth's Future: Taming the Climate, and were summarized in the State of the Planet Consensus Statement. You can find more detailed information about the results of both of these events, which brought in experts from around the world, at our website (<http://www.earth.columbia.edu/>www.earth.columbia.edu).

The Earth Institute at Columbia has as its mission the mobilizing of science to address the needs of all humankind but especially those of the poorest who have such limited capacity to deal with their own daunting problems. We are ready to assist in any way as you go forward with the CCSP and CCRI initiatives.

Parkinson, NASA Goddard
The guidelines are readable and clear. My main recommendation would be to add a Phase V along the lines of:

"Phase V (as needed): Revision of Products Post Initial Release.
Recognizing that once a data product begins to be used, flaws are often identified and it becomes clear that an improved product is desirable, a CCSP-sponsored product will be able to be revised and submitted for a new scientifically-rigorous peer review. The revised product will have a new version number associated with it, to distinguish it from the original product. If the revised product is produced by the same individuals as the original product, it will only need to repeat Phases III and IV, but if it is produced by a different group, it will need to go through Phases I-IV."

Prather, University of California, Irvine
The draft guidelines for the CCSP Synthesis and Assessment Reports have an excellent design. It follows in many ways the IPCC process and has a good combination of participation and external review. The only question I had was: What does publish mean exactly? Although the backup science will appear in regular journals and some of these reports could readily be published in the standard peer-reviewed literature as review papers, I think that CCSP will need to establish a more reliable and uniform method of publication with a regular publisher. As planned, the reports (like the IPCC) will be more thoroughly reviewed than any typical scientific paper and hence would not need to be forced into the peer-reviewed journals for credibility.

Solomon, NOAA Aeronomy Lab, CO
I have a series of general and important comments that cut across the document and will require major revisions to the document in many places.

1) The goals and audiences of the reports need to be clearly identified and presently are not. This gives scientists a sense of purpose, and an understanding of who the product is addressed to. CCSP refers to decision makers and the public as audiences, but this is too

generic. What decision makers? Which segments of the public? How would the public be reached broadly (rather than narrowly)? Communication with the public would benefit from links to education - e.g., high school and undergrad school teachers. CCSP would also benefit by making clear that qualified scientists themselves must be a key audience. The reports will not be credible unless they are also credible to other scientists. The revised document should clarify what is meant by decision makers and the public, should indicate that other scientists are also a key audience, and indicate what steps will be taken to reach each of these audiences.

2) There must be a clear demarcation of roles and procedures between the stakeholders/agencies/ government organizations and the scientists who produce the report, and the authors must have independence in their work if the reports are to be credible. Agencies, CCSP principals, OSTP, or others should not have oversight, and they certainly should not have a right of final review. Many people can and should participate in providing written review comments, but any oversight mechanisms should involve only distinguished scientists. Agencies should not have authority for appointing authors. Reports will only be credible if a distinguished scientific committee is convened to choose the authors, perhaps with meeting support from an agency. Such a committee should also be asked to make decisions regarding e.g. model results or unpublished work to be included, instead of the CCSP principals. Interactions and responsibilities of scientist/authors, reviewers, and audiences must be carefully designed (and documented) to maintain the independence of the science. CCSP should commit to clarifying and documenting exact procedures and roles of all involved in CCSP assessments and procedures to be followed. A formal 'procedures and roles' document should be produced before any work is begun. All roles must be open, transparent, and public.

3) The reports should go through several staged and different rounds of review but the reviewers of each should not be the same. All reviews should not be anonymous -- reviewer names should be given to the authors and made public.
Staged reviews. There is a big difference between having just one review and having several of different types. The IPCC system of developing a zero-order draft, informal review by well-known scientists, first order draft, broad expert review by a much wider group (including self-nominated individuals which thus includes the public), and second order draft subject to a Government review means that the structure and content of the report is first determined by scientists. The timing of the review involving governments (stakeholders) is key. The CCSP review proposal does not appear to be staged to address its audiences sequentially. I suggest changing the review plan to the above system, which allows for public comment, as well as input from stakeholders while at the same time allowing the scientists the time and process that is needed to reach mature drafts first using scientific inputs.
Non-anonymous reviews. Anonymous reviews are appropriate for scientific journals, because they are not open to a wide spectrum of persons. Rather, in the case of a journal the editor of the journal (a senior and highly respected individual) carefully chooses the reviewers from well-qualified experts whose works are known. This approach cannot credibly be used when any and all persons may comment on the documents. The open

review process that is planned makes it important that the reviewers be identified, so that all inputs are open and transparent. It is not appropriate to use anonymous review here.

4) Scientific judgment should be the guiding force and final arbiter in the responses to the review process. Senior distinguished review editors are a helpful role used in IPCC. These individuals must be scientists of very strong reputation, and they should be asked to evaluate whether the authors have responded appropriately to the reviews. Putting agency persons in that role would not be credible. I suggest revamping the discussion of who will decide if the reviews have been properly treated to reflect the above.

5) The author teams must be given adequate time. A rushed report pays the price in quality. The document should make clear the commitment to take the time required to produce the reports to a high standard, regardless of the time required.

6) The assessment conclusions should be fully grounded in well-documented peer-reviewed literature, models, and datasets. CCSP documentation would benefit from more clarity on how it will deal with this. The procedures document referred to above should make clear what kinds of information will be included, and what would not be eligible for inclusion.

7) Stakeholder inputs should be provided in open yet formal forums. Any feedback to the author teams from e.g., the agencies, the CCSP principals, OSTP, or others must be written down (not verbal) and made fully public. No anonymous or informal feedback should be permitted from any of these sources, and this should be stated.

8) Clear science leadership must be provided by internationally known and respected scientists. CCSP should identify how the reports will be led -- I suggest a committee of designated "assessment science leaders" e.g., those leading the many different products. These individuals should participate in a well defined, open, and formal assessment review feedback mechanism with agencies, OSTP and other stakeholders.

9) There must be explicit funding and technical support (TSUs) for the assessment process. The cost of TSUs is small compared to the hidden costs of volunteer scientist time, and the funding of the TSUs provides a critical contribution to the planning, compiling, editing, and management of the reports. CCSP documentation should make clear that this kind of support will be provided.

Trenberth, NCAR

1. The proposal talks about Lead Authors. However it is far from clear how the contributions from the lead authors are assembled into a chapter and how the chapters are assembled into a coherent document. In IPCC the first is the responsibility of convening lead authors (CLAs) but no such people are designated here. The second is achieved through plenaries and interactions through the CLAs. Such mechanisms should be spelled out here.

2. I am very concerned about these assessment activities in several ways. Firstly they appear to be piecemeal. But the main concern is that they will be occurring in parallel with IPCC. The US is hosting IPCC WG I, and it requires major resources to carry out an assessment. These are not only travel and organizational resources, but also huge commitments of scientists who are unpaid to do the assessment and writing. The IPCC already is a huge burden on the community but has advantages of being an open international process. The CCSP assessment will never achieve the credibility of the IPCC outside of the United States. In my view it is essential that the CCSP assessment activities should be very clearly and explicitly related to the IPCC or they should not be done. The timeline and how they relate to IPCC must be specified. In fact the CCSP assessment, if timely, can be very useful input into IPCC. If the activities are in fact in parallel then it has the potential to undermine IPCC and CCSP at the same time. Also if they are separate the burden on the community is too great and the cost in terms of lost research at the expense of assessment will be huge. It is very difficult to make substantial progress on the science while at the same time assessing the science. I.e. this seems like too much of a good thing.

UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)
It is important that the assessment products do not only have full scientific credibility, but also that they are perceived to have credibility throughout the international scientific and policy communities, otherwise they will not be used to underpin practical decisions on climate policy and further research. This being the case, it is important that the widest possible participation of independent experts is encouraged, both in the drafting and the review stages.

In the interest of making the process accessible, we suggest that a mailing list is established so that interested parties can be notified when report drafts are published on the CCSP websites.

Winstanley, Illinois State Water Survey, IL
A critical component of the review process is the review of the reports by independent experts. The draft guidelines state that peer reviewers are to be selected on the basis of scientific and technical expertise, and that it is sufficient simply to include in the report reviews any previous involvement of reviewers with the lead agency(ies) or issues under consideration. In view of the critical nature of independent reviews, the above criteria and reporting requirements are necessary, but not sufficient to establish independence. I recommend that additional criteria be established for selecting independent reviewers. Such criteria might include not being related to the authors and/or program managers, not having worked together, not having co-authored reports, not being dependent upon involved agencies for support, and being otherwise free from influence of the outcome of the report.

Specific Comments
Page 1, Lines 7-14: The process described in this introduction and throughout the document is ad hoc, with a different mix of agencies and external involvement for each

synthesis and assessment product. We suggest that CCSP reconsider the National Research Council recommendation to establish a standing advisory body charged with independent oversight. We believe such an advisory body would make the production of synthesis and assessment documents more efficient and consistent. It would also ensure the input of external experts.
Abbott, NASULGC

Page 1, Lines 9-12
The Introduction provides that the lead agency (or agencies) "will collaborate" with CCSP working groups and the National Science and Technology Council subcommittees, without explaining how that collaboration would work and what impact it could have on timely completion of the products. It adds that the collaboration must extend to "other national and international entities," which is a rather far-reaching requirement, particularly since there are all sorts of such entities. At the very least, this idea of collaboration with such entities needs more criteria and direction. In its present form, it should be deleted.
Edison Electric Institute, Fang

Page 1, line 11: It is not at all clear why collaborations should be limited to national and international entities. Depending on the matter at hand, one would think that involvement might be with a much wider range of possible entities, including ones that are bilateral, regional, and even local. This is especially the case given that the CCSP research plan indicates the need for place-based studies; one could imagine undertaking assessments about particular regions, etc. It is also vital to getting buy-in of groups in various regions to base studies in that region, so the guidelines need to have a provision for coordinating with local and regional groups.
Michael MacCracken, Climate Institute

Page 1, Lines 13-14: The Introduction to the draft Guidelines quite properly directs that in order to "ensure scientific integrity and credibility, each deliverable will be produced in accordance" with the guidelines. However, the sentence beginning on line 13 of the Introduction appears to undercut that directive in stating that "specific implementation" of the guidelines "will vary from product to product." It is a very broad and open-ended statement that is susceptible to wide and varied interpretation by the lead agency (or agencies), the authors and others. It lacks any criteria for its application and any degree of oversight, and apparently could be applied in any phase of the guidelines without limitation and without any public knowledge. It is also unclear to whom the provision is directed. In addition, it appears inconsistent with the provisions of Phase I of the guidelines, which calls for a prospectus that is subject to public comment and then "finalized" and "posted on the CCSP website," and which then provides (in the beginning of Phase II) that the lead authors "will prepare the product according to the process described in the prospectus."

There is sufficient flexibility in the guidelines – which are not rules or regulations – to enable lead agencies in applying them to each of the 21 products to recognize and accommodate, where necessary, various needs in their development. We urge deletion of

the sentence, or in the alternative a revision that would require identification of any needed variance and the reasons why it is needed as part of the draft prospectus required under Phase I of the guidelines, which is subject to public comment:

> However, a lead agency (or agencies) may, in consultation with the IWGs, identify and explain in the prospectus any unusual circumstances where application of some aspect of the guidelines to a product may justify, consistent with such assurance of integrity and credibility, some form of limited modification.

Edison Electric Institute, Fang

Page 1, Lines 18-21: The first sentence of Phase I of the Guidelines provides that for each "product" the lead agency (or agencies) "should involve the scientific community and the public in a scoping process," which "should culminate in preparation and review of a product prospectus." We have several concerns with this provision.

First, the term "scientific community" seems to single out only one group of experts (*i.e.*, government and non-government scientists) to the exclusion of technical experts – such as engineers, economists and sociologists – who, in the case of some products, would seem to have much to offer. While it is good to mention the scientific community, it is also encompassed by the term "public." Further, it is equally appropriate to refer to, and specifically include, other experts and stakeholders in the scoping effort, as well as the general public. As in the case of the IPCC, authors and contributors often are composed not only of scientists but also of a wide range of other technical experts. For this and other public comment opportunities on the prospectus, the CCSP could establish and maintain a "list server" that would automatically send out in a timely fashion an E-mail to alert scientists, technical experts, stakeholders and the public of that opportunity.

Second, the sentence does not indicate how this involvement with scientists and the public in the "scoping process" is to be accomplished. The terms "scientific community" and "the public" are quite broad and leave open how and to what extent each will be informed of the opportunity to be involved in the process. There is no provision for Website or *Federal Register* notice. Later in Phase I, provision is made for public comment on the draft prospectus. However, that occurs after the scoping process.

CCSP Director Richard H. Moss gave a presentation on the guidelines at the April 8, 2004, "Workshop on Issues in Global Change" held by the Global Change Coordinating Committee at the National Academies, which included a table on the "Status of Deliverables Scheduled for Completion Within 2 Years." The table indicates that in the case of some products, the prospectus (which is described in Phase I of the Draft Guidelines) has already been drafted or is "being drafted," and in other products, the "scoping" that precedes the prospectus (also according to Phase I) has been completed or is "in progress." These activities apparently are taking place internally at the lead and supporting agencies and on an interagency basis with the CCSP. Apparently because the timeline for these products began last October, Moss indicated that there would need to be "simultaneous review" of the guidelines and the several prospectuses referred to above. However, he does not indicate in his comments to what extent, if any,

involvement of the "scientific community and the public" occurred in the process or whether, after the guidelines are finalized, those efforts will be revisited in light of the guidelines. It is unclear how initiation of the product process can begin in advance of finalization of the guidelines. In the case of these products, the 2-4 year period could be viewed as beginning from the date of finalization of the guidelines, rather than from last October.

Third, "should" on line 18 suggests that involvement of the scientists and the public might have a discretionary tone to it, leaving the impression that a lead agency could decide on a product-by-product basis about whether to involve either or both. There is no good reason for such discretion. Uniformity is the best approach. This problem with "should" exists throughout the guidelines. In some cases, "will" is used and in at least one instance "shall" appears.

Therefore, we urge that on lines 18 and 20 "should" be changed to "will" (or "shall") in both sentences; on line 19, change "scientific community" to "scientific/technical community" and "public" to "stakeholders and the public"; and on line 18 after "involve", insert
", through the lead agency Website,".

Incidentally, the term "stakeholders" is defined in Annex D of the Strategic Plan. That definition is broad enough to include the entities that we listed above for that term. However, if that is not your understanding, the guidelines should clearly include them.
Edison Electric Institute, Fang

Page 1, ln. 18-33: This section currently reads like an invitation to explore a tiny wiggle room. We have already defined the problem and the product (for you) and all you get to do is "further refine" it. This section should sound and be far more inviting for stakeholders to truly shape the product. This section should reflect the CCSP's sincere openness and responsiveness to decision-support needs (whatever they may be). The bulleted list should include (i.e., be more explicitly demanding specifics on) what specific CCSP goal(s) and specific user/decision-support needs this product will respond to. The fourth bullet in particular should be reworded to be more inviting and permissive of a broad range of forms of open stakeholder involvement. "If needed" in parentheses suggests something exceptional, something tolerated but not really desired. Touché! This should be replaced with "as deemed appropriate and desirable", and add examples of the kinds of ways in which stakeholders could be involved. You have a VERY traditional and narrow definition of stakeholder involvement! (See NRC Review of Final Strategic Plan for multiple additional examples).
Moser, NCAR

Page 1, line 30: Having each report possibly develop its own framework for expressing uncertainties seems very likely to greatly confuse the public. It would be much better to try to arrive at some more uniform approach for communicating levels of confidence and uncertainty in scientific understanding. In this regard, both the IPCC Assessment process and the National Assessment process have utilized a lexicon to express levels of

confidence. Although similar, there are differences between these systems. One of the research recommendations in the National Assessment report was to encourage research on the strengths and weaknesses of these and other approaches (e.g., how effective were they or weren't they in conveying information to the public, government leaders, the media, etc.) and to work to find a better system. IPCC is calling a meeting to consider further possibilities, but I am aware of no similar effort within the US to try to find ways to bridge the communications gap between the frameworks for uncertainty and risk used by the scientific community (and they vary across fields) and the more qualitative framework on which the public seems to rely.
Michael MacCracken, Climate Institute

Page 1, ln. 35: Nowhere do you define "CCSP Principals" – it is not clear who they are, how they are chosen, what their relationship is to the lead authors or reviewers, etc. All that needs to be stated clearly somewhere in this document.
Moser, NCAR

Page 1, Lines 35-40
The process laid out in this paragraph seems overly cumbersome and is likely to be time-consuming, particularly in the case of products with a target completion of two years after October 2003.

First, it calls for two approvals of the prospectus by the "CCSP Principals." One is to take place before there is peer review and public comment and the other after that review and comment, although there is no procedure stated for submitting the draft prospectus to these Principals for either approval.

Second, it includes a requirement for peer review. However, that is premature because, according to Phase III of the draft guidelines, the prospectus is to describe the "review process" for each product. Until the prospectus has gone through the public comment period and has been approved by the CCSP Principals, this process does not exist at Phase I of the guidelines. Moreover, if there is to be a separate peer review, there needs to be a selection process for those reviewers as well. That second review is not needed.

Third, the guidelines do not specify a time frame for the CCSP Principals to give or deny their approval. In the case of the first approval, the guidelines call for them to "review" the "draft" in a "timely fashion," which is not very meaningful. In the case of the "final approval," the guidelines do not even say that. Again, given the tight time frames for the products, such an open-ended review process could be an obstacle to achieving the targets.

Fourth, neither the guidelines nor the Strategic Plan indicate who the CCSP Principals are, even though the term is used quite frequently in the guidelines. It is our understanding that they apparently are program directors of the several lead and supporting agencies who may or may not be policy-makers or political appointees. It seems odd that a federal agency would prepare the prospectus and then submit it for

review to persons who are likely to be subordinate to those agency officials who oversee the preparation of the prospectus.

It is important to reemphasize that this process, as described in Phase I of the guidelines, is begun by the "lead agency[ies]." They are to conduct a scoping process leading to the development of a draft prospectus that is to address a list of specific points set forth in Phase I. The draft prospectus is then subject to public comment. Thus, we question the need for both approvals, given the fact that the prospectus is to be drafted by the lead agency and subject to public comment. Accordingly, we urge that the paragraph on lines 35-40 be revised as follows:

> Upon completion of the draft prospectus, it will be published on the CCSP website and in the *Federal Register* for a minimum of 30 days for public comment. Upon consideration by the lead agency (or agencies) of the public comments, the draft prospectus with appropriate revisions will be submitted to the CCSP Principals for review, approval and publication on the CCSP Website.

As to the principals, at a minimum they need to be identified and some explanation given as to why they have been selected to grant approvals or denials over other line officials of the lead agency (or agencies).

Edison Electric Institute, Fang

Page 1, Line 38 - Responses to public comments should be included in the assessment. Responses may be group by subject matter, however all subjects receiving public comment within the 30 day period should be addressed in the product assessment.

Neuman, Preserve Our Climate Coalition

Page 1, Line 42 through Page 2, Line 3

We urge these lines be revised to read as follows:

> *Selection of authors*: Such CCSP Website and *Federal Register* notice of the draft prospectus will also afford an opportunity for the public to nominate authors, contributors, and reviewers for the prospectus. The lead agency (or agencies) are responsible for the selection of the authors, contributors and reviewers, who may be drawn from within or outside the federal government and the public and from outside the U.S. and independent of the public comment nominations. Authors and contributors shall reflect a balance of scientific/technical expertise and points of view appropriate to the specific topic addressed in the product.

This revision makes clear that the *Federal Register* and Website notice for the comments on the draft prospectus will afford the public, in lieu of "interested parties," an opportunity to nominate the authors, contributors and reviewers. It also makes clear that the lead agency will select not only the authors but also the contributors and reviewers. We assume that the lead agency will consider the nominees from the public, but will not be bound by that list. In addition, the revision applies the same criteria for selection of the contributors as the authors. At the same time, it deletes the requirement that they "be

known for their scientific work related to the topic" expressed in the product. That requirement could effectively exclude qualified authors and contributors, and it is uncertain how it would affect selection of authors and contributors for such products as those for CCSP Goal 5 in Table/Box 2-1 of the Strategic Plan.

We have retained the reference to "reviewers." However, it is unclear who they are or their roles. Presumably, they are not peer reviewers, because the selection process of the latter is covered by Phase III of the guidelines. This concept may be derived from the IPCC procedures, which provides for "Review Editors." However, the need for reviewers has not been demonstrated in this process.
Edison Electric Institute, Fang

Page 1, Line 42 – Page 2, Line 5
We applaud the public process for nomination of authors and contributors. We urge that nominations be solicited from the university research community.
Abbott, NASULGC

Page 2, Line 4: Perhaps the choice of authors should reflect a balance of experts from within and outside the Federal government, in order for the products to have a broad ownership and demonstrate the participation of the scientific community as a whole.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, Lines 10-12
Phase II provides that the "drafting process will be coordinated" by lead authors with "national/international governmental and non-governmental entities." We presume that the lead authors are working for the lead agency (or agencies) and thus are subject to applicable federal law. In this or any context, it is unclear what it means for these authors to coordinate with such entities and who decides which, if any, such "entities" are to have the favor of coordination. The criteria for their selection are unexplained. It is unclear whether this function to be part of the prospectus. In addition, it is unclear what this does to the timetable for these products. It is our understanding that the drafts are to be based on peer-reviewed literature and research, not such coordination. This coordination should be left to public comment review and peer review.
Edison Electric Institute, Fang

Page 2, Line 14: Suggest that authors should primarily use published, peer-reviewed scientific literature in the drafting process.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, ln.14-20: It strikes me as rather odd, and likely politically motivated, to demand that lead authors – who supposedly are independent scientists – need to request permission from the (undefined) CCSP Principals to use "grey literature." Don't you trust those scientists (or the "independent peer review process" for that matter to be able to evaluate the appropriate use of this or any other literature? What really is the purpose of this stipulation? I recommend that the responsibility for evaluating the appropriateness of use of this type of literature be left to the lead author(s). You can specify that they pay

particular attention to the appropriateness of its use, but not let any political appointees get in the middle of this decision. This then also eliminates the need for the ambiguously stated turn-around on this decision ("promptly" – p.2, ln. 20 – How long is that? This window can be totally misused if someone wants to!)
Moser, NCAR

Page 2, line 16: If experts submit contributions for consideration that are not published, it should be noted that they must be publicly available prior to the review of the draft of the assessment/report.
Michael MacCracken, Climate Institute

Page 2, Line 20: When responding to requests to use non-peer-reviewed material, the CCSP Principals should consider the balance of evidence used and ensure that it is primarily composed of peer-reviewed literature.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, Lines 22-25
First, the paragraph provides that the draft product "will include a scientific/technical analysis as well as a non-technical summary for the public." This appears to attempt to adopt the structure – generally described by Dr. Susan Solomon at an April 8, 2004, "Workshop on Issues in Global Change" held at the National Academies for IPCC reports – to the lead agency (or agencies) products. It suggests that public, including stakeholder, input during the comment period should focus on the "non-technical summary." It also suggests that the public is not capable of understanding the underlying scientific/technical analysis.

While we do not object to the product including such a summary, in light of the statutory provisions cited in our General Comments – particularly the Information Quality Act – attempting to draw what may be described as a bright line for the public between the underlying analysis and summary is inappropriate. We also note that in addition to stakeholders the public includes scientists/experts who may not be selected as authors or contributors. Under Phase III, provision is made for public comment on the entire product, not just the summary, which is quite appropriate. Therefore, we urge that a period be inserted after "summary" on line 22 and that "for the public" on line 23 be deleted.

Second, the sentence beginning on line 23 provides that the "products should identify disparate views that have significant scientific or technical support." If such "views" have scientific support, technical support or both, there should be no question that they need to be included in the "products." However, "should" suggests that the lead agency (or agencies) or authors would have discretion whether to include those views. There is no reasonable rationale for such discretion. We urge that on line 23 "will" (or "shall") be substituted for "should."

Third, the sentence beginning on line 24 indicates that the products should provide "confidence levels for findings, if this is appropriate to the product." We assume that this

refers to the use of probabilities relative to uncertainties. However, the term "confidence levels" is not explained, nor is there an indication as to who determines that such levels would be "appropriate to the product." It suggests reliance on subjective judgments and lacks any provision for transparency. This is a very important issue that deserves more consideration and greater direction and criteria than just this single, rather open-ended sentence. For example, a basic question exists as to whether any probability or confidence level assertion should be made relative to these products. The Strategic Plan calls for 21 products, each with its own lead author (or authors), and this could result in 21 different approaches and decisions.

We are concerned about this provision. Every "prediction" or "projection" of future climate phenomena potentially attributable to human activities depends, in the first instance, on assumptions as to future levels of anthropogenic emissions of greenhouse gases and aerosols. The myriad of driving forces that determine these emissions (including economic, demographic and technological factors, and non-climate government policies) and their interrelationships necessarily defy rational probability assertions, and the inherently subjective nature of any guesses as to how future emissions paths will unfold is accentuated by the increasingly speculative nature of assumptions about the underlying, driving forces over time horizons as long as a century.

Lack of scientific justification for asserting the probability of occurrence of any particular level of future emissions over long time periods is sufficient reason, standing alone, for rejection of efforts to have the CCSP products declare "confidence levels" for the occurrence of future climate phenomena. Of course, there are additional concerns about the substantial uncertainties regarding factors such as climate sensitivity and other issues with respect to global and regional climate modeling exercises that render unappealing assertions about such confidence levels. Terms such as "likely" or "unlikely" are either meaningless or capable of creating unjustified impressions unless they are accompanied by a standard, agreed set of quantitative definitions, but that is precisely what is inappropriate.

It is our understanding that the IPCC's Third Assessment Report includes such "levels" for Working Groups I and II, but not Working Group III. A September 5, 2003, paper titled "A Concept Paper for the AR4 Cross Cutting Theme: Uncertainties and Risks" by Martin Manning and Michael Pettit discusses the "treatment of uncertainty in the TAR." It noted that Working Group I "adopted a different seven-level scale to characterize confidence" than the "five-level confidence scale" used in Working Group II and stated that "[i]n retrospect it appears that the use of specific language (words such as *likely or low confidence*) to describe probability ranges can be misleading or confusing and this aspect of describing uncertainty needs to be reviewed." We urge deletion of the sentence, as well as the reference to "conference levels" in Phase I regarding the prospectus.

Edison Electric Institute, Fang

Page 2, Line 23: Identification of disparate views that have significant scientific support should be consistent. This could be facilitated by provision of a definition of 'significant'

support – for example, evidence of significant support could be demonstrated by one or more peer-reviewed supporting papers in the literature.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, Line 24: Reports on confidence levels for key findings should be consistent. All key findings should be identified, and confidence levels provided for all of them.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, line 24: I suggest the phrase "provide confidence levels for key findings" be followed by "based on clearly defined methodologies." Sometimes confidence limits can be only crudely guessed at and sometimes they can be rigorously defined; it is helpful to know which is which.
Barlow; AER, Inc.

Page 2, Lines 27-30 and Footnotes 1 and 2
This paragraph and the footnotes propose to implement the requirements of the Information Quality Act (which is section 515 of Pub. Law No. 106-554) by stating that the lead agency (or agencies) "should" provide to the authors the information quality guidelines issued by the Commerce Department (DOC) and NOAA and that the authors "should" develop the products in "accordance with these guidelines." Phase IV of the draft guidelines provides that each final synthesis and assessment product is to be "identified as a CCSP-sponsored product," is to be "published in a consistent format to ensure that all deliverables are seen as part of the family of CCSP-sponsored" products, and "will indicate the Federal agency or agencies that led its preparation." In addition, the "products will include a statement that indicates the product was prepared according to the DOC/NOAA information quality guidelines." That proposal is inconsistent with the Information Quality Act and the Office of Management and Budget (OMB) final Guidelines, 67 *Fed. Reg.* 8452 (Feb. 22, 2002).

The OMB guidelines apply "government-wide." They state that the Information Quality Act "directs" "agencies subject to the Paperwork Reduction Act" to issue "their own information quality guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information, disseminated by the agency" within one year after the OMB guidelines are issued. It is our understanding that all of the lead agencies listed in the Strategic Plan have complied with this requirement. However, the CCSP is not a federal agency. Rather, as explained in Chapter 16 of the Strategic Plan, it is a "federal program" established in 2002 by the President as part of a "new Cabinet level management structure," with "ultimate budget accountability" residing "with the participating agencies and departments." It reports to the Cabinet-level committee on Climate Change Science and Technology Integration. Thus, presumably the CCSP has not prepared these guidelines, but rather relies on the DOC/NOAA guidelines, although apparently it is not part of DOC/NOAA.

Notwithstanding the provisions of Phase IV of the draft guidelines, the information quality guidelines of each of the lead agencies would, by law, apply to the products prepared by those agencies. DOC/NOAA are the sole lead agency in a number of

products, and their guidelines would apply to their products. In other products, they share the lead agency role, and we presume that the DOC/NOAA guidelines could apply. However, in the case of the remaining products, the DOC/NOAA guidelines could not be construed to apply. Moreover, the Information Quality Act and the OMB guidelines unquestionably require that each of these agencies make their guidelines available to the authors of the products being produced by each such agency and require the authors to abide by them. The statute does not allow the lead agencies to, in essence, ignore their own information quality guidelines. Therefore, we urge that this paragraph and the footnotes be revised consistent with these comments.

Edison Electric Institute, Fang

Page 2, Line 32 – Page 4, Line 2:
The synthesis and assessment products produced by the CCSP will be critical inputs to the development of U.S. climate policy. As such, it is critical that they have the highest level of credibility. To ensure credibility, it is necessary that CCSP provide a transparent process for soliciting and responding to public comments on draft products.

The Draft Guidelines for Producing CCSP Synthesis and Assessment Products promise the opportunity for public comments. However, they do not provide transparency on the response to these public comments. The Draft Guidelines state:

> Lead Authors will revise the draft product to incorporate the public comments, as they deem appropriate, and the CCSP Principles will review the product a final time. (Pg. 3, lines 40-41.)

No independent check on the decisions of the Lead Authors is provided, nor is there any indication of mechanism for providing the CCSP Principles with the scope and disposition of public comments. Reviewers providing comments during the public comment period can only infer how their comments were addressed when the final report issues.

We recommend that the CCSP develop a transparent procedure that will ensure that all public comments are given appropriate consideration, and that their scope and disposition is reported to the CCSP Principles before they complete their final review. The procedure could be modeled after the one currently in use by the IPCC. This procedure is detailed in a document titled: Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports (www.ipcc.ch/about/app-a.pdf).

The IPCC procedure involves the use of review editors whose functions include ensuring that all substantive review comments are afforded appropriate consideration. Review editors are experts in the field covered by the report, but they are neither authors nor reviewers of that report.

IPCC applies it procedure by requiring a written record of the disposition of all review comments. Lead Authors can respond to comments by making the appropriate change in their report or by providing a reason why no change is required. The review editor then

provides assurance in writing to the IPCC body approving or accepting the report that the Lead Author team has considered all comments and that all have been responded to in an appropriate fashion.

IPCC procedures also state:

> All written expert and government review comments will be made available to reviewers on request during the review process and will be retained in an open archive in a location determined by the IPCC Secretariat on completion of the Report for a period of at least five years.

We recommend that CCSP adopt a similar procedure.

In practice, these procedures need not be cumbersome. The documentation on public comments distributed to Lead Authors can also provide space for indicating how the Lead Author team responded to each comment. The review editor should attend the discussion of public comments, which will allow him/her to advise the Lead Author team as to whether all comments have been handled appropriately. Once the Lead Author team has completed its response to public comments, the review editor will be in a position to assure the CCSP Principals that public comments have been appropriately addressed. Finally, the CCSP Library can act as an archive for public comments for the appropriate storage period.

Instituting this type of procedure will ensure transparency in CCSP review processes and credibility for CCSP Assessment and Synthesis products.
O'Keefe & Bernstein, George Marshall Institute

Page 2, Line 34 – Page 3, Line 13
This paragraph of Phase III of the draft guidelines provides that the products "will have an appropriate and scientifically rigorous peer review," that the "process" is the "responsibility of the lead agency," and that it is to be described in the prospectus and "approved by the CCSP Principals." On April 28, 2004, OMB issued its "Revised Information Quality Bulletin for Peer Review" of "Influential Scientific Information" and "Highly Influential Scientific Assessments" for additional public comment. 69 *Fed. Reg.* 23230 (2004). When the OMB revision takes effect later this year, it will apply to all federal agencies subject to the Paperwork Reduction Act, which includes all of the lead agencies. These guidelines must conform to that revision when it does take effect.
Edison Electric Institute, Fang

Page 2, Line 35: Should provide a guide for the process used to choose independent experts, and for appropriate numbers of experts.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 2, Lines 35-36: In connection with the "review process," Phase III calls for a rigorous per review and states that the process "will include scientific/technical review by independent experts." It gives the impression that there are two reviews, one by peer reviewers and one by experts. It is unclear whether that is intended. In addition, it is

unclear what the word "independent" means regarding such experts. Questions arise about who are they independent of and what they are independent of. It is unclear whether this phrase is intended to exclude experts from agriculture, business, labor, industry or the environment.
Edison Electric Institute, Fang

Page 2, footnote 2 : Provide the url for the OMB guidelines as well.
Moser, NCAR

Page 3, Line 2: The review process should ensure a balance between independent and government associated reviewers.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 3, ln.6: You state on p.2, ln. 35-36 that the peer-review is to be conducted by independent scientists/experts. Here you include government scientists/experts as potential reviewers. In this day and age, government scientists can only be independent if they don't care about their job security. As there are many highly qualified government scientists/experts, I suggest you include a statement here relieving them of conformity with government policy for the purposes of this INDEPENDENT peer review.
Moser, NCAR

Page 3, Line 6
The words "as necessary" gives the wrong connotation and suggests a limit on the experts selected. What is needed for peer review is not just a "broad range" of expertise, but also a broad range of views. Therefore, we recommend deletion of the qualifying words "as necessary" and insertion instead of "and points of view."
Edison Electric Institute, Fang

Page 3, Line 20 through Page 4, Line 2
These provisions of Phase III of the guidelines provide that: the "individual" peer reviews are to be "made available to the CCSP Principals when completed"; "lead authors" should revise the draft products to "incorporate the peer review comments, as they deem appropriate"; to the extent such comments are not incorporated, the authors must "prepare a brief explanation" for the Principals; the lead agency or (agencies) are to provide the "revised" draft product to the Principals; the Principals are to review the draft and approve it for release for public comment; thereafter lead authors are once again to review the draft and "incorporate" the results of the public comments; and the Principals are to review it a "final time" and give their final approval.

First, this portion of the guidelines raises the question of the role of the lead agencies in the preparation and approval of the products. For example, the provisions for the lead authors providing to the Principals "individual" peer reviews and the "brief explanation" about not incorporating some "peer review comments" and for the lead agency (or agencies) sending to the Principals "draft products" for review and approval before public comment appears to make them nothing more than funding and resource sources, overseers of the process, and conduits to the Principals, who apparently are lead agency

personnel. Yet Phase IV provides that each product will indicate the agency that "led its preparation." Phase IV also provides that the lead agencies "are responsible" for developing products and for all phases of their preparation.

The wisdom of this process in unclear. Since the lead authors are selected by the lead agency (or agencies), it would seem appropriate that it is the agency's responsibility to receive the peer review materials and to review the draft product prior to public comment. In addition, the sentence beginning on line 36 provides that public comment notices must clearly state that the draft product "does not represent agreed findings" of the "participating agencies" or that of the Principals, even though the Phase III provisions do not seem to provide any opportunity for "agreed findings" by both the agencies and the Principals. Only the Principals are mentioned.

Second, the need to involve the Principals in the review of the product before it is noticed for public comment is not justified. This review should be undertaken by the agency. The Principals should only be involved after the public comments have been received, the lead authors have considered them, and the agency has reviewed the draft with the appropriate revisions.

Third, in the case of the peer review comments, the lead authors apparently have broad discretion whether to revise the draft product through application of the word "should" and the words "as they deem appropriate." Nevertheless, they must explain to the Principals any "aspects" of the peer review comments that they do not incorporate into the product. However, the guidelines do not indicate what, if anything, the Principals should do if they disagree with the explanation.

Fourth, the sentence beginning on line 28 calls upon the Principals to, among other things, review the product to see if the summary "describes the findings in a context understandable to the public." That suggests that the public is incapable of understanding a summary that "accurately conveys the findings of the scientific/technical material and describes the findings." The reference to the public is unnecessary.

We urge the following revisions: On lines 21 and 25 before "CCSP Principals", insert "lead agency[ies] and the". On line 27, insert "for information purposes" before the period. On line 28, delete "CCSP Principals" and insert "lead agency[ies]". On line 30, delete all after the second "findings" until the period on line 31. On line 37 after "represent", insert "an approved and final product" and delete the remainder of the sentence until the period on line 38.

Edison Electric Institute, Fang

Page 3, line 23: Suggest this should read "...revise the draft product in the light of the peer review comments, as they deem appropriate." The comments might be of the nature of guidance or instructions, rather than wording intended to be incorporated.

UK Department for Environment, Food and Rural Affairs (Johnson-DEFRA)

Page 3, line 25: Suggest replace "incorporated" with "accepted" (to be consistent with comment above on page 3 line 23.)
UK Department for Environment, Food and Rural Affairs (Johnson-DEFRA)

Page 3, Line 25: Propose that the reasons for choosing not to incorporate review comments should be explained to reviewers as well as the CCSP Principals.
UK Department for Environment, Food and Rural Affairs (Oliver-DEFRA)

Page 3, Line 36: Change "30 days" to "60 days." Rationale: Given the importance of the products, the valuable input that may be obtained through public review, and the potential volume of the material to be reviewed, it would be preferable to extend the public comment period to a minimum of 60 days. [See General Comments for further discussion.]
American Petroleum Institute, Feldman

Page 3, Line 40: Suggest this should read "... revise the draft product in the light of public comments, as they deem appropriate." The comments might be of the nature of guidance or instructions, rather than wording intended to be incorporated.
UK Department for Environment, Food and Rural Affairs (Johnson-DEFRA)

Page 3, Line 40: Perhaps the lead authors' reactions to the public comments – whether they are accepted, or rejected, with reasons – should be made available to those members of the public who commented?
UK Department for Environment, Food and Rural Affairs (Johnson-DEFRA)

Page 3, ln.41-43: Here is the place where the political independence of the review process and of the production of scientific synthesis and assessment products breaks down. Very dangerous section! At the VERY LEAST, you must make explicit here what the purpose and POWERS of the final CCSP Principals review is, and that of the NSTC review process is. Also specify what guards will be in place to protect against political influence at this final stage.
Moser, NCAR

Page 4, ln.10-12: It concerns me greatly that the CCSP office and lead agencies will develop a communications/outreach plan (a) independent of the lead and contributing authors, and (b) that they will do so only this late in the game. Again, this reflects the very traditional, very out-dated, and product-focused approach described and criticized in the general comment section. I recommend that this communications plan be developed at the start of the project, and be subject of the stakeholder scoping, expert peer review and public review processes.
Moser, NCAR

Page 4, Lines 26-38
This portion of Phase IV states that the "IWGs will be able to contribute significantly to the preparation of a deliverable" and lists, as one of their "potential roles," drafting "sections of reports" (*i.e.*, products), subject to "agreement" with the lead "agency[ies]".

The guidelines do not identify the IWGs or indicate their membership. However, Phase II states, "The lead authors will prepare the product according to the process described in the prospectus."
In addition, Phase IV specifies that the lead agencies "are responsible for developing products" and they are to "take responsibility for all phases of product preparation." In light of these provisions, it is unclear what is intended by these provisions concerning the IWGs. Furthermore, it is unclear what benefit is achieved through drafting by groups. The role of the IWGs needs to be reconsidered in light of the requirements for an approved prospectus. If they are needed, their role should be set forth in the prospectus.
Edison Electric Institute, Fang

Cover Letter from Edison Electric Institute:
Re: Request for Comments on Draft Guidelines for Climate Change Science Program Synthesis and Assessment Products, 69 *Fed. Reg* 18358 (April 7, 2004)

Dear Assistant Secretary Mahoney:

The Edison Electric Institute (EEI) appreciates the opportunity to comment on the above-referenced National Oceanic and Atmospheric Administration (NOAA) notice requesting comment on the U.S. Climate Change Science Program's (CCSP) revised draft "Guidelines for Producing CCSP Synthesis and Assessment Products."

EEI is the association of U.S. investor-owned electric companies, international affiliates and industry associates worldwide. EEI's U.S. members serve more than 90 percent of all customers in the shareholder-owned segment of the industry, generate approximately three-quarters of all electricity in the country, and serve about 70 percent of all ultimate customers in the nation. EEI also has long been a participant in matters related to climate change science and its assessments, particularly with regard to the Framework Convention on Climate Change sessions of its Conference of the Parties and its Subsidiary Body for Scientific and Technology Advice and to the Intergovernmental Panel on Climate Change sessions.

EEI is supportive of the CCSP established by the President in 2002, which includes the Climate Change Technology Program. We were pleased to see the final version last July of the Strategic Plan for the CCSP. EEI particularly appreciates NOAA making the draft available for public comment on the "effectiveness" of the proposed guidelines for "(1) ensuring scientific integrity and (2) facilitating public involvement in the products," which are described in detail in Chapter 2 of the Strategic Plan. That chapter also includes "Examples of Key Research Activities" and milestones for each such activity for each of the five goals, with more detail provided in Chapters 3-9.

Enclosed are our comments on the draft Guidelines and their application to the several CCSP Goals set forth in Chapter 2 of the Strategic Plan.

If you have any questions about our comments, or if we can be of any assistance, please contact either me at (202) 508-5617 or bfang@eei.org or Eric Holdsworth, EEI's Director of Climate Programs, at (202) 508-5103 or eholdsworth@eei.org.

Sincerely,

William L. Fang, Esq.
Deputy General Counsel
and Climate Issue Director

Enclosure
WLF:fhm

cc (w/ enc):
David W. Conover, Esq.
Director, Climate Change Technology Program, Department of Energy
Dr. Bryan J. Hannegan
Associate Director, Council on Environmental Quality
Dr. Harlan L. Watson
Senior Climate Negotiator and Special Representative, U.S. Department of State
Dr. John H. Marburger II
Assistant to the President for Science & Technology Policy, National Economic Council

From: Hannegan, Bryan J.
Sent: Thursday, May 13, 2004 5:53 PM
To: 'Marlay, Robert'
Subject: RE: CCTP Working Group Chairs Mtg., 10:00 - 12:00 Noon, Friday, M ay 14
Bob -- thanks -- I hope to be well enough to attend in the morning.

Bryan

-----Original Message-----
From: Marlay, Robert [mailto:Robert.Marlay@hq.doe.gov]
Sent: Thursday, May 13, 2004 2:37 PM
To: Hannegan, Bryan J.
Subject: FW: CCTP Working Group Chairs Mtg., 10:00 - 12:00 Noon, Friday, M ay 14

Brian: Dave Conover and I wanted to be sure you knew about this meeting, Friday, of the CCTP Working Group Chairs. We will be discussing internal reviews of the Draft Strategic Plan. I recall that David invited your early review of the document, and I am wondering if you have suggestions on how to improve its chances for release in June as a "public review draft". Bob

-----Original Message-----
From: Marlay, Robert
Sent: Monday, May 10, 2004 6:52 PM
To: Stamos, John; Ginsberg, Mark; Bill Hohenstein (Bill Hohenstein); Dina Kruger (Dina Kruger); Ron Birk (Ron Birk); Patrinos, Ari

Cc: Conover, David; Braitsch, Jay; Elwood, Jerry; John@battelle Clarke (E-mail); Gunning_Paul@EPA (E-mail); Johnston Gordon (E-mail); Anderson, Margot; Baldwin, Sam; Sullivan, John

Subject: CCTP Working Group Chairs Mtg., 10:00 - 12:00 Noon, Friday, May 14

CCTP Working Group Chairs: Dave Conover has scheduled the next CCTP WG Chairs meeting for 10:00 to 12:00 Noon, Friday, May 14. The meeting will be held at DOE's Forrestal Building, Room GH-019. Please allow about 10 extra minutes to get through DOE front desk security and sign-in. The primary purpose of the meeting will be to discuss comments on the CCTP Draft Strategic Plan, schedule and next steps. Personal attendance is preferred, but for those who cannot attend, a call-in number is provided below. Each WG Chair will be expected to present a consolidated summary of his/her WG's comments on the overall draft Plan, in addition to a summary of the WG technical area. Electronic submission of detailed comments should be provided separately for CCTP staff to address. WG Chairs who may not be able to participate should designate a suitable representative. Thank you for your continued support and interest. Bob. 202-586-3949

Call-In Number: 202-287-1019

-----Original Message-----
From: Conover, David
Sent: Monday, April 26, 2004 2:24 PM
To: Stephen Seidel (Stephen Seidel); Ari Patrinos (Ari Patrinos); Bill Hohenstein (Bill Hohenstein); Bob Marlay (Bob Marlay); Dina Kruger (Dina Kruger); John Stamos (John Stamos); Mark Ginsberg (Mark Ginsberg); Ron Birk (Ron Birk)

Cc: McSlarrow, Kyle; Garman, David; Maddox, Mark; Magwood, William; Glotfelty, Jimmy; Orbach, Ray; DeVito, Vincent; Knox, Eric; Salmon, Jeffrey; James R. Mahoney Ph. D. (James.R.Mahoney@noaa.gov); Kolevar, Kevin; McMonigle, Joe; Shaw, John

Subject: CCTP Strategic Plan - ACTION REQUESTED

The Draft Strategic Plan of the U.S. Climate Change Technology Program is now available for internal

review and comment. Comments may be provided at any time over the next two weeks, but not later than two weeks from today, Monday, May 10. Please provide comments directly to me, either in the form of summary and/or specific comments or, if you prefer, as "track changes" on the MS Word documents. Please forward copies of all comments to Dr. Bob Marlay (DOE/PI), who is coordinating multi-agency CCTP staff support for the project.

Hard copies will be delivered to S-2, S-3/EE-1, FE-1, NE-1, TD-1, SC-1 and PI-1. For CCTP WG Chairs and WG team members, the entire Plan is available by downloading electronic files, in either MS Word or PDF formats, from the following limited access intranet web site:

URL: www.climatetechnology.gov/cctp-stratplan/
Username: cctp.plan
Password: agencyrvw
Click on: April 2004 Review Files

This review is the first step in an intra-agency, formal review and concurrence process. The next step, after incorporating feedback and comments, is to request comments from the offices of the Executive Office of the President (CEQ, OSTP, NEC and OMB). After changes, the third step will be to seek concurrences from the Federal R&D agency heads, under the auspices of the Cabinet-level Committee on Climate Change Science and Technology Integration (CCCSTI). The Interagency Working Group of the CCCSTI, chaired by Deputy Secretary Kyle McSlarrow, will meet to review CCTP progress Tuesday, April 27.

The current schedule calls for the CCTP Draft Strategic Plan to be released in the form of a "Public Review Draft" for an extended period of public dialogue and comment, supplemented by technical workshops, from July through November. The 2004 CCTP Strategic Plan is scheduled for publication in December 2004.

Please direct questions about the Plan or its intended purposes to me, at 586-3994, or to Dr. Marlay, at 586-3949. The CCTP Draft Strategic Plan is intended to meet or exceed the quality and content standards recently set the by the Strategic Plan of CCTP's counterpart program, the U.S. Climate Change Science Program, led by the U.S. Dept. of Commerce. The CCSP's Strategic Plan was released in July 2003 (see <www.climatescience.gov>). It was recently commended favorably by after an in-depth review by the National Academy of Sciences.

The CCTP Draft Strategic Plan's summary outline is provided below:

U.S. Climate Change Technology Program (CCTP) Draft Strategic Plan - Table of Contents:

1. Cover
2. Letter to the Reader
3. Table of Contents
4. Chapter 1 - Introduction
5. Chapter 2 - Mission, Goals and Approaches
6. Chapter 3 - Exploring Alternative Futures
7. Chapter 4 - Reducing Emissions from Energy End-Use and Infrastructure
8. Chapter 5 - Reducing Emissions from Energy Supply
9. Chapter 6 - Capturing and Sequestering Carbon Dioxide
10. Chapter 7 - Reducing Emissions of Non-CO2 Greenhouse Gases
11. Chapter 8 - Enhancing Capabilities to Measure and Monitor Greenhouse Gases
12. Chapter 9 - Fortifying Basic Science Contributions to Technology Development
13. Chapter 10 - Summary and Conclusions
14. Append. A - CCTP Investment Portfolio, FY 2003 and 2004, and FY 2005 Request
15. Append. B - CCTP Scenarios Analysis Details

Thanks for your attention to this matter.

Dave Conover
Senior Policy Advisor, Office of the Secretary
Director, US Climate Change Technology Program
Department of Energy
1000 Independence Ave., SW
Washington, DC 20585
202-586-3994 (voice)
202-586-7169 (fax)
240-472-4264 (wireless)

From: ccsp-bounces@usgcrp.gov on behalf of James R Mahoney [James.R.Mahoney@noaa.gov]
Sent: Friday, May 14, 2004 3:37 PM
To: ccsp@usgcrp.gov; ccspinfo@usgcrp.gov
Cc: Rick Rosen; vicki horton; Scott Rayder; TED KASSINGER; Mary Glackin; Chester J Koblinsky; Robert W Connors; Ahsha Tribble; Otto Wolff; Conrad C Lautenbacher
Subject: [ccsp] GAO Initiates an Inquiry on CCSP and NOAA
To all:

I am attaching a PDF file with a letter from Thomas McCool at GAO to Otto Woolf at DOC notifying us about a GAO review of three issues related to climate change.

GAO representatives have already contacted NOAA administrative personnel suggesting dates for an initial meeting. The suggested dates are

Monday, May 24 at 2:00 PM
Tuesday, May 25 at 10:00 AM

I invite CCSP agency, department and EOP representatives attend the initial meeting, whether it is held at one of the suggested dates or at a later time.

I propose that we have a conference call next Wednesday, May 19 from 10:30 to 11:15 AM to discuss our response to the GAO initiative.. Call setup details will be sent to you next Monday. Please plan to participate in the call, or designate a representative if necessary.

NOAA's audit staff will provide administrative support for our interactions with GAO. Our responses will be developed and reviewed on behalf of the interagency CCSP program when requested by GAO, and by NOAA directly when specified by GAO.

I have asked Dr. Ahsha Tribble (202-482-5920) to coordinate our communications on this matter. If you respond to this email, please copy both Ahsha and myself.

Thank you

Jim Mahoney

003522 [redacted]

CEQ 006393

Cooney, Phil

From: ccsp-bounces@usgcrp.gov on behalf of James R Mahoney [James.R.Mahoney@noaa.gov]

Sent: Friday, May 14, 2004 3:37 PM

To: ccsp@usgcrp.gov; ccspinfo@usgcrp.gov

Cc: Rick Rosen; vicki horton; Scott Rayder; TED KASSINGER; Mary Glackin; Chester J Koblinsky; Robert W Connors; Ahsha Tribble; Otto Wolff; Conrad C Lautenbacher

Subject: [ccsp] GAO Initiates an Inquiry on CCSP and NOAA

To all:

I am attaching a PDF file with a letter from Thomas McCool at GAO to Otto Woolf at DOC notifying us about a GAO review of three issues related to climate change.

GAO representatives have already contacted NOAA administrative personnel suggesting dates for an initial meeting. The suggested dates are

Monday, May 24 at 2:00 PM
Tuesday, May 25 at 10:00 AM

I invite CCSP agency, department and EOP representatives attend the initial meeting, whether it is held at one of the suggested dates or at a later time.

I propose that we have a conference call next Wednesday, May 19 from 10:30 to 11:15 AM to discuss our response to the GAO initiative.. Call setup details will be sent to you next Monday. Please plan to participate in the call, or designate a representative if necessary.

NOAA's audit staff will provide administrative support for our interactions with GAO. Our responses will be developed and reviewed on behalf of the interagency CCSP program when requested by GAO, and by NOAA directly when specified by GAO.

I have asked Dr. Ahsha Tribble (202-482-5920) to coordinate our communications on this matter. If you respond to this email, please copy both Ahsha and myself.

Thank you

Jim Mahoney

001608

GAO
Accountability * Integrity * Reliability
United States General Accounting Office
Washington, DC 20548

May 7, 2004

Mr. Otto J. Wolff
Chief Financial Officer and
Assistant Secretary for Administration
Department of Commerce

Dear Mr. Wolff:

This is to notify you that the U.S. General Accounting Office is initiating a review of three issues relating to climate change. This work responds to a request from the Chairman and Ranking Member of the Senate Committee on Commerce, Science, and Transportation.

Specifically, we plan to examine (1) efforts by the U.S. Climate Change Science Program to comply with the reporting requirements of the 1990 Global Change Research Act; (2) the possible effect of climate change on federal lands during the past 50 years and available literature on the potential impact of climate change on federal lands in the next 50 years; and (3) trends in federal spending on climate change over the past decade. The study will be conducted under engagement code 360457.

During the course of our work, we plan to contact the U.S. Climate Change Science Office and the National Oceanic and Atmospheric Administration, under the Assistant Secretary of Commerce for Oceans and Atmosphere.

This work will begin immediately and will be performed by staff from our Natural Resources and Environment team in Washington, D.C. We will be contacting you soon to set up an entrance conference.

We would appreciate your notifying the appropriate offices in your agency and identifying a point of contact for this engagement. If you have any questions, please contact John Stephenson, Director, at (202) 512-6225, stephensonj@gao.gov; David Marwick, Assistant Director, at (202) 512-6775, marwicke@gao.gov; or Anne Johnson, Analyst-in-Charge, at (202) 512-6188, johnsonak@gao.gov.

Sincerely yours,

(*signed*)

Thomas J. McCool
Managing Director, Financial Markets
and Community Investment

cc: Mr. Johnnie Frazier, Inspector General
Ms. Mary Mozingo, GAO Liaison Officer

Cooney, Phil

From: ccsp-bounces@usgcrp.gov on behalf of Sandy MacCracken [smaccrac@usgcrp.gov]
Sent: Monday, May 17, 2004 1:36 PM
To: ccsp@usgcrp.gov; Robert.W.Connors@noaa.gov; Chester.J.Koblinsky@noaa.gov
Cc: ccsp_info@usgcrp.gov
Subject: [ccsp] Call-in procedure for Wednesday telecon

Good Afternoon -

Dr. Mahoney has asked me to send the call-in procedure for the proposed conference call on Wednesday, May 19 from 10:30 to 11:15am. The purpose of the conference call will be to discuss the response to the GAO initiative.

For participants, please call: 800-516-9896, and use 888503 as your code number.

If you have any questions regarding this call, please contact Ahsha (Ahsha.Tribble@noaa.gov), as I will be on leave until June 1.

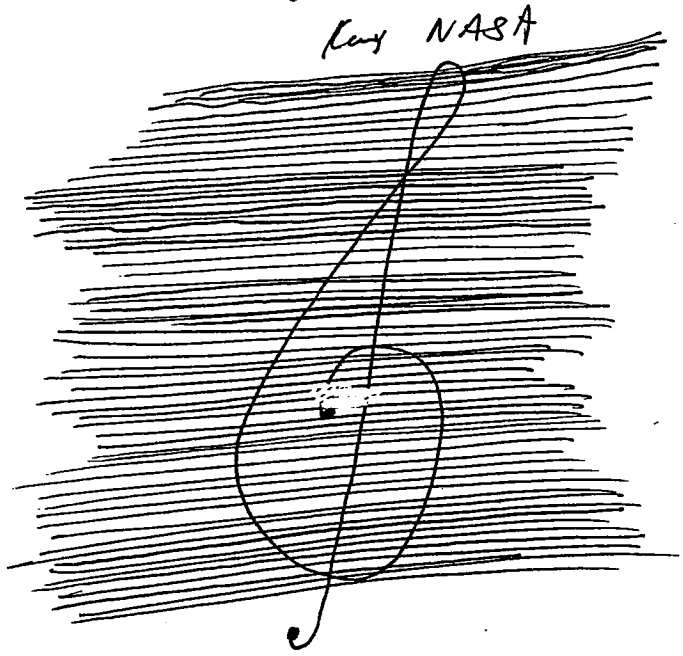
call notes:

Thank you,
Sandy
--
Sandy MacCracken
Administrator
Climate Change Science Program Office
U.S. Global Change Research Program
1717 Pennsylvania Avenue NW
Suite 250
Washington, DC 20006
Tel: 202-419-3483
Fax: 202-223-3065
Email: smaccrac@usgcrp.gov

Connor NOAA
Halpern
Glackin
Elwood DOE
Baer DOE
Slimak EPA
Lemen/Spence NSF
Andrews DOD
Key NASA

Tonel - State
Ko Barrett - AID
Kenyan Burke - DOT

counsel?
schedule for completion



ccsp Draft Prospectus CCSP SA Product 2.2review requested by June 1.txt
From: ccsp-bounces@usgcrp.gov on behalf of Rick Piltz
[rpiltz@usgcrp.gov]
Sent: Tuesday, May 18, 2004 1:14 PM
To: ccsp@usgcrp.gov
Cc: wgcc@usgcrp.gov; ipo@usgcrp.gov; ccsp_info@usgcrp.gov
Subject: [ccsp] Draft Prospectus, CCSP S&A Product 2.2,review requested
by June 1

Importance: High

TO: CCSP Principals
CC: Interagency Working Group Co-Chairs

Attached please find the draft prospectus for CCSP Synthesis and Assessment Product 2.2: "North American Carbon Budget and Implications for the Global Carbon Cycle."

Please send your comments on this prospectus to Sandy MacCracken (smaccrac@usgcrp.gov) by COB on Tuesday, June 1, 2004. This is an internal government review only -- please do not circulate the prospectus to those outside of government. You are being asked to comment on the suitability of this draft for public review. CCSP Principals will have a second opportunity to review and give final approval to the prospectus after the public comments are received and the document is revised accordingly.

Please follow these simple formatting steps to ensure that CCSPO collates the comments correctly:

1) Include prospectus number and a short product qualifier in the subject line of the e-mail you use to submit your comments (e.g., "2.2 North American Carbon Budget").

2) Refer to page and line numbering for each discrete comment.

3) Include your contact info in case we need to reach you for clarification.

CCSPO will collate all the comments and provide them to the product leads. Let me know if you have any questions.

THANK YOU.

Rick Piltz
Acting Director until May 24
Climate Change Science Program Office

--

Rick Piltz
Senior Associate
U.S. Global Change Research Program
Climate Change Science Program Office
1717 Pennsylvania Ave., NW, Suite 250
Washington, DC 20006
Tel (direct): 202-419-3468 Fax: 202-223-3064 Tel (main #): 202-223-6262
www.usgcrp.gov, www.climatescience.gov

From: ccsp_info-bounces@usgcrp.gov on behalf of Ahsha Tribble [Ahsha.Tribble@noaa.gov]
Sent: Wednesday, May 19, 2004 6:37 PM
To: CCSP@usgcrp.gov; CCSP_INFO@usgcrp.gov
Subject: [ccsp_info] Abrupt CC FAQs for Clearance - RESPONSE DUE BY NOON,5/21

Importance: High
To: CCSP Principals

From: Dr. James Mahoney

Subject: Clearance of Abrupt Climate Change FAQs

Priority: High

The Communications Interagency Working Group (CIWG) has developed a set of Frequently Asked Questions (FAQs) on Abrupt Climate Change to be posted on the CCSP website as part of our communications responsibility. The draft FAQs are attached for your review and clearance. The goals is to have these FAQs available at www.climatescience.gov by Monday, 5/24.

We ask that you send your concurrence or comments to **Ahsha.Tribble@noaa.gov** no later than **noon on Friday, May 21**. Because this is a time sensitive document, if you do not respond, we will take that as a concurrence.

If you have any questions, please feel free to call Ahsha at 202-482-5920.

003531

From: ccsp-bounces@usgcrp.gov on behalf of James R Mahoney [James.R.Mahoney@noaa.gov]
Sent: Thursday, May 20, 2004 5:55 PM
To: CCSP@usgcrp.gov; CCSP_INFO@usgcrp.gov
Cc: Craig Montesano; mmozingo@doc.gov; Robert W Connors; Conrad C Lautenbacher; Scott Rayder; tkassinger@doc.gov; Debra Larson; James R Walpole; Jane Chalmers; Ghassem Asrar; Otto Wolff; Thomas R Karl
Subject: [ccsp] GAO inquiry concerning CCSP and NOAA

To: CCSP Principals and DOC/NOAA Representatives

From: Jim Mahoney

Subject: DOC/NOAA GC Lead and Entrance Conference Information

DOC/NOAA General Counsel (GC) Lead

DOC GC/Deputy Secretary of Commerce Designate Ted Kassinger and NOAA GC Jim Walpole have elected to assign NOAA Deputy General Counsel Jane Chalmers as the DOC/NOAA lead attorney for the GAO Inquiry on climate change.

Jane will be assisted by other DOC and NOAA attorneys as appropriate. She will serve as the legal point of contact for the GC representatives from all of the CCSP agencies. Jane's contact information is as follows: Jane.Chalmers@noaa.gov and 202-482-1538.

Entrance Conference

The Entrance Conference has been scheduled for June 3, 2:30PM at the Department of Commerce (HCHB), Conference Room 5215. Per the guidance during our teleconference regarding the GAO on May 19, please advise if you wish to attend to Ahsha.Tribble@noaa.gov.

003539

From: Ahsha Tribble [Ahsha.Tribble@noaa.gov]
Sent: Friday, May 21, 2004 11:57 AM
To: Hannegan, Bryan J.
Cc: Cooney, Phil
Subject: Re: [Fwd: Abrupt CC FAQs for Clearance - RESPONSE DUE BY NOON, 5/21]
Bryan,

Sorry for another email. I have attached a draft in track changes mode that incorporates the agency comments that I have received thus far.

Ahsha

Ahsha Tribble wrote:

> Bryan,
>
> Does CEQ have any comments on the draft Q&As on abrupt climate change for the CCSP website?
>
> Ahsha
>
> -------- Original Message --------
> **Subject:**Abrupt CC FAQs for Clearance - RESPONSE DUE BY NOON, 5/21
> **Date:**Wed, 19 May 2004 18:37:20 -0400
> **From:**Ahsha Tribble <Ahsha.Tribble@noaa.gov>
> **To:**CCSP@usgcrp.gov, CCSP_INFO@usgcrp.gov
>
> **To:** CCSP Principals
>
> **From:** Dr. James Mahoney
>
> **Subject:** Clearance of Abrupt Climate Change FAQs
>
> **Priority:** High
>
> The Communications Interagency Working Group (CIWG) has developed a set of Frequently Asked Questions (FAQs) on Abrupt Climate Change to be posted on the CCSP website as part of our communications responsibility. The draft FAQs are attached for your review and clearance. The goals is to have these FAQs available at www.climatescience.gov by Monday, 5/24.
>
> We ask that you send your concurrence or comments to **Ahsha.Tribble@noaa.gov** no later than **noon on Friday, May 21.** Because this is a time sensitive document, if you do not respond, we will take that as a concurrence.
>
> If you have any questions, please feel free to call Ahsha at 202-482-5920.

ccsp_info Thursday 300-400 p.m. CCSP meeting to initiateCCSP-NRC study.txt
From: ccsp_info-bounces@usgcrp.gov on behalf of rpiltz@usgcrp.gov
Sent: Monday, May 24, 2004 10:41 AM
To: ccsp@usgcrp.gov
Cc: ccsp_info@usgcrp.gov
Subject: [ccsp_info] Thursday 3:00-4:00 p.m. CCSP meeting to initiateCCSP-NRC study

Importance: High

Following up on discussion at a meeting of CCSP Principals last month, Ghassem Asrar has been asked and has agreed to chair a CCSP study to make recommendations to the CCSP Principals on the future relationship between the program and the National Academies/National Research Council. The study will address issues of funding of the NRC by CCSP participating agencies, CCSP-supported NRC reports, and other issues.
All interested CCSP Principals are invited to participate in the initial meeting this week to kick off the study. It is expected that a subgroup of CCSP representatives will carry out the full study.

The initial meeting is scheduled for Thursday, May 27, from 3:00 - 4:00 p.m. in the CCSP Office large conference room.

A draft agenda/workplan for the study will be sent out in a separate message. This message is intended to get the notification of the meeting on your calendars. Please notify me whether you are planning to attend.
If you wish to participate but need to do so via telecon, let me know and we will send you the needed dial-in information.

--RP
--
Rick Piltz
Senior Associate
Climate Change Science Program Office
U.S. Global Change Research Program
1717 Pennsylvania Ave., N.W., Suite 250
Washington, DC 20006
Tel: 202-419-3468; Fax: 202-223-3064

RE ccsp Thursday 300-400 p.m. CCSP meeting to initiate CCSP-NRCstudy.txt
From: Cooney, Phil
Sent: Tuesday, May 25, 2004 7:47 AM
To: 'rpiltz@usgcrp.gov'
Subject: RE: [ccsp] Thursday 3:00-4:00 p.m. CCSP meeting to initiate CCSP-NRCstudy

Rick, as Bryan is out this week, I will cover for CEQ. Would you please provide me the call in number, as I may need to go that route? Many thanks, Phil

-----Original Message-----
From: ccsp-bounces@usgcrp.gov [mailto:ccsp-bounces@usgcrp.gov] On Behalf Of rpiltz@usgcrp.gov
Sent: Monday, May 24, 2004 10:41 AM
To: ccsp@usgcrp.gov
Cc: ipo@usgcrp.gov; ccsp_info@usgcrp.gov
Subject: [ccsp] Thursday 3:00-4:00 p.m. CCSP meeting to initiate CCSP-NRCstudy
Importance: High

Following up on discussion at a meeting of CCSP Principals last month, Ghassem Asrar has been asked and has agreed to chair a CCSP study to make recommendations to the CCSP Principals on the future relationship between the program and the National Academies/National Research Council. The study will address issues of funding of the NRC by CCSP participating agencies, CCSP-supported NRC reports, and other issues. All interested CCSP Principals are invited to participate in the initial meeting this week to kick off the study. It is expected that a subgroup of CCSP representatives will carry out the full study.

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A draft agenda/workplan for the study will be sent out in a separate message. This message is intended to get the notification of the meeting on your calendars. Please notify me whether you are planning to attend. If you wish to participate but need to do so via telecon, let me know and we will send you the needed dial-in information.

--RP
--
Rick Piltz
Senior Associate
Climate Change Science Program Office
U.S. Global Change Research Program
1717 Pennsylvania Ave., N.W., Suite 250
Washington, DC 20006
Tel: 202-419-3468; Fax: 202-223-3064

ccsp CCSP telecon tomorrow on review of CCSP-NRC relations.txt
From: ccsp-bounces@usgcrp.gov on behalf of Rick Piltz
[rpiltz@usgcrp.gov]
Sent: Wednesday, May 26, 2004 4:01 PM
To: ccsp@usgcrp.gov
Cc: kathy.holmes@science.doe.gov; ccsp_info@usgcrp.gov; djwhite@nsf.gov;
msweeney@hq.nasa.gov
Subject: [ccsp] CCSP telecon tomorrow on review of CCSP-NRC relations

Importance: High

This is a reminder that the initial CCSP meeting to kick off the review of the CCSP relationship with the National Academies / National Research Council is scheduled for Thursday, May 27, from 3:00 - 4:00 p.m. Ghassem Asrar will chair the review.

The meeting will be conducted by telecon. The CCSP Office will set up the conference call. Your procedure for connecting is:

Dial 800-516-9896
At prompt, enter the passcode 888503

Attached is a draft workplan for the review developed by Dr. Asrar.

--

Rick Piltz
Senior Associate
U.S. Global Change Research Program
Climate Change Science Program Office
1717 Pennsylvania Ave., NW, Suite 250
Washington, DC 20006
Tel (direct): 202-419-3468 Fax: 202-223-3064 Tel (main #): 202-223-6262
www.usgcrp.gov, www.climatescience.gov

Privileged and Confidential EPICI Draft
Redraft of 12/18/03 EPICI Draft
3-26-04
in wlf gcc #69 diskette under "epicimou,032604draft2"

CLIMATE VISION MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES ELECTRIC POWER SECTOR AND THE DEPARTMENT OF ENERGY

I. Overview

This Memorandum of Understanding (MOU) establishes a voluntary umbrella framework for reducing the greenhouse gas (GHG) emission intensity of the power sector. This framework shall be part of the President's Climate VISION ("Voluntary Innovative Sector Initiatives: Opportunities Now") program, which was established on February 12, 2003, as a public-private partnership to address the long-term challenge of global climate change and to make a meaningful contribution to the President's goal of reducing the GHG intensity of the United States' economy by 18 percent by 2012.

This MOU is entered into by and between each of the six electric power sector trade associations of the United States (as named below), the Tennessee Valley Authority (TVA), and the United States Department of Energy (DOE), who are hereinafter collectively referred to as the "Parties." The six trade associations that are Parties to the MOU are the American Public Power Association, Edison Electric Institute, Electric Power Supply Association, Large Public Power Council, Nuclear Energy Institute, and the National Rural Electric Cooperative Association. TVA and the six trade associations, acting through their members, are hereinafter collectively referred to as the "Power Partners[SM]."

II. Goals

The overall goal of this MOU is to support the President in his efforts to reduce the GHG emissions intensity of the U.S. economy by 18 percent by the end of 2012. To this end, Power Partners[SM] and DOE collectively commit to establish an effective and robust partnership between the electric power sector and DOE that is:

- Part of a larger economy-wide effort under the Climate VISION program and other voluntary programs to reduce the GHG emission intensity of the U.S. economy;
- Intended to make a meaningful contribution by the power sector to ensure the achievement of the President's GHG emission intensity goal[1] by 2012; and

[1] President Bush's intensity goal is defined in terms of the ratio of national GHG emissions to gross domestic product (GDP).

- To facilitate actions by Power Partners[SM] and their members to reduce collectively the power sector's GHG emission intensity[2] by an equivalent of 3 to 5 percent below 2000-2002 baseline levels, as measured over the 2010-2012 period.

This emissions intensity reduction goal is based on anticipated future trends and conditions within the power sector and other major sectors of the U.S. economy.[3] In addition, the goal applies to the entire electric power sector and does not apply individually to the Power Partners[SM] or their members. Achievement of this goal depends, in part, on the implementation of the government policies and incentives generally identified in section IV (p. 3 below) in order to enable voluntary reductions in GHG emissions intensity. One such policy that is key to Power Partners[SM] and their members is the revisions now being made to the guidelines for reporting and registering GHG emission intensity reductions under section 1605(b) of the Energy Policy Act of 1992 (hereinafter referred to as "1605(b) program").

As a secondary goal of this MOU, Power Partners and DOE commit to spur GHG emission intensity reductions across all sectors of the economy through collaborations with electricity end-users/customers in the industrial, commercial, residential, transportation and other sectors.

III. Principles

By entering into this MOU, the Parties agree to undertake a robust public-private partnership for the purpose of advancing the "new approach to the challenge of global climate change" that the President announced on February 14, 2002. This new approach is designed to harness the power of the markets and technological innovation to reduce GHG emissions intensity.

The Parties recognize that climate change is a global, complex, long-term challenge that will require a sustained effort over many generations. One essential element of an effective U.S. response entails accelerating the research, development and commercial use of innovative, economic, zero- or low-emissions technologies for the electric power and other sectors.

Activities undertaken as part of the Climate VISION program will be voluntary and flexible and may cover any GHG, while also promoting the energy and environmental enhancement objectives of the program. Participation by Power Partners[SM] does not constitute endorsement of any particular scientific theory on global climate change.

The Parties recognize that the primary responsibility of the Power Partners'[SM] trade associations is to facilitate actions by their members, in accordance with the framework

[2] The power sector's collective intensity goal is defined in terms of the ratio of carbon dioxide (CO_2) emissions to generation (MWH). However, Power Partners'[SM] members that choose to set company-specific intensity goals may express their goals in other ways.

[3] Emissions in the carbon intensity metric will be adjusted, as appropriate, in accordance with Attachment 1 and the workplan(s) developed under this MOU.

established in the MOU, for the purpose of achieving the goals and objectives set forth in the MOU. However, the Parties recognize that the Power Partners'[SM] trade association members and TVA have specific, but varying circumstances (*i.e.*, diverse growth requirements, power supply demands, fuel mix, geographical constraints, and financial and other resource limitations) that will influence and affect their operations and the actions they take.

IV. Parties' Joint Actions

As part of the Climate VISION program, the Parties seek to achieve the goals and purposes of this MOU in a transparent manner. Such efforts will include consistent and periodic evaluations of progress by the Parties and encouraging the submission of reports by the Power Partners'[SM] trade association members and TVA to the revised 1605(b) program.

Under this MOU, the Parties will work together to:

- Promote economic GHG emission intensity reductions.
- Encourage expanded use of current low-emission or no-emission technologies, such as nuclear, hydroelectric, wind, and other renewables, highly efficient natural gas and clean coal technologies.
- Pursue approaches that will help to accelerate research, development demonstration and, as soon as practicable, widespread commercial use of economic zero- or low-carbon electric generation technologies and processes (including carbon capture and sequestration), advanced high-efficiency electric generation, transmission, distribution and end-use technologies.
- Develop strategies to enable others to reduce GHG emission intensity, such as Power Partners'[SM] electricity end-users/customers in the industrial, commercial, residential, transportation and other sectors of the U.S. economy.
- Facilitate the development and use of tools for measuring and reporting GHG emissions and emissions reductions.

The Parties agree to work together to develop and encourage policies, practices and practices that will enhance, facilitate, and encourage voluntary efforts for GHG emission intensity reductions and that will provide incentives and reduce barriers to such reductions. In particular, it is the aim of the Parties to promote policies and incentives to advance the goals and objectives of this MOU by:

- Providing investment stimulus to deploy advanced technologies and maintain America's critical energy infrastructure.
- Creating and maintaining regulatory stability, and minimizing regulatory uncertainty and delay.
- Removing unnecessary constraints that may inhibit implementation of voluntary GHG reductions and use of lower-emitting technologies.
- Spurring investment in the short- and long-term through a balanced and progressive research, development and deployment portfolio.

The Parties will jointly coordinate the development of work plans that mutually reflects, to the greatest extent possible, the flexible implementation strategies and actions for achieving the goals of this MOU. The Power Partners'[SM] contribution to such work plans shall be based on the activities and initiatives described in their action plans submitted to the Secretary of Energy in connection with the initiation of the Climate VISION program on February 12, 2003.

The Parties agree to confer, at reasonable intervals, on the progress towards achieving the GHG intensity reduction goal and implementing the other provisions established under this MOU. Additional actions or other such changes may be reflected by revising the terms and provisions of this MOU if they are mutually agreed to by the Parties.

The Power Partners[SM], and DOE view the development and use of advanced technologies as critical to the achievement of the President's goal to reduce U.S. GHG intensity by 18 percent by 2012. The Parties commit to develop a process (i) or identifying within six months high-priority power sector research, development and demonstration associated with technologies necessary to attaining the GHG intensity reduction goal specified in section II of this MOU[5] and ultimately to surpass this goal ("power sector RD&D"), and (ii) for carrying out the identified high priority power sector RD&D. This process will provide for:

- Joint review by Power Partners[SM] (through EPRI and its affiliates) and DOE of power sector RD&D priorities, with particular attention to technologies necessary to attain the Power Partners' GHG intensity reduction goal specified in section II of this MOU and to further extend the transformation of electricity production, transmission, distribution and consumption with advanced technologies. DOE's review would be facilitated by the National Energy Policy Office (NEPO) and would involve the Climate Change Technology Program (CCTP) and appropriate DOE Program Offices[6].

- Joint recommendations by Power Partners [SM] (through EPRI and its affiliates), NEPO, CCTP and appropriate DOE Program Offices of steps to carry out the identified power sector RD&D priorities, including where appropriate an RD&D plan.

- To the extent these joint recommendations so provide, strengthening existing and establishing new public-private partnerships for the purpose of carrying out the high priority power sector RD&D.

[5] This power sector RD&D can include research, development and demonstration of advanced zero- or low-carbon emission electric generation technologies (including carbon capture and sequestration) and advanced high-efficiency electric generation, transmission, distribution, and end-use technologies.

[6] These DOE program offices include the Offices of Science; Fossil Energy; Nuclear Energy; Science and Technology; Electric Transmission and Distribution; and Energy Efficiency and Renewable Energy.

- Subject to the availability of appropriations and of non-federal funding, performing the high priority power sector RD&D through such partnerships.

- Evaluating potential new policy mechanisms to support early commercial uses of the technologies developed under the power sector RD&D program, once they are commercially demonstrated.

The timing and responsibilities for, and components of, this program are described in Attachment 2.

V. Power Partners[SM] Actions

The Power Partners[SM] will take actions to encourage and facilitate participation in the Climate VISION program by their trade association members and TVA. The important purposes of this effort will be to improve the level and depth of participation, through workshops or other means, of their trade association members and TVA and to enhance performance and reporting.

The Power Partners[SM] will encourage their trade association members to achieve the goals, actions and initiatives described in the associations' Climate VISION action plans, which were transmitted by letter from each of the Power Partners'[SM] members to the Secretary of the DOE. Collectively, these action plans serve as the starting point for the establishment of an effective voluntary framework for reducing the GHG emission intensity of the power sector.

The Power Partners[SM] will use best efforts to achieve the GHG intensity reduction goal of this MOU by facilitating their membership to undertake the activities described in the work plan to be developed with DOE. The activities contained in the work plan will cover a wide range of actions that may be undertaken over the term of this MOU to achieve GHG emissions intensity reductions. Such activities may include domestic and international actions, including actions to enable those in other sectors to reduce their GHG intensity.

Individual trade association member companies and TVA may memorialize their voluntary actions, programs, and activities through company-specific plans tailored and detailed in accordance with such members' and TVA's circumstances and submitted to the Power Partners[SM] and DOE. Member companies and TVA may use the revised 1605(b) program for reporting and registering GHG emissions intensity reductions achieved under their company-specific plans and this voluntary program.

The Power Partners[SM] will develop and promote power sector initiatives that will allow their member companies and TVA to pool their resources and collaborate collectively on joint, industry-wide programs and activities to reduce GHG emissions intensity.

The Power Partners[SM] will prepare an annual report on activities and accomplishments under this MOU, beginning two calendar years after this MOU (with attachments) is signed by the Parties. This report shall present the actions taken and results achieved

through the Climate VISION program during the preceding year and shall include an analysis that explains how these activities and accomplishments represent a meaningful contribution by the power sector to the President's 18 percent GHG emission intensity reduction goal. In support of this effort, the Power Partners[SM] will develop a standardized metric for measuring progress in reducing GHG emissions intensity for the electric power sector. This report and accompanying analysis will reflect anticipated future trends and conditions within the power sector and other major sectors of the U.S. economy.

VI. DOE Actions

DOE will use its best efforts to develop and implement programs, policies, regulations, budgets and legislative proposals in support of the goals and purposes of this MOU.

DOE will use its best efforts to: promote the harmonization of governmental policies and procedures; promote the minimization of regulatory barriers and uncertainties; encourage supportive fiscal and other actions and incentives; and otherwise promote an atmosphere that encourages and supports Power Partners[SM] in their efforts to achieve the goals and purposes of this MOU.

The DOE, in consultation with other federal agencies, is revising the reporting guidelines for the 1605(b) program. As directed by the President, the revised reporting guidelines are intended to provide an effective "tool for companies to publicly record their progress" in reducing GHG emission intensity. The President stated that this "tool goes hand-in-hand with voluntary business" actions, such as those to be undertaken by the Climate VISION Program generally and this MOU specifically. Such revisions to improve the 1605(b) program are critical to maximizing participation under this Climate VISION partnership and achieving the goals and objectives of this MOU. To this end, DOE will strive to assure that collection and documentation of information through EIA under the revised 1605(b) program are consistent with, and supports the achievement of, the President's overall climate change objectives of February 14, 2002, and the goals and objectives of this MOU.

In revising the 1605(b) guidelines, DOE and other federal agencies will consider 1) registration of stand-alone, credible projects and 2) baseline protection or registration of past and future actions. These issues are very important to the Power Partners[SM], both during and subsequent to the current revision of the 1605(b) program.

Through the Climate VISION program, DOE will provide recognition to Power Partners[SM] and their members for making substantial contributions to GHG emission intensity reductions through the revised 1605(b) program and by other means. DOE will also provide recognition to Power Partners[SM] and their members that make financial contributions to GHG emissions reduction research, development, and commercial use of advanced technologies and practices.

DOE shall provide technical assistance to the Power Partners[SM] and their trade association member companies and TVA in support of the goals, activities and actions

undertaken pursuant to this MOU. This assistance shall include DOE support in the development of:

- Voluntary commitments, actions, programs and other such strategies developed under this MOU for reducing GHG emission intensity;
- Tools for measuring and reporting GHG emissions intensity reductions and for achieving energy savings; and
- Strategies to assist others to reduce GHG emission intensity, such as by demand-side management, energy efficiency, and utilization of electrotechnology applications by customers and other end-users.

VII. General Provisions

The Parties enter into this MOU under the authority provided to DOE in the Department of Energy Organization Act (Pub. L. No. 95-91), section 203, 42 U.S.C. § 7133, and section 646, 42 U.S.C. § 7256.

The Parties agree to work together to: promote public and congressional awareness and confidence in the Climate VISION program and this MOU. The Parties also agree to resolve in a mutually satisfactory manner interpretative and other problems that may arise in the implementation of this MOU. In addition, each Party shall designate a point of contact for these purposes and otherwise facilitate implementation of this MOU. Any Party shall notify all other Parties of any change in its designated contact person.

Any Party may, after 30 days notice in writing to other Parties, terminate its participation in the agreement without penalty or criticism, and without being subject to any judicial action.

This MOU broadly states the basic understandings of all Parties of voluntary tasks and the methods for performing such tasks described herein and is not to be considered a binding contract. This MOU shall not be used to obligate or commit funds or as the basis for the transfer of funds.

Trade secrets and commercial or financial information contained in reports made pursuant to section V of this MOU shall be subject to the applicable provisions of section 1605(b) of the Energy Policy Act of 1992.

This MOU shall become effective as of the date the last Party duly executes it below:

Date: __, 2004

/signatures/
/names of trade association and TVA heads/names of trade associations and TVA/Secretary of Energy

Attachments (2)

Attachment 1

Factors in Carbon Intensity Metrics

Changes in carbon intensity relating to the power sector can occur from on-system or off-system actions.

I. On-system activities could include (but are not limited to):

- Changes in fuel mix.
- Generation performance improvements (including nuclear, hydro or other renewables).
- Changes in emissions due to improvements in efficiency of electricity production or use.
- Reductions in transmission and distribution losses.
- Reductions in SF 6 releases.
- Avoidances that result from substituting low-emitting or zero-emitting generation for higher-emitting generation.

II. Off-system activities, both domestic and international, that should be considered could include (but are not limited to):

- Offsets from carbon sequestration, methane reduction or utilization, and other activities that reduce or avoid GHG emissions.
- Offsets from purchased power.
- Reductions in other sectors due to product substitution (*e.g.*, flyash in cement).
- Reductions in direct fuel use in other sectors due to electrotechnologies.
- Transfer of reductions or offsets from other entities.
- Reductions or offsets achieved by prior actions.

Some of these off-system activities may result in shared reductions or offsets.

Depending on the level of reporting and referenced baseline, some of these activities may not be reflected in carbon intensity estimates. If not, they should be considered as adjustments to that data.

Attachment 2

POWER SECTOR CLIMATE TECHNOLOGY RD&D PARTNERSHIPS

Phase I: Recommendation of Research Priorities and of Funding Mechanisms

Objective: Identify (i) future climate technology needs for the electric power sector, (ii) gaps or under-funding in current power sector climate technology research, development and demonstration (power sector RD&D) programs, (iii) priorities for new or supplemental power sector climate technology RD&D, and (iv) options for potential funding mechanisms for early commercial use of advanced technologies.

Responsible Parties: Power Partners[SM] participants, EPRI and DOE. NEPO will facilitate participation by appropriate DOE program offices and CCTP.

Funding: EPRI and DOE (subject to availability of funding)

Deliverable: EPRI will work with Power Partners[SM] participants and DOE (i) to identify high priority power sector RD&D, (ii) to provide by April 15, 2004, recommendations for carrying out these priorities including, as appropriate, new or supplemental power sector climate technology RD&D programs to be jointly funded by Power Partners[SM] participants and DOE and to be carried out beginning in FY 2006 (or earlier, if feasible based on availability of funding), and (iii) to identify by such date options for new mechanisms to provide funding for early commercial use of advanced power sector climate technology.

Phase II: Design Public/Private RD&D Partnership

Objective: Establish one or more public/private partnerships where there is a joint recommendation to conduct mutually agreed-upon priority power sector climate technology RD&D through such partnerships.

Responsible Parties: EPRI, DOE (including NEPO, CCTP and appropriate program offices)and Power Partners[SM] participants.

Funding: To be determined.

Deliverables: By July 15, 2004, for projects for which there is a joint recommendation to do so, DOE program offices and EPRI will sign and be prepared to implement (contingent on Federal and non-Federal funding) cooperative agreements or CRADAs to which DOE program offices, DOE laboratories, and EPRI are parties. Under the cooperative agreements or CRADAs, DOE program offices, DOE laboratories, and EPRI will develop a detailed RD&D plan by September 15, 2004, subject to the review and comment by Power Partners[SM] participants.

Phase III. Implementation of RD&D Program

Objective: Carry-out priority power sector climate technology RD&D public/private partnership.

Responsible Parties: EPRI, DOE program offices, DOE laboratories, Power Partners[SM] participants through EPRI

Funding: Shared DOE and industry through EPRI.

Deliverable: Contingent on availability of appropriations and of non-Federal funding, over five-fiscal-year period beginning with FY 2006 (or earlier, if feasible based on availability of funding), public private partnerships will –

(1) carry-out public/private partnership agreement executed in Phase II, and
(2) analyze and report results, and recommend any further power sector climate technology RD&D.

Phase IV. Facilitating Early Commercial Use

Objective: Ensure early commercial use of technologies developed by public/private partnerships

Responsible Parties: NEPO and DOE program offices, Power Partners[SM] participants and EPRI

Funding: To be determined

Deliverable: Once authorized by Congress, provide financial incentives for early commercial use of technologies developed pursuant to RD&D program under the MOU.

RECORD TYPE: FEDERAL (NOTES MAIL)

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CREATION DATE/TIME: 7-JUN-2004 17:43:52.00

SUBJECT:: Climate Change Technology Program (CCTP), Working Groups Mtg. -- Cancelled

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TEXT:
EOP Reviewers, CCTP Working Group Chairs, Interested Parties:ÿ Due to the National Day of Remembrance for President Reagan on June 11, the CCTP Working Group Chairs meeting, originally scheduled for Friday, June 11, is CANCELLED.ÿ The meeting will not be rescheduled.ÿ Comments on the CCTP Draft Strategic Plan are now due at the Close-of-Business, Thursday, June 10.ÿ Barring unforeseen complications, the final version of the CCTP Draft Strategic Plan, with the latest round of comments incorporated, will be distributed to CCCSTI-IWG principals (and CCTP participants and supporting staff) on or about Tuesday, June 22, seven days prior to the IWG meeting on Tuesday, June 29.ÿ Bobÿ 202-586-3949

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HIGHLIGHT:
A state plan to be unveiled Monday would be the first to curb greenhouse-gas emissions in cars.

BODY:
Once again, California is trying to change the world. This time its target is the ever-present automobile, and Monday state officials will announce emissions regulations of unprecedented scope and significance.

Never before has a country - let alone a state - required that car manufacturers reduce the amount of greenhouse gases emitted from tailpipes in an effort to combat global warming. Within the next decade, however, California will demand that new cars sold in the state cut those pollutants by 30 percent.

On one hand, it is a measure of California's clout: 12 percent of all cars sold in the United States roll off lots here. Yet it also marks a reprise of California's role as Washington West - the primary counterweight to the policies of the Bush administration. As a result, the decision could stir states dissatisfied with Washington's leadership, despite the fact that the program could eventually add $ 1,000 to new car prices.

"In a number of states, a lot of misgivings have been expressed about the failure of the federal government to do anything about greenhouse gases," says Therese Langer of the American Council for an Energy Efficient Economy in Washington. "That will make this very appealing."

In recent years, seven Northeastern states - including New York, New Jersey, and Massachusetts - have adopted California's auto-emission regulations, which are tougher than the federal standard. California's new plans, however, represent something unique. It has never before regulated gases such as carbon dioxide, which many scientists believe contribute to global warming.

While some European countries have voluntary guidelines for reducing tailpipe greenhouse-gas emissions, California would be the first in the world to create a mandatory standard, introducing it in 2009 and gradually strengthening it until 2015. Since California is home to some of the most car-clogged cities in the US, the change would have an obvious environmental effect.

Yet even environmentalists say the greater significance is political. As it has done many times before, California has crafted a new policy for other states and countries to follow. In 1960, for example, California established the world's first agency to control air pollution; several years later it became the first state to regulate pollutants such as carbon monoxide.

Already, New York has said it would follow California's new greenhouse-gas regulations, and Canada has made similar intimations. The California Air Resources Board is expected to lay out the details of the plan Monday. Two years ago, the legislature passed a bill - signed by former Gov. Gray Davis - that gave the agency the authority to regulate

greenhouse gases. Gov. Arnold Schwarzenegger says he will support the decision.

"If it weren't for California, the environment would be much worse in this country," says Roland Hwang of the Natural Resources Defense Council. "It puts pressure on the auto industry and Washington to come up with a solution."

For its part, the auto industry wants nothing to do with the new California policy, and it has said it might sue. At issue is California's authority. The federal Clean Air Act clearly gives California the right to set its own emissions policy in order to curb pollution. Many times in the past, California has used this authority to pass stricter regulations than those that existed in other states.

But critics of the new plan suggest that one of California's fundamental goals is to improve fuel-efficiency, and Washington still retains total authority over national fuel-efficiency standards. Experts suggest that there are other ways to lower greenhouse-gas pollutants besides improving fuel efficiency, such as cutting the carbon content of gasoline. Yet improved fuel economy is "the great untapped resource," says Ms. Langer.

A study by her organization found that fuel economy could be doubled using existing technology - such as lighter materials and more sophisticated transmissions - with no change in a car's appearance and no loss of performance. The cost: between $ 1,000 and $ 1,500 per car - roughly in line with California's estimates. Moreover, if California's plan can survive, the state hopes its mandate will spur further innovation. It has happened before: In the 1970s, California pioneered the use of the catalytic converter, which is now standard equipment on all automobiles.

"[Auto manufacturers] don't want to make two different cars," says Mr. Hwang. But if California's new regulations spread as previous ones have, he says, "the California car may become the de facto national car."

DRAFT

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
AIR RESOURCES BOARD

STAFF PROPOSAL REGARDING THE MAXIMUM FEASIBLE AND COST-EFFECTIVE REDUCTION OF GREENHOUSE GAS EMISSIONS FROM MOTOR VEHICLES

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

June 14, 2004

EXECUTIVE SUMMARY

California has a long history of environmental leadership. This tradition of environmental leadership continues to this day. In 2002, recognizing that global warming would impose compelling and extraordinary impacts on California, the legislature adopted and the Governor signed AB 1493. That bill directs the California Air Resources Board (Board) to adopt regulations to achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles. This Draft Initial Statement of Reasons presents a preview of the staff proposal that will be considered by the Board at its September 2004 public hearing.

This document describes the conceptual outlines of the staff proposal, including the specific details of the proposed approach, its rationale, and an assessment of its environmental and economic consequences. The reader should bear in mind that this document is a draft. The various elements of the staff proposal as well as the methodology used to evaluate its environmental and economic impacts are all subject to change, due to work in progress as well as comments received from the public.

This draft does not include proposed regulatory language. Staff is in the process of developing specific regulatory language and will release a draft for public comment prior to the September hearing.

Climate Change Overview

The earth's climate is changing because human activities are altering the chemical composition of the atmosphere through the buildup of greenhouse gases (GHGs), primarily carbon dioxide (CO_2), methane, nitrous oxide, and hydrofluorocarbons.

The heat-trapping property of GHGs is undisputed. Although there is uncertainty about exactly how and when the earth's climate will respond to enhanced concentrations of GHGs, observations indicate that detectable changes are under way. There most likely are and will continue to be changes in temperature and precipitation, soil moisture, and sea level, all of which could have significant adverse effects on many ecological systems, as well as on human health and the economy.

California Actions to Address Climate Change

The State of California has traditionally been a pioneer in efforts to reduce air pollution, dating back to 1963 when the California New Motor Vehicle Pollution Control Board adopted the nation's first motor vehicle emission standards. California likewise has a long history of actions undertaken in response to the threat posed by climate change. Beginning with 1988 legislation that directed the

California Energy Commission, in consultation with the Air Resources Board and other agencies, to study the implications of global warming on California's environment, economy, and water supply, and continuing on over the years through Governor Schwarzenegger's April 2004 Executive Order outlining his vision for the California Hydrogen Highway Network, California state government has consistently recognized the necessity for state action on climate change to protect California's interests. At the Air Resources Board, attention to the mechanisms and effects of climate change dates back to 1989, when staff first updated the Board on the emerging science.

Maximum Feasible and Cost-Effective Technologies

A key part of the staff's technical work is an assessment of technologies and fuels that can contribute to a reduction of climate change emissions in passenger vehicles from the 2009 model-year and beyond. The staff technology assessment reviews baseline vehicle attributes and their contribution to atmospheric climate change emissions, and evaluates technologies that have the potential to decrease these emissions. The technologies explored are currently available on vehicles in various forms, or have been demonstrated by auto companies and/or vehicle component suppliers in at least prototype form. The report then examines the lifetime cost of these technologies to vehicle owner-operators. This approach is consistent with the AB 1493 directive to require climate change reduction technologies that are economical to an owner or operator of a vehicle, taking into account the full life-cycle costs of a vehicle.

There are near-term, or off-the-shelf, technology packages in each of the vehicle classes evaluated (small and large car, minivan, small and large truck) that results in a reduction of CO_2 emissions of at least 15-20% from baseline 2009 values. Several technologies stood out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift, dual cam phasing, turbocharging with engine downsizing, automated manual transmissions, and camless valve actuation. Potential improvements in the air conditioning system include an improved variable displacement compressor, reduced leakage systems, and the use of an alternative refrigerant (HFC-152a). Packages containing these and other technologies provided substantial emission reductions at prices that ranged from a saving to several hundreds of dollars. Nearly all technology combinations modeled provided reductions in lifetime operating costs that exceeded the retail price of the technology.

Climate Change Emission Standards

Vehicle climate change emissions comprise four main elements: (1) CO_2, CH_4 and N_2O emissions resulting directly from operation of the vehicle, (2) CO_2 emissions resulting from operating the air conditioning system (indirect AC emissions), (3) refrigerant emissions from the air conditioning system due to either leakage, losses during recharging, or release from scrappage of the

vehicle at end of life (direct AC emissions, and (4) upstream emissions associated with the production of the fuel used by the vehicle. The climate change emission standard incorporates all of these elements.

Staff elected to incorporate the CO_2 equivalent emission standards into the current LEV program along with the other light and medium-duty automotive emission standards. Accordingly, there would be a CO_2 equivalent fleet average emission requirement for the passenger car/light-duty truck 1 (PC/LDT1) category and another for the light-duty truck 2 (LDT2) category, just as there are fleet average emission requirements for criteria pollutants for both categories of vehicles in the LEV program.

Determination of the specific climate change emission standards for each category involved several steps. First, the maximum feasible emission reductions were modeled for five vehicle types (small and large car, minivan, small and large truck) with various technology packages. These technology packages were then categorized with respect to their technology readiness (i.e. near-, mid-, or long-term). Secondly, manufacturer specific data was collected for the California fleet in order to evaluate individual manufacturer product mix. The emission standards for each category were then determined based on the manufacturer with the highest average weight vehicles (as opposed to the average of all the manufacturers) to ensure that all manufacturers can comply with the standards.

Staff proposes setting near-term standards, phased in from 2009 through 2011, and mid-term standards, phased in from 2012 through 2014. The proposed standards, expressed in terms of CO2 equivalent grams per mile, are as follows:

Tier	Phase-in	Year	CO_2 equivalent emission standard by vehicle category (g/mi)	
			PC/LDT1	LDT2
Near-term	30%	2009	315	422
	60%	2010	284	385
	100%	2011	242	335
Mid-term	30%	2012	233	328
	60%	2013	223	321
	100%	2014	211	311

Staff estimates that the average fleetwide incremental cost of control to meet these standards, taking into account the phase-in of the standard and the specific starting point of the individual manufacturers, will be as follows:

Year			All major 6
2009	Near-term phase-in	PC/LDT1	$25
		LDT2	$69
2010		PC/LDT1	$96
		LDT2	$176
2011		PC/LDT1	$241
		LDT2	$326
2012	Mid-term phase-in	PC/LDT1	$294
		LDT2	$421
2013		PC/LDT1	$382
		LDT2	$584
2014		PC/LDT1	$539
		LDT2	$851

Thus when fully phased in the near term standards will result in an estimated average cost increase of $241 for PC/LDT1, and $326 for LDT2. The fully phased in mid term standards will result in an estimated average cost increase of $539 for PC/LDT1 and $851 for LDT2. The staff analysis concludes, however, that these increased costs will be more than offset by operating cost savings over the lifetime of the vehicle.

Looking at the cost of the technology on a per vehicle basis, staff estimates that applying the maximum feasible near term technology to an individual vehicle would cost an average of $328 for the PC/LDT1 category and $363 for the LDT2 category, compared to the 2009 baseline vehicle. The estimated average cost to apply the maximum feasible mid term technology is $1047 for PC/LDT1 and $1210 for LDT2. These costs are higher than the fleet average shown above because not all vehicles will need to be controlled to the maximum level. Rather, the proposed standard is set at a level that is feasible for the manufacturer in the worst starting position. Therefore the average cost across the fleet will be less than the maximum cost of the technology on a per vehicle basis.

The staff analysis concludes that these standards, when applied to the fleet of the "major six" automakers (GM, Ford, DaimlerChrysler, Toyota, Honda, Nissan), would result in the following emission reductions by year. The reductions needed by individual automakers will vary depending on their initial starting position.

Year			All major 6
2009	Near-term phase-in	PC/LDT1	-2.3%
		LDT2	-5.1%
2010		PC/LDT1	-8.8%
		LDT2	-13.1%
2011		PC/LDT1	-22.2%
		LDT2	-24.3%
2012	Mid-term phase-in	PC/LDT1	-25.3%
		LDT2	-25.9%
2013		PC/LDT1	-28.3%
		LDT2	-27.6%
2014		PC/LDT1	-32.3%
		LDT2	-29.8%

The proposed standards also address upstream emissions (emissions due to the production and transportation of the fuel used by the vehicle). Staff proposes to use the upstream emission levels for conventional fuel vehicles as a yardstick against which to compare the relative emissions of alternative fuel vehicles. This approach simplifies the regulatory treatment of gasoline vehicles, while at the same time allowing for appropriate consideration of differences in upstream emissions from alternative fuel vehicles.

AB 1493 directs that emission reduction credits be granted for any reductions in greenhouse gas emissions achieved prior to the operative date of the regulations. ARB staff proposes that the baseline against which manufacturer emissions are measured should be the fully phased in near term standards, and that credit for early emission reductions should be available for model years 2000 through 2008. Thus under the staff early credit proposal, manufacturer fleet average emissions for model years 2000 through 2008 would be compared to the near term standards on a cumulative basis. Manufacturers that had cumulative emissions below the near term standards would earn credit.

AB 1493 also requires that the regulations "provide flexibility, to the maximum extent feasible consistent with this section, in the means by which a person subject to the regulations ... may comply with the regulations. That flexibility shall include, but is not limited to, authorization for a person to use alternative methods of compliance with the regulations." Thus the use of alternative compliance strategies must not undercut the primary purpose of the regulation, which is to achieve greenhouse gas reductions from motor vehicles. Accordingly, the ARB's alternative compliance program will be limited to the vehicles that are regulated through AB 1493, and their fuels. This is to ensure that the program does not dilute the technology-forcing nature of the regulation, since the goal is to reduce emissions from the vehicles themselves. The major features of the staff proposal are:

- Projects must be located in California to be eligible as alternative methods of compliance.

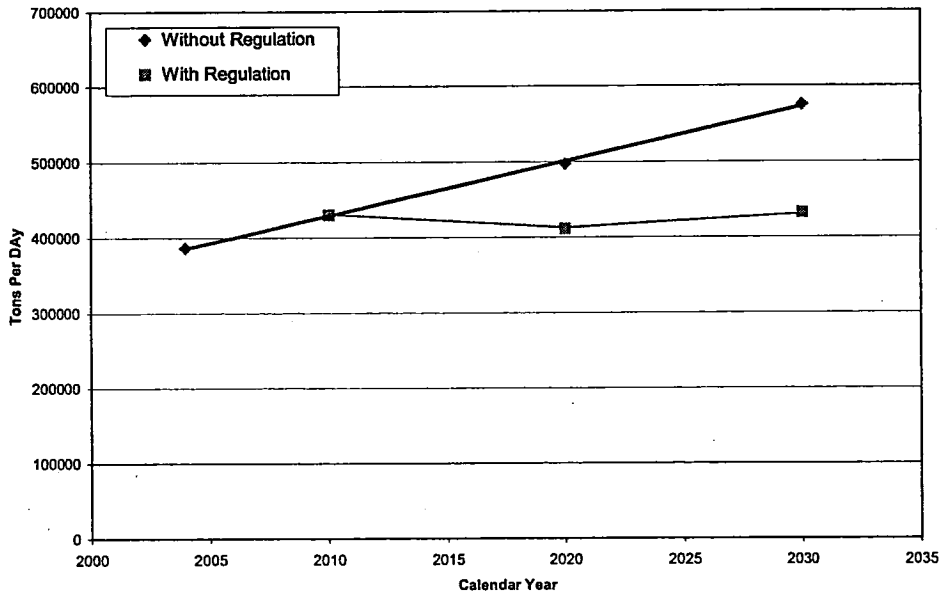
- Only companies regulated by AB 1493 (automakers) will be permitted to apply for alternative compliance credits.
- Only those vehicles regulated under AB 1493 are eligible for alternative compliance credits. This includes model year 2009 and later passenger vehicles and light-duty trucks and other vehicles used for noncommercial personal transportation in California.
- Staff proposes that eligible projects be limited to those that achieve greenhouse gas reductions through documented increased use of alternative fuels in eligible vehicles.

Environmental Impacts

Taking into account the penetration of 2009 and later vehicles meeting the new standard into the fleet, staff estimates that the proposed regulation will reduce climate change emissions by an estimated 85,900 CO_2 equivalent tons per day statewide in 2020 and by 143,300 CO_2 equivalent tons per day in 2030. This translates into a 17% overall reduction in climate changes emissions from the light duty fleet in 2020 and a 25% overall reduction in 2030.

Staff estimates that baseline emissions today (2004) are 386,600 CO_2 equivalent tons per day. With the regulation 2020 emissions will be lower than today's, and 2030 will be approximately the same, as shown below.

Motor Vehicle Greenhouse Gas Emissions



Cost Effectiveness

Typically, emission control regulations impose a cost. Cost effectiveness is a measure of the cost imposed per ton of reduction achieved, and thus is a useful tool to compare various possible approaches. In this instance, however, AB 1493 requires that the regulations be economical to the consumer over the life cycle of the vehicle. Consistent with this direction, the technology packages that provide the basis for the standard result in operating cost savings that exceed the initial capital cost, resulting in a net savings to the consumer over the lifecycle of the vehicle. This translates to a "negative" cost effectiveness value (there is a cost savings per ton reduced). Thus staff estimates that the cost effectiveness of the staff proposal, in terms of dollars per ton of CO_2 equivalent emissions reduced, is -$143 in 2020 and -$136 in 2020.

Economic Impacts

The climate change regulation may impact several sectors of the economy. The steps that manufacturers will need to take to comply with the regulatory standards are expected to lead to price increases for new vehicles. Many of the technological options that manufacturers choose to comply with the regulation are also expected to reduce operating costs. These two responses to the regulation have combined positive and negative impacts on California businesses and consumers. The vehicle price increase will be borne by purchasers and may negatively affect businesses. However, the operating cost savings from the use of vehicles that comply with the regulation will positively impact consumers and most businesses. Based on the staff analysis, the net effect of the regulation on the economy is expected to be small but positive. The proposed climate change regulation is not expected to cause any significant adverse impact on the State's economy. It is very likely that savings from reduced vehicle operating costs would end up as expenditures for other goods and services. These expenditures would flow through the economy, causing expansion or creation of new businesses in several sectors. Staff's economic analysis shows that as the expenditures occur, jobs and personal income increase. There will not be any impacts on the ability of California business to compete with businesses in other states. State and local agencies will not be adversely impacted and are likely to realize a net reduction in their cost of fleet operations.

Impacts on Low Income and Minority Communities

The ARB has made the achievement of environmental justice an integral part of its activities. The Board approved Environmental Justice Policies and Actions (Policies) on December 13, 2001. These Policies establish a framework for incorporating environmental justice into the ARB's programs consistent with the directives of State law.

As the ARB developed the climate change regulations, staff worked closely with community leaders involved with environmental justice as well as with environmental and public health organizations to maintain an ongoing dialogue and thus successfully implement the ARB's environmental justice policies.

Staff has undertaken an evaluation to investigate if low-income and minority communities (communities) may be impacted disproportionately by the climate change regulation. The primary direct mechanism identified was the potential effect on used car prices. Because the vehicle price increases caused by the proposed regulation may, over time, increase the price of used vehicles that low-income households tend to purchase, the staff focused on analyzing the potential impacts of the vehicle price increase on low-income purchasers of used vehicles. The analysis showed that the expected impacts of any price increase are minor, and would be more than outweighed by a reduction in operating cost. Thus the proposed regulation should not have a significant impact on low-income purchasers of used vehicles.

Staff has not identified any mechanisms by which the climate change regulation would result in disproportionate impact on low income or minority communities

Other Considerations

Staff also is investigating several approaches that supplement the standard economic analysis. The methods used rely on recent tools and studies that provide additional insight into the potential impacts of the regulation. Using those tools and studies to investigate possible secondary impacts of the regulation, this report presents additional perspectives on the potential impact of the proposed regulation on fleet mix, emissions, the State's economy, small businesses, and low-income households. The methods discussed are in the early stages of development relative to the standard analysis. As such, it is expected that these methods will be further refined.

The economic impact analysis is based on the staff assessment that the reduced vehicle operating cost resulting from the regulation will be sufficiently attractive to new car buyers to compensate for the vehicle price increase, which results in vehicle sales that are unchanged from the levels that would have been the case without the regulation. Staff also, however, assessed what the consequences would be if one assumes that the changes in vehicle price and other attributes do affect sales. Staff analyzed the potential effect of price and operating cost changes on sales, fleet size, and fleet age using a consumer choice model developed by University of California, Davis. The results show that the net result of increased new vehicle prices and lower operating costs is a tendency to increase sales in the near term, and slightly decrease sales in the longer term as the more stringent second step of the regulation is fully phased in.

Staff also evaluated potential adverse environmental impacts associated with increased VMT due to lower operating costs. Our analysis indicates that the benefits of reduced climate change emission from the regulation will not be affected significantly by any increase in driving attributable to lower operating cost.

The staff assessment concludes that communities with low income and minority households are expected to have increased jobs as a result of the regulation. Future employment growth in some sectors may be reduced, but an increase in overall economic activity because of increased purchasing power due to lowered operating costs of vehicles would be expected to create a sufficient number of jobs to more than offset any losses.

Staff will continue to refine these approaches and will consider public comment received before issuing the final staff report.

ccsp FW Revised Prospectus--Final check requested by Friday 25June.txt
From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Tuesday, June 22, 2004 1:59 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; wgcc@usgcrp.gov
Cc: CNierenberg; ipo@usgcrp.gov
Subject: [ccsp] FW: Revised Prospectus--Final check requested by Friday 25June

TO: CCSP Principals and Key Contacts, Interagency Working Group Co-Chairs

I am forwarding a message from Bill Murray/Tom Karl, along with the draft prospectus for S&A Product 1.1. As Bill and Tom indicate, the prospectus has been revised in response to CCSP comments. This previous CCSP review was conducted to prepare the prospectus for public comment, as described in the draft S&A Product Guidelines.

Because some time has elapsed since the previous review, Jim Mahoney has asked me to circulate this revised prospectus for a quick final check.
Please make sure your previously submitted comments have been acted upon in a satisfactory fashion.

Please let me know by COB on Friday if there is any reason not to move forward with posting the prospectus for public comment. We will do so early next week unless we receive comments to the contrary.

Thanks for your cooperation.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

-----Original Message-----
From: Bill Murray [mailto:william.l.murray@noaa.gov]
Sent: Tuesday, June 22, 2004 1:45 PM
To: Richard Moss
Cc: Tom Karl; Christopher D Miller
Subject: Revised Prospectus

Dear Richard:

The CCSP Synthesis Product Prospectus for Product 1.1, "Temperature trends in the lower atmosphere - steps for understanding and reconciling differences," has been amended in response to the comments received from the CCSP Principals. The revised document is attached.

We call particular attention to the revised text on page 4, lines 15-20, which discusses the planned review process. This section now notes that the Lead Authors will be encouraged to supplement the review process through publication of findings in the scientific literature. In addition, one of the goals of the Exeter workshop milestone, planned for September, 2004, will be to stimulate publication activity.

Sincerely,

Bill Murray (for Tom Karl)

Attachment

From: Hannegan, Bryan J.
Sent: Friday, June 18, 2004 3:36 PM
To: 'kparker@usgcrp.gov'
Cc: Halpern, David
Subject: Climate communications

Kathryn -- David Halpern (OSTP) and I would like to meet with you and Nick next week to discuss the work and direction of the CCSP Communications Working Group. Can you check with Nick and suggest times when you both are available?

Thanks,
Bryan Hannegan
CEQ

From: ccsp_info-bounces@usgcrp.gov on behalf of Rick Piltz [rpiltz@usgcrp.gov]
Sent: Friday, June 18, 2004 4:26 PM
To: ccsp@usgcrp.gov
Cc: ccsp_info@usgcrp.gov
Subject: [ccsp_info] REMINDER--(Action needed) Review of CCSP Relationship with the NAS/NRC

Importance: High
Re-sending this June 4 memo as a reminder--

[This memo requests write-ups from agencies to address several issues, by Monday, June 21.]

Review of CCSP Relationship with the National Academy of Sciences / National Research Council

Follow-Up Actions from Initial Meeting on May 27, 2004
The CCSP review of the program's relationship with the NRC had a successful first meeting via telecon. Participants included CCSP Principals Ghassem Asrar (chair), NASA; Jim Mahoney, NOAA; Margaret Leinen, NSF; Ari Patrinos, DOE; Jim Andrews, DOD; and Bill Hohenstein, USDA. Also participating were Jack Kaye, NASA; Chet Koblinsky (for Mary Glackin), Ahsha Tribble, Margarita Conkright, and Dave Goodrich, NOAA; Jerry Elwood, Dave Conover, and Mitchell Baer, DOE; Janet Gamble (for Mike Slimak), EPA; Nick Lancaster (for Chip Groat), USGS; Karrigan Bork (for Linda Lawson), DOT; Laurette Ruppe, USAID; and Richard Moss and Rick Piltz, CCSP Office.

There was general agreement on the workplan for the review that was distributed prior to the meeting. Dr. Asrar indicated that he envisioned the review will require holding a total of up to four meetings to complete. He will communicate with Bruce Alberts at the National Academy of Sciences to inform him that the CCSP review is under way and to enlist the participation of the NAS/NRC in working with the CCSP to address the issues that are part of the review.

Dr. Asrar requested that CCSP Principals representing agencies that fund NRC studies agree to participate in the review on an ongoing basis. He also requested that each agency designate and inform the CCSP Office of a Point of Contact for communications pertaining to the review, including the preparation of information that was requested in advance of the next meeting (see below).

Dr. Asrar called for the next meeting to be held in late June. The CCSP Office will send out specific notification of the meeting when it is scheduled, along with a briefing package for the meeting. **In preparation for the discussion at the next meeting, the workplan calls for agencies to prepare a write-up to address several items, as follows. Agency representatives/POCs please send your agency's response to the following items to Rick Piltz in the CCSP Office (rpiltz@usgcrp.gov, 202-419-3468) by Monday, June 21:

(a) describe your agency's support for all NRC activities related to climate and global change research during the past 5 years;
(b) revise the inventory of NRC global change activities if needed;
(c) assess the effectiveness of relevant NRC studies and prepare to discuss that with the CCSP review group;
(d) provide some sense of how your agency responded to particular NRC recommendations, at least from those reports you regard as being of greatest relevance and value; and
(e) provide your input on questions for this review that both the CCSP and the NRC should consider, so that when we come together with the NRC they will have gone through a similar process to that of the CCSP review.

The CCSP Office also will solicit input from CCSP interagency working groups on their assessment of the effectiveness of relevant NRC studies.
NRC staff has provided a draft inventory, in spreadsheet form, of NRC studies pertaining to climate and global change research funded by the CCSP, or by CCSP participating agencies, during the past five years ("post-Pathways"). This inventory might be subject to revision on further review, but to expedite your work the draft is attached with this message for your use. In deciding which reports to include in the list, NRC staff attempted to use "climate and associated global changes" as the criterion for inclusion. They also included a few important reports from the ecosystems, ocean, human dimensions, and energy technology areas that do not focus explicitly on climate change because they believed CCSP Principals would find them of interest. There are many more NRC reports of this type in areas such as ecosystems and water resources that could be added on request. For each report, they have attempted to indicate the lead NRC unit (standing committee, board, or division), other involved units, the sponsoring agencies, and the URL where the report can be found on the National Academy Press Web site.

--

Rick Piltz
Senior Associate
U.S. Global Change Research Program
Climate Change Science Program Office
1717 Pennsylvania Ave., NW, Suite 250
Washington, DC 20006
Tel (direct): 202-419-3468 Fax: 202-223-3064
Tel (main #): 202-223-6262
www.usgcrp.gov, www.climatescience.gov

From: Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Wednesday, June 23, 2004 4:16 PM
To: Hannegan, Bryan J.
Cc: Rick Piltz
Subject: RE: Status of Synthesis and Assessment Products

Bryan -- I am out of the office and checking email remotely.

Prospectuses for products 1.1 (temperature trends), 2.2 (carbon cycle) and 3.1 (climate models) have already been through CCSP review.

I'm attaching for your convenience the climate model prospectus; by copy of this message to Rick Piltz, I'm asking him to foward to both of us the carbon cycle prospectus (which he sent out for review in mid-May). These are currently being revised. If you have comments on these, it would be helpful to have them soon--please let me know so I can inform the authors to expect them.

The only thing that is due on Friday is the final check on the prospectus for product 1.1.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office
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1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

-----Original Message-----
From: Hannegan, Bryan J. [mailto:Bryan_J._Hannegan@ceq.eop.gov]
Sent: Tuesday, June 22, 2004 2:32 PM
To: Moss, Richard H
Subject: Status of Synthesis and Assessment Products

Richard -- can you send me a list of all of the synthesis and assessment products, showing their current status, and which (if any) have prospectuses drafted that I need to be reviewing prior to Friday? Thanks, Bryan

CommWG Re Meeting Reminder Next CIWG Meeting-June 30th at 3 PM.txt
From: outreach-bounces@usgcrp.gov on behalf of kparker@usgcrp.gov
Sent: Monday, June 28, 2004 7:25 AM
To: outreach@usgcrp.gov
Cc: rmoss@usgcrp.gov; james.r.mahoney@noaa.gov
Subject: [CommWG] Re: Meeting Reminder Next CIWG Meeting-June 30th at 3 PM

CIWG Members,

A final reminder that our next CCSP Communications Interagency Working Group meeting is being held on Wednesday at 3 PM. We need everyone's attendance, as we will be discussing and making necessary revisions to our group's terms of reference. Please make sure you have reviewed them prior to the meeting. I am attaching them again to this email. It is preferable for you to be present in person, however, if you need to call in dial 1 800 516 9896. At the prompt, enter code 888502. If you cannot attend, please send an alternate and let either Nick or I know.

Don't forget we're asking everyone for a brief report on their agency's climate communications activities (see previous email below for the information we'd like you to include). We'll be asking for volunteers to work on drafting the implementation plan, so please consider volunteering.

Looking forward to seeing everyone on Wednesday,

Kathryn
202 343-9044

Nick
202 419 3480

> Fellow CIWG Members,
>
> Thanks to those of you who replied to my last email. As you might expect,
> there was no time when everyone could make it, but we got close. The new
> date for the next CIWG meeting will be Wednesday, June 30 from 3-4:30
> PM at the CCSP Office (1717 Pennsylvania Avenue, Suite 250).
>
> Please see the previous email (copied below) which includes the agenda. Remember, we will be asking each of you to give us a brief report (3-5 minutes) on your agency's climate communications activities.
>
> Also, the terms of reference are attached for your review prior to the meeting. Please come with suggested revisions/comments. Thank you Scott,
> Jennifer and Jason for your efforts in preparing this draft document.
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> If you cannot make it, please let us know and send an alternate. We will
> also be able to tie you in via phone, if neccessary.
>
> See you on the 30th,
>
> Kathryn
>
>
>
>> Fellow CIWG Members,
>> Because many of you will be unable to make the Tuesday CIWG meeting,
>> We

are rescheduling it to the week of June 28. In order to maximize participation, please let us know which of the following times do NOT work
>> for you:
>> Tuesday, June 29 at 3 PM
>> Wednesday, Jun 30 at 9 AM or at 3 PM
>> Thursday, July 1 at 3 PM
>> Friday, July 2 at 9 AM or 3 PM
>> Please respond by COB Monday so that we can provide ample time to get this
>> on everyone's calendar. Thanks for your input!
>> Kathryn
>>> Fellow CIWG members,
>>> The next CIWG meeting will be held on Tuesday, June 15 from
>>> 2:30-4:00 PM
>>> at the CCSP office (1717 Pennsylvania, Suite 250). Thanks to those
>>> of you who provided feedback on suggested meeting times. The proposed meeting agenda is:
>>> A. Follow-up on abrupt climate change activities B. Review of draft
>>> terms of reference (soon to follow) C. Brief report from each agency
>>> on their communications activities We would like to begin composing a list of climate change
>>> communications
>>> activities that the group will be focusing on over the next 6
>>> month-1 year period to fulfill communications goals of the strategic plan. To this end, when you give your brief (3-5 minute)agency report, please include the following information:
>>> 1. Climate communications activities in which your agency is
>>> currently involved.
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>>> for the coming 6 month-1 year period.
>>> As a reminder, coordinating with the other CCSP working groups to assist
>>> in producing and developing the synthesis and assessment products
>>> will be an important CIWG activity.
>>> Any comments or revisions to the proposed agenda are welcomed.
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>>> See you next week,
>>> Kathryn
>>> (202) 343-9044
>>> Nick
>>> (202) 419-3480
>

From: kparker@usgcrp.gov
Sent: Wednesday, June 30, 2004 11:09 AM
To: Holbrook, William F.
Cc: kparker@usgcrp.gov; Hannegan, Bryan J.; Hopkins, Robert
Subject: Re: FW: [CommWG] Re: Meeting Reminder Next CIWG Meeting-June 30th at 3 PM

Thanks for the info. It is important for CEQ to be represented, so we do hope you can make it (even if via phone).

Kathryn

> I have a meeting that has popped up at 2:00 today that is a must-attend.
> I may be late this afternoon, so it might be easier for me to call in
> this time and make the next one in person.
>
> Thanks!
>
> -----Original Message-----
> From: outreach-bounces@usgcrp.gov [mailto:outreach-bounces@usgcrp.gov]
> On Behalf Of kparker@usgcrp.gov
> Sent: Monday, June 28, 2004 7:25 AM
> To: outreach@usgcrp.gov
> Cc: rmoss@usgcrp.gov; james.r.mahoney@noaa.gov
> Subject: [CommWG] Re: Meeting Reminder Next CIWG Meeting-June 30th at
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>>>> Nick
>>>> (202) 419-3480
>>
>
>
>
>
>

-up from yesterday's meeting-implementation plan subgroup meeting set for Tuesday July

From: kparker@usgcrp.gov
Sent: Thursday, July 01, 2004 5:04 PM
To: nsundt@usgcrp.gov; ahsha.tribble@noaa.gov; kbickel@oce.usda.gov; samenow.jason@epa.gov; scott.smullen@noaa.gov; gwilliam@hq.nasa.gov; gretchen.cook-anderson@nasa.gov; Holbrook, William F.; Hopkins, Robert
Cc: James R. Mahoney; richard.moss@pnl.gov; rmoss@usgcrp.gov
Subject: Re: Follow-up from yesterday's meeting-implementation plan subgroup meeting set for Tuesday, July 6 at 11 AM

Dear CIWG Implementation Plan Subgroup Members,

As we discussed at the end of yesterday's meeting, we want to meet ASAP to get the draft of the CCSP communications implementation plan moving forward (and before many of you leave on summer vacation).

I have confirmed with USDA that the meeting time we discussed, next Tuesday, July 6 at 11 AM, will work for them (Katie Bickel will be their representative). I have not heard confirmation back from NASA as of yet, but wanted to get this out to you so you could get it on your calendars.
Since everyone else can meet at this time, we will go ahead with this date and hope that our NASA representative can join us. We will meet at the CCSP Office (1717 Pennsylvania Ave, Suite 250).

See you all on Tuesday. Please give the implementation plan some additional thought prior to Tuesday's meeting so it can be as productive as possible.

Thank you for your willingness to participate in this important CIWG subgroup,

Kathryn
(202) 343-9044

Cooney, Phil

From: Hannegan, Bryan J.
Sent: Thursday, July 08, 2004 3:20 PM
To: Cooney, Phil; Peel, Kenneth L.
Subject: EC fails emissions scheme, says E&Y director

EC fails emissions scheme, says E&Y director

The European Commission's failure to challenge eight EU national allocation plans undermines Europe's ability to meet its carbon dioxide emissions reduction targets agreed under the Kyoto Protocol according to Ernst & Young's director of emissions trading Tony Ward.

The European Commission has today approved outright national plans submitted by Denmark, Ireland, the Netherlands, Slovenia and Sweden, and requires only technical changes to "sound" plans submitted by Austria, Germany and the UK, according to EC Environment Commissioner Margot Wallström.

But according to Ward, "The EC's failure to grasp the nettle at this critical stage has significant consequences," he says. In particular, without creating scarcity of supply by challenging national allocation plans, the commission runs the risk of undermining the value of carbon credits and of providing insufficient financial incentive for companies to cut emissions, says Ward. The price of carbon credits has dropped "significantly" upon the announcement, according to market monitor PointCarbon.

In addition, Ward says the decision to approve these plans without material challenge or change confirms the sceptical views of Europe's power and industrial sectors found by an Ernst & Young Survey conducted in June.

The survey found European companies are ill prepared internally for the Emissions Trading Scheme (ETS) and have no clear understanding of the long term business management issues involved in its adoption. In addition, the survey found only 40% of respondents believe the scheme will result in a reduction in emissions.

"There is a danger this becomes a self-fulfilling prophecy," says Ward. "If the affected parties believe this will be a damp squib, if people are not preparing [for the ETS], it gives further oxygen to the idea that people don't need to change their behaviour."

Pointcarbon.com
Last updated: 07.08.04

001712

7/8/2004

Greenwire
TRACKING POLICY, POLITICS AND THE PRESS

Thursday, July 8, 2004

CLIMATE CHANGE

European Commission approves CO2 allocation plans

Andrew Freedman, *Greenwire* reporter

The future of the European trading system for carbon dioxide emissions became clearer yesterday when the European Commission approved emission allocation plans of eight nations, with five of the plans approved outright and three conditionally approved pending certain changes.

The Emissions Trading Scheme -- essentially a cap-and-trade system E.U. member countries will use to achieve reductions in carbon dioxide -- provides manufacturers, utilities and others the opportunity to buy their way out of specific reductions using an open market of carbon credits. ETS is set to launch Jan. 1, 2005.

National Allocation Plans outline the number of CO2 emission allowances that E.U. Member States intend to allocate to energy-intensive industrial plants, so they can participate in emissions trading.

Yesterday's decision encompassed more than 5,000 of the estimated 12,000 facilities to be covered under the ETS, representing more than 40 percent of the allowances expected to be issued. The E.C. unconditionally accepted the plans of Denmark, Ireland, the Netherlands, Slovenia and Sweden. The commission ruled Austria, Germany and the United Kingdom's plans must undergo revisions, but they will not be required to undergo a second assessment.

In addition, the commission said it is sending two member states - Greece and Italy - written warnings because they have not yet submitted their NAPs, which were due by March 31. Italy has, however, issued a draft plan that has been roundly criticized by environmentalists and carbon market analysts for allowing high levels of CO2 emissions.

Jeff Fiedler of the Natural Resources Defense Council said the NAPs would result in an overall emissions reduction of 3 percent across Europe from business as usual. This would be comparable to U.S. voluntary emission reduction goals, he said.

"If the E.U. wants to retain its leadership in fighting climate change, it can best demonstrate its determination through the emissions trading scheme, and all Member States need to be on board," said E.U. Environment Commissioner Margot Wallstrom.

The plans cover the initial emissions trading period of 2005 to 2007 and are a prelude to Europe's Kyoto commitments between 2008 and 2012. They will have a significant effect on the development of the ETS by determining how much demand there will be for carbon credits.

Most experts said the NAPs are weaker than initially envisioned, and if countries allow their industrial facilities to emit large amounts of CO2 and new E.U. member states bring a significant amount of surplus credits to the table, the CO2 trading market may not get far off the ground.

NAPs disappoint many

ooney, Phil

From: Peel, Kenneth L.
Sent: Thursday, July 08, 2004 3:26 PM
To: Hannegan, Bryan J.; Cooney, Phil
Subject: Seven states unprepared for EU greenhouse gas system

euobserver.com
EUobserver - for the latest EU related news

Seven states unprepared for EU greenhouse gas system

08.07.2004 - 09:57 CET | By Mark Beunderman

EUOBSERVER / BRUSSELS - Seven EU states have still not submitted national plans to reduce greenhouse gas emissions to the European Commission - despite long overdue deadlines.

Environment Commissioner Margot Wallström announced on Wednesday (7 July) that Greece, Italy, the Czech Republic, Cyprus, Hungary, Malta and Poland have failed to send in their national plans against climate change.

The national plans are part of the EU's "Emissions trading scheme" (ETS) whereby companies may trade allowances to emit greenhouse gasses.

The system will enter into force in January 2005 and is seen by the EU as a cost-effective way to comply with the international Kyoto Protocol on climate change.

National plans, designed to allocate emissions allowances to companies, had to be submitted to the European Commission by "old" member states by March 31, and by new member states by May 1.

"I am disappointed that some Member States are slow in taking the measures necessary to ensure a smooth start of emissions trading next year", said Ms Wallström.

She added: "If the EU wants to retain its leadership in fighting climate change, it can best demonstrate its determination through the emissions trading scheme, and all Member States need to be on board."

The Commissioner announced infringement procedures against Greece and Italy, but the new member states escaped legal action as their original deadline had been a month later.

National plans approved
Despite poor preparations by some member states, Ms Wallström expressed confidence that "we can start the emission trading the first of January next year as planned."

The Commission approved five national allocation plans unconditionally, from Denmark, Ireland, the Netherlands, Slovenia and Sweden.

DO 1713

7/8/2004

Te.hnical changes were requested from Austria, Germany and the UK, but in principle their plans were given the green light by the EU executive as well.

The plans from the eight countries together cover 5,000 industrial plants emitting greenhouse gasses - out of a total of 12,000 plants in the EU.

Ms Wallström said: "Today's decision is a crucial step as it clears the way for almost half of the plants which will be part of the Pan European emissions trading system".

But last month it emerged that companies are not sufficiently prepared for the EU's emissions trading system either.

A report published by LogicaCMG - a large international IT and consultancy firm - revealed that only 51% of industry expects to be prepared by January 2005.

-----Original Message-----
From: Hannegan, Bryan J.
Sent: Thursday, July 08, 2004 3:20 PM
To: Cooney, Phil; Peel, Kenneth L.
Subject: EC fails emissions scheme, says E&Y director

EC fails emissions scheme, says E&Y director

The European Commission's failure to challenge eight EU national allocation plans undermines Europe's ability to meet its carbon dioxide emissions reduction targets agreed under the Kyoto Protocol according to Ernst & Young's director of emissions trading Tony Ward.

The European Commission has today approved outright national plans submitted by Denmark, Ireland, the Netherlands, Slovenia and Sweden, and requires only technical changes to "sound" plans submitted by Austria, Germany and the UK, according to EC Environment Commissioner Margot Wallström.

But according to Ward, "The EC's failure to grasp the nettle at this critical stage has significant consequences," he says. In particular, without creating scarcity of supply by challenging national allocation plans, the commission runs the risk of undermining the value of carbon credits and of providing insufficient financial incentive for companies to cut emissions, says Ward. The price of carbon credits has dropped "significantly" upon the announcement, according to market monitor PointCarbon.

In addition, Ward says the decision to approve these plans without material challenge or change confirms the sceptical views of Europe's power and industrial sectors found by an Ernst & Young Survey conducted in June.

The survey found European companies are ill prepared internally for the Emissions Trading Scheme (ETS) and have no clear understanding of the long term business management issues involved in its adoption. In addition, the survey found only 40% of respondents believe the scheme will result in a reduction in emissions.

"There is a danger this becomes a self-fulfilling prophecy," says Ward. "If the affected parties believe this will be a damp squib, if people are not preparing [for the ETS], it gives further oxygen

to the idea that people don't need to change their behaviour."

Pointcarbon.com
Last updated: 07.08.04

Cooney, Phil

From: Watson, Harlan L (OES) [WatsonHL@state.gov]
Sent: Sunday, July 11, 2004 2:02 PM
To: Peel, Kenneth L.; Cooney, Phil
Subject: REMARKS BY PRESIDENTIAL ECONOMIC ADVISER ANDREI ILLARIONOV AT A PRESS CONFERENCE ON RESULTS OF THE CLIMATE CHANGE AND KYOTO PROTOCOL SEMINAR IN MOSCOW , ALEXANDER HOUSE, 17:00, JULY 8, 2004

> Copyright 2004 The Federal News Service, Inc.
> Official Kremlin Int'l News Broadcast
> Friday, July 9, 2004
>
> REMARKS BY PRESIDENTIAL ECONOMIC ADVISER ANDREI ILLARIONOV AT A PRESS
> CONFERENCE ON RESULTS OF THE CLIMATE CHANGE AND KYOTO PROTOCOL SEMINAR
> IN MOSCOW , ALEXANDER HOUSE, 17:00, JULY 8, 2004
>
> Illarionov: We have a few minutes left and I would like to tell you
> about the impressions on the two-day seminar that has just ended.
>
> Yuri Antonovich and I have mentioned the fact that this is the first
> seminar of its kind that we have managed to arrange and it was
> accidental. Over almost a year we have repeatedly asked our foreign
> partners who advocate the Kyoto Protocol and who insist that Russia
> should ratify the Kyoto Protocol, and we have invited them to meet and
> discuss these issues, present arguments and counter-arguments and
> discuss them jointly. But we have not received any reply for a year.
> These people persistently refused to take part in any discussion.
>
> Nine months ago, at an international climate change conference in
> Moscow, ten questions concerning the essence of the Kyoto Protocol and
> its underlying theory were submitted to the IPCC. We were told that
> the reply would be given within several days. Nine months have passed
> since then but there has been no reply, even though we have repeated
> our inquiries on these and the growing number of other related
> questions.
>
> Instead of getting replies to our questions, we kept on hearing that
> replies did not matter. What was important is that whether or not
> Russia trusts Britain, the European Union and the countries that have
> ratified the Kyoto Protocol and that have been exerting unprecedented
> pressure on Russia to ratify it. This is why it was so important for
> us to arrange a real meeting and a real discussion of real problems
> with the participation of foreign scientists who have different views
> in order not to stew in one's own juice, as Yuri Antonovich put it,
> but to hear the arguments not only of our Russian scientists but also
> the arguments and counter-arguments from scientists in other
> countries.
>
> We did get such an opportunity and over the past two days we heard
> more than 20 reports, we held detailed discussions, and now we can say
> that a considerable number of the questions we formulated and raised
> have been somewhat clarified, just as some other questions have.
>
> I would sum up my conclusions in six points. The first one concerns
> the nature and the contents of the Kyoto Protocol. This is one of the
> biggest, if not the biggest, international adventure of all times and
> nations. Frankly speaking, it's hard to recall something like this of
> the same scale and of the same consequences, just as the lack of any
> grounds for action in field.
>
> Basically, none of the assertions made in the Kyoto Protocol and the
> "scientific" theory on which the Kyoto Protocol is based been borne
> out by actual data. We are not seeing any high frequency of emergency

> situations or events. There has been no increase in the number of
> floods. Just as there has been no increase in the number of droughts.
> We can see that the speed of the wind in the hails in some areas is
> decreasing contrary to the statements made by the people who support
> the Kyoto Protocol. We are not witnessing a higher incidence of
> contagious diseases, and if there is a rise, it has nothing to do with
> climate change.
>
> If there is an insignificant increase in the temperature it is not due
> to anthropogenic factors but to the natural factors related to the
> planet itself and solar activity. There is no evidence confirming a
> positive linkage between the level of carbon dioxide and temperature
> changes. If there is such a linkage, it is a reverse nature. In
> other words, it is not carbon dioxide that influences the temperature
> on Earth, but it just the reverse: temperature fluctuations are
> caused by solar activity influence the concentration of carbon
> dioxide.
>
> The statistical data underpinning these documents and issued in
> millions of copies are often considerably distorted if not falsified.
> The most vivid example of that is the so-called "ice hockey stick", or
> the curve of temperature changes on the planet over the past 1000
> years. It is alleged that there were insignificant temperature
> fluctuations for 900 years but there was a sharp rise in temperature
> in the 20th century.
>
> A number of scientific works published lately show that in order to
> produce this "ice hockey stick", nine intentional or unintentional, I
> don't really know, mistakes were made that led to distortions in
> initial data and final results. Using the words of famous poet
> Vladimir Vysotsky, everything is not the way it should be.
>
> Second, in respect to the presentation made by representatives of the
> so-called official team of the British government and the official
> British climate science, or at least how they introduced themselves at
> the seminar. I personally was surprised by the exceptionally poor
> content of the papers presented. During the past two years I took
> part in many international meetings, seminars, conferences and
> congresses on these issues both in Russia and in many of the
> countries, including the seminar that we had today and yesterday.
> Honestly, these papers and presentations differed dramatically from
> what is usually offered at international congresses and conferences.
>
> Simultaneously, they revealed an absolute - and I stress, absolute
> inability to answer questions concerning the alleged professional
> activities of the authors of these papers. Not only the ten questions
> that were published nine months ago, but not a single question asked
> during this two-day seminar by participants in the seminar, both
> Russian and foreign, were answered.
>
> When it became clear that they could not provide a substantive answer
> to a question, three devices were used. And I have to say it now
> although has not direct bearing on the Kyoto Protocol and the content
> of the extremely interesting presentations made during the past two
> days. The British participants insisted on introducing censorship
> during the holding of this seminar. The chief science adviser to the
> British government, Mr. King, demanded in the form of an ultimatum at
> the beginning of yesterday that the program of the seminar be changed
> and he presented an ultimatum demanding that about two-third of the
> participants not be given the floor.
>
> The participants in the seminar who had been invited by the Russian
> Academy of Sciences, they have been invited by the president of the
> Academy of Sciences Yuri Sergeyevich Osipov. Mr. King spoke about
> "undesirable" scientists and undesirable participants in the seminar.
> He declared that if the old program is preserved, he would not take
> part in the seminar and walk out taking along with him all the other

> British participants.
>
> He has prepared his own program which he proposed, it is available
> here and my colleagues can simply distribute Mr. King's hand-written
> program to change the program prepared by the Russian Academy of
> Sciences and sent out in advance to all the participants in the
> seminar.
>
> A comparison of the real program prepared by the Academy of Science
> and the program proposed as an ultimatum by Mr. King will give us an
> idea of what scientists, from the viewpoint of the chief scientific
> adviser to the British government, are undesirable. In the course of
> negotiations on this issue Mr. King said that he had contacted the
> British Foreign Secretary Mr. Straw who was in Moscow at the time and
> with the office of the British Prime Minister, Blair, so that the
> corresponding executives in Britain should contact the corresponding
> officials in Russia to bring pressure on the Russian Academy of
> Sciences and the President of the Russian Academy of Sciences to
> change the seminar's program.
>
> When the attempt to introduce censorship at the Russian Academy of
> Sciences failed, other attempts were made to disrupt the seminar. At
> least four times during the course of the seminar ugly scenes were
> staged that prevented the seminar from proceeding normally. As a
> result we lost at least four hours of working time in order to try to
> solve these problems.
>
> During these events Mr. King cited his conversations with the office
> of the British Prime Minister and had got clearance for such actions.
>
> And thirdly, when the more or less normal work of the seminar was
> restored and when the opportunity for discussion presented itself,
> when questions on professional topics were asked, and being unable to
> answer these questions, Mr. King and other members of the delegation,
> turned to flight, as happened this morning when Mr. King, in an
> unprecedented incident, cut short his answer to a question in mid
> sentence realizing that he was unable to answer it and left the
> seminar room. It is not for us to give an assessment to what
> happened, but in our opinion the reputation of British science, the
> reputation of the British government and the reputation of the title
> "Sir" has sustained heavy damage.
>
> The next point brings us directly to the Kyoto Protocol, or more
> specifically, to the ideological and philosophical basis on which it
> is built. That ideological base can be juxtaposed and compared, as
> Professor Reiter has done just now, with man-hating totalitarian
> ideology with which we had the bad fortune to deal during the 20th
> century, such as National Socialism, Marxism, Eugenics, Lysenkovism
> and so on. All methods of distorting information existing in the
> world have been committed to prove the alleged validity of these
> theories. Misinformation, falsification, fabrication, mythology,
> propaganda. Because what is offered cannot be qualified in any other
> way than myth, nonsense and absurdity.
>
> Finally, my last point is why it happens and how the whole thing can
> be described. When we see one of the biggest, if not the biggest
> international adventures based on man-hating totalitarian ideology
> which, incidentally, manifests itself in totalitarian actions and
> concrete events, particularly academic discussions, and which tries to
> defend itself using disinformation and falsified facts. It's hard to
> think of any other word but "war" to describe this.
>
> To our great regret, this is a war, and this is a war against the
> whole world. But in this particular case the first to happen to be on
> this path is our country. It's unpleasant to say but I am afraid it's
> undeclared war against Russia, against the entire country, against the
> left and the right, against the liberals and the conservatives,

> against business and the Federal Security Service, against the young
> and the old who live in Moscow or in provinces. This is a total war
> against our country, a war that uses all kinds of means.
>
> The main prize in this war for those who have started it and who are
> waging is the ratification by Russian authorities of the Kyoto
> Protocol. There is only one conclusion to be made from what we have
> seen, heard and
> researched: Russia has no material reasons to ratify this document.
> Moreover, such a ratification would mean only one thing: complete
> capitulation to the dangerous and harmful ideology and practice that are
> being imposed upon us with the help of international diplomacy.
>
> This is not a simple war. Like any war it cannot be easy and simple.
> Regrettably like any war it has its losses and victims, and we must
> understand that. The main thing is that we have now obvious evidence
> that we have got over the past two days, although we had some hints
> before that time, and it was the approach to Russia practiced by some
> people attending the seminar, an approach to Russia as a kind of
> banana republic, an approach to a country that is not a colony yet but
> about to become it as soon as it ratifies the document. At least we
> now know how people in colony feel towards other people who are trying
> to make them a colony.
>
> And maybe the last touch. During the discussion of the economic
> impact of the ratification of the Kyoto Protocol and of when Russia
> will achieve the 1990 emission level, one of the representatives of
> this official British team of scientists and government officials said
> quite blantly: Russia cannot expect an increase in the population, on
> the contrary, the population will decrease. And as long as you reduce
> your population, you can meet the Kyoto Protocol requirements.
>
> Thank you for your attention. The remaining small team is ready to
> answer your questions.
>
> Izrael: Just a couple of words to add. The Kyoto Protocol aims to
> impoverish our country, and not only us but our children and
> grandchildren, I'd like to emphasize that, because the more time
> passes the more we will have to invest to meet the requirements of the
> Kyoto Protocol.
>
> Illarionov: And maybe the very last point. Indeed Russia has found
> itself in the forefront of this war. We haven't chosen it. We did
> not want and do not want to war. This war has been imposed on us.
> The fate of our country, the fate of our children, as Yuri Antonovich
> has just said, and the fate of the entire world will depend on the
> outcome of this war.
>
> There have been examples in our fairly recent history of how a
> considerable portion of Europe was flooded with the brown Nazi
> ideology, the red Commie ideology that caused severe casualties and
> consequences for Europe and the entire world. Now there is a big
> likelihood that a considerable part of Europe has been flooded with
> another type, another color of ideology but with very similar
> implications for European societies and human societies the world
> over. And now we in Russia are facing a historical opportunity: are
> we going to let the genie out of the bottle as the previous
> generations let the Nazi and Communist genies out of the bottles or
> not?
>
> Q: My question is to the representative from Australia.
> Unfortunately I did not get his name -
>
> Illarionov: William Kinenmos.
>
> Q: As far as I know Australia has refused to ratify the Kyoto
> Protocol. Can you tell us if Great Britain and the European Union

> exerted the same kind of pressure on Australia when it was thinking
> about whether or not it should ratify the Kyoto Protocol? And how can
> you explain what is now happening to Russia?
>
> And a question to Andrei Illarionov...
>
> Kinenmos: Getting to the Australian situation, very early after
> Kyoto, the Australian government and the Prime Minister said that
> Australia was not going to ratify the Kyoto Protocol because of the
> impact on the economic conditions in Australia. It would mean the
> loss of jobs and the export of jobs because Australia is essentially a
> country that has a lot of energy-intensive industries, and their
> growth would be on energy-intensive industries. So the Prime Minister
> was very categorical, and he has been since that time that Australia
> would not ratify the Kyoto Protocol.
>
> Q: Was there any pressure on Australia to ratify?
>
> Kinenmos: I cannot answer whether in the government area there was
> pressure or not. There certainly was not pressure as is experienced
> here in Russia, but Australia very early, the Prime Minister said that
> Australia was not going to ratify for the reasons that I gave.
>
> Q: My second question is for Andrei Nikolayevich. Doesn't the
> Academy of Sciences have security guards so that you wouldn't have to
> lose for hours and wouldn't have your seminars disrupted?
>
> Illarionov: Before I answer your question I've just been asked that
> here is a package of materials distributed at the seminar and is
> available at the exit. You will be able to get the hand out.
>
> As for the guards, I have seen them. But I understand that the
> question was that Russian participants tried to do all they could in
> order that the seminar's work were normal. And unfortunately, from
> this two-day experience, I have made it clear for myself that
> different participants in the seminar pursued different goals. For
> some participants the main goal was the search for the truth,
> understanding of real processes. Other people had the task of
> disrupting the seminar, so that other people who were seeking the
> truth could not do so. And this, probably, accounts to what was
> taking here over the past two days.
>
> Izrael: I will add something because Andrei Nikolayevich has already
> said that Sir David King, adviser to the British government - he had
> brought several scientists along with him and he insisted that the
> program should include among the speakers only those scientists and no
> other. So, he came over, selected scientists at his discretion,
> scientists who were to be given the floor in his opinion and
> scientists who were to be denied an opportunity to speak. He even
> said that you are in the minority and we are not going to listen to
> you.
>
> Q: Japanese paper Mainichi. I have a question to Mr. Illarionov.
> Last month when Foreign Minister of Japan came to Moscow she met with
> high-ranking officials of the Russian government and one of them told
> her that Russia will soon be ready to get the answer about the Kyoto
> Protocol ratification issue and he also told her that the answer will
> be in favor of Japan. Pretty much indicating that Russia will be
> ratifying the protocol pretty soon. Do you think that will happen and
> has Mr. Putin made the decision about ratifying or not ratifying the
> protocol?
>
> Illarionov: I'll try to answer each part of your question. The first
> part is, you said that the decision would be taken in favor of Japan.
> As you understand, a decision in favor of Japan means a refusal to
> ratify the Kyoto Protocol. Because the ratification of the Kyoto
> Protocol will hit hardest at those countries which had been careless

> enough to assume obligations to cut carbon dioxide emissions, and
> Japan was one of such countries.
>
> In February a large international seminar was held in Moscow on the
> issues of the Kyoto Protocol and climate change which was attended
> among others by representatives of Japan, including representatives of
> Japanese business and the government of Japan. I remember the
> presentation by a Japanese representative who described how Japan was
> already doing everything possible to comply with the terms of the
> Kyoto Protocol. That gentleman said that Japan was doing everything
> to reduce economic activities in Japan, including the movement of
> production outside Japan thus aggravating the economic crisis in which
> Japan has been for the last 14 years.
>
> It is known that in the last 14 years Japan has been lagging far
> behind other developed states and instead of bridging the gap between
> itself and the United States and even Europe, it was increasing the
> gap. So, the introduction of the Kyoto Protocol through ratification,
> for instance, possible ratification by Russia would mean that Japan
> would quickly start to move back to the state in which it was a decade
> ago, it would be weak, poor and backward. I don't think it would be
> in the interests of Japan.
>
> As for the reference to the remarks by you Foreign Minister who had
> met with an unidentified Russian officials who allegedly promised your
> Minister early ratification of the Kyoto Protocol by the Russian side,
> you understand that in wartime, and we re aware that it is a war,
> there is always room for the fifth column. You know what the fifth
> column is. And the people in the fifth column are working actively
> because they want Russia to pass such a decision as quickly as
> possible and they use every trick in the book starting from bribery
> and ending with intimidation, threats and blackmail.
>
> So, you as a close observer of events in Russia has a unique chance to
> see, identify and even interview some of the representatives of the
> fifth column.
>
> And finally, regarding the last part of your last question. If the
> Russian Federation ever decides to ratify the Kyoto Protocol such a
> decision will have been taken not only the basis of substantive
> analysis, not for substantive, but for some other reasons. We cannot
> fully rule that out just as we cannot fully predict climate change on
> the planet. But in any case, if such a decision is taken, it would
> deal, I repeat, a very serious blow to Russia, Japan, the European
> Union and Canada, the countries and regions which were rash enough to
> assume such obligations.
>
> And it would deal a powerful blow on the whole humanity similar to the
> one humanity experienced when Nazism and communism flourished.
>
> Q: The Japanese Information Agency. Mr. Illarionov, a very simple
> question. Why don't you go along with the words of your boss,
> President Putin, who said quite clearly: "We are in favor of the
> Kyoto Protocol"?
>
> Illarionov: I will permit myself to remind you of the words said by
> President Putin. President Putin has never said that he supported the
> Kyoto Protocol. President Putin said on May 24, 2004 that he
> supported the Kyoto process. So, I am sorry, but you can't say that I
> do not support President Putin on this issue.
>

ccsp_info Invitation to Presentation by Dr. Susan Solomon Co-Chair IPCC WG I on July 23
From: ccsp_info-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Thursday, July 15, 2004 5:13 PM
To: ccsp_info@usgcrp.gov
Subject: [ccsp_info] Invitation to Presentation by Dr. Susan Solomon, Co-Chair IPCC WG I, on July 23

Dear Colleague -

You are invited to attend a presentation by Dr. Susan Solomon, Co-chair of IPCC Working Group I (and recipient of the 2004 Blue Planet Prize!), on progress in preparing Working Group I's portion of the IPCC Fourth Assessment Report. The presentation and subsequent discussion will be held in the Climate Change Science Program Office conference room on July 23rd at 9 a.m. The Office is located at 1717 Pennsylvania Avenue NW, Suite 250.

Everyone will need to be cleared into the building. Please RSVP to Sandy (smaccrac@usgcrp.gov) if you plan to attend.

We hope to see you there!

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

Carbon cycle prospectus

From: Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Friday, July 16, 2004 11:00 AM
To: Hannegan, Bryan J.
Subject: Carbon cycle prospectus

Bryan,

This prospectus for the carbon cycle synthesis and assessment product was sent around a while ago for review. I am meeting next Tuesday with the authors to discuss revisions. I wanted to make sure you were comfortable with it. Please let me know by Monday night (if at all
possible) if you have any final comments. It will be much more efficient if the authors can deal with all comments at once. I hope you are having a good summer!
Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
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THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Coordinating Committee on Global Change
July 16, 2004
Washington, DC
Keck 204

Draft Agenda

CLOSED SESSION

8:30-10:45

OPEN SESSION

10:45-10:00 Break

11:00-12:30 Updates on Major Cross-Cutting National Academies Activities (Tab D)
- Lessons Learned from Global Change Assessments (Amanda Staudt)
- Earth Observations Study (Art Charo)
- Review of Climate Change Technology Program Strategic Plan (Jim Zucchetto)
- Roundtable on Science and Technology for Sustainability (Bill Clark)

12:30 - 1:30 Lunch

1:30-2:30 Discussion of CCSP Review of its Relationship with the National Academies (Ghassem Asrar, Jim Mahoney) (Tab B)

2:30-3:30 Discussion of Advisory Process for CCSP Program of Synthesis and Assessment Products (Jim Mahoney, Richard Moss) (Tab C)

3:30-3:45 Break

CLOSED SESSION

3:45-5:00

From: Hannegan, Bryan J.
Sent: Monday, July 19, 2004 12:31 PM
To: 'Carla Sullivan'; 'Scott.Rayder@noaa.gov'
Cc: 'James.Mahoney@noaa.gov'
Subject: TRMM Funding
Was NOAA approached about keeping TRMM operational for hurricane forecasting purposes? How does this impact our increasing effort in global earth observations, including the CCSP focus on the water cycle?

NASA Denies Funding for Key Satellite

Decision on Orbiter Frustrates Scientists

By Guy Gugliotta
Washington Post Staff Writer
Monday, July 19, 2004; Page A01

NASA is allowing a highly successful satellite to fall out of Earth's orbit by refusing to fund it for as little as $28 million, dismaying the scientists and forecasters who use its unique abilities to study climate change and track hurricanes.

NASA officials said engineers did not order a planned firing of its rockets in early July to hold the Tropical Rainfall Measuring Mission satellite in orbit 241 miles above Earth. Without periodic assists from its thrusters, atmospheric drag will send the satellite's remains to a watery grave in six to nine months.

Engineers said the satellite, a joint venture with the Japanese Aerospace Exploration Agency, is working perfectly and could still be saved, but NASA officials said neither the Japanese nor other U.S. agencies were willing to contribute to the estimated $28 million to $36 million needed to keep the mission operating for as long as two more years.

The satellite is a unique space platform whose instruments have proved invaluable not only to researchers studying global change, but also to meteorologists who use its one-of-a-kind "rain radar" to probe deep into cloud cover to determine whether the makings of a cyclone lurk there.

In 2002, a NASA study determined that the potential lifesaving value of the satellite was great enough to justify keeping it aloft until it ran out of fuel and tumbled unguided back to Earth, possibly killing or injuring someone.

The decision instead to use a "controlled de-orbit" for the satellite, known by its initials TRMM, was announced quietly July 13 in an internal NASA memo, and came at a time when NASA's Earth observation budget is shrinking as the agency begins to focus on President Bush's plan for human exploration of the moon and Mars.

NASA officials said the agency decided to de-orbit TRMM because the money saved could be put to better use on a next-generation satellite scheduled for launch in 2011.

The Bush administration is already facing harsh public criticism for its decision to cancel space shuttle servicing of the Hubble Space Telescope, and congressional critics of the Bush initiative have publicly warned NASA not to rob Hubble or other valuable programs -- especially in earth science -- to fund the new undertaking.

But congressional sources said lawmakers do not necessarily see TRMM's problem as the harbinger of cuts to come: "TRMM would be a problem regardless, because it's an unanticipated expense," and not part of the NASA budget, said a knowledgeable Republican congressional staffer who declined to be identified. "NASA may even deserve credit for being willing to ante up" some of the money.

Or not. NASA has said little about TRMM's demise, but researchers all over the country and in Japan are questioning the decision. Data from TRMM on rainfall and storms are used by climate scientists and meteorologists all over the world.

"Unlike a lot of missions, it's worked great from the beginning -- something of a miracle in satellite meteorology, and we're still on the rising part of the curve," University of Washington atmospheric scientist and TRMM team member Robert Houze said in a telephone interview. "It seems almost unfathomable to me that you would not let it live out its full lifetime."

House Science Committee chief of staff David J. Goldston acknowledged in a telephone interview that his office had gotten "probably in the last week an inch-high pile of letters from researchers around the United States saying we're missing this great opportunity. We don't have a position yet, but we are looking into it."

TRMM was launched in Japan on Thanksgiving Day 1997 into an orbit that girdles the globe ranging from 35 degrees north of the equator -- the latitude of North Carolina -- to 35 degrees south (Santiago, Chile).

TRMM measures and analyzes rainfall, using microwave, infrared and lightning sensors supplied by the United States, and the Japanese-built rain radar. Together they provide the most detailed information on rainfall patterns ever created, from the part of the world that influences global climate more than any other.

"Having all these instruments on the same satellite can provide best estimates of rainfall over oceans and land, can measure the impacts of the El Niño ocean temperature changes and document the release of heat when water changes to rainfall," said Goddard Space Flight Center's Robert Adler, the NASA project scientist in charge of TRMM.

TRMM was supposed to last three years, but instead it lived long enough to become a victim of its own success. "It has been superb on all counts," said Ghassem Asrar, NASA's associate administrator for earth science. "The nominal life was 18 months, the goal was three years, and we just kept extending."

As the years crept by, scientists found they could use TRMM to improve the baseline accuracy of computer climate models and weather forecasts, or to give their local research a global context. And the longer TRMM operated, the more comprehensive the data became, because climate patterns take years to develop.

"But the biggest surprise, which I never anticipated, is this whole ability of the satellite to observe hurricanes in a way that no satellite can," Houze said. TRMM's radar can peer inside tropical storms to watch them evolve.

"A lot of times you'll just see a ball of white cloud, but TRMM can go to the core, see the eye wall start to develop: Is it intensifying? Is it getting better defined? Is it falling apart?" National Hurricane Center Director Max Mayfield said in a telephone interview from his Miami office. "It's been absolutely critical. Ask any of our hurricane forecasters."

Asrar said that engineers had planned a controlled de-orbit for TRMM "from the beginning," using onboard thrusters to steer the satellite into the ocean far from population centers. He said the satellite was sturdy enough for large pieces of it to survive reentry temperatures and potentially injure or kill people in the debris path.

As time passed, however, what seemed like a routine maneuver to end a successful mission loomed as the limiting factor for the mission itself. Operating systems were working perfectly, instruments were not wearing out, and the data were impeccable. The only thing being used up was the fuel needed to maintain orbit.

In 2002, Asrar asked Bryan O'Connor, NASA associate administrator for safety and mission assurance, to conduct a "disposal risk review." Did the benefits of using all the fuel to keep TRMM in orbit an additional five years outweigh the hazards of allowing the spacecraft to fall back to Earth without guidance?

In his reply on Sept. 4, 2002, O'Connor said the probability of a TRMM debris casualty would be one in every 5,000 reentries, twice as dangerous as NASA's standard of one in 10,000. NASA allows about six uncontrolled reentries a year.

Despite the heightened danger, O'Connor concluded that "these risks appear to be reasonable when subjectively weighed against the potential public safety benefits of improved storm analysis and forecasting capabilities that appear to be realized by extending the TRMM mission."

But uncontrolled reentry was never seriously considered, Asrar said, and the O'Connor analysis was used to reaffirm what Asrar described as NASA's original view: "What if the one in 5,000 becomes a reality?" Asrar said. "Can anybody stand up and say it was worthwhile?" He said he asked for the O'Connor report simply to show that "we had done due diligence" in evaluating TRMM's potential hazard .

In 2003, engineers bought some more time by boosting TRMM from its initial orbit 210 miles above Earth to its current height. At the higher orbit, the satellite needed station-keeping burns only once a month, instead of once every three days.

But by mid-2004, NASA had to make another choice: bring TRMM down in a controlled de-orbit this year for a landing next year or deplete the fuel for one or two more years, then let the satellite "drift down" unguided for a couple of years, using the last of the fuel to control the final reentry.

NASA officials who declined to be quoted by name questioned whether Asrar ever seriously considered prolonging the mission further, and disputed his view that it would cost $28 million to $36 million to keep TRMM running for up to two more years.

Asrar explained that extending TRMM would require payment not only for the two data years, but also for the two or more "drift-down" years, when the satellite would not be sending reliable data, but would still have to be watched. Spending more money now would mean postponing the 2011 launch of a new satellite designed to improve on TRMM's performance, he said.

Asrar said it was "absolutely incorrect" that NASA decided to begin the de-orbit now to save money for the Bush initiative, noting that "we started looking at this issue two years ago," long before the moon-Mars plan arose.

The Deputy Secretary of Energy
Washington, DC 20585

July 23, 2004

MEMORANDUM FOR: Interagency Working Group on Climate Change Science and Technology

FROM: Kyle McSlarrow, Chair

SUBJECT: U.S. Climate Change Technology Program

Based on considerations arising from our Interagency Working Group (IWG) meeting of June 29, I have directed Dave Conover, Director, Climate Change Technology Program (CCTP), to build on the work of the CCTP *Draft Strategic Plan* and undertake a number of new or redirected activities in support of the President's climate change technology initiatives, as follows.

CCTP will: (1) coordinate with IWG members and agencies the development of a CCTP *Vision and Framework* document for public release, which will outline our approach to multi-agency R&D planning under CCTP; (2) coordinate and provide related input to the development of the President's FY 2006 budget request; and (3) revise the CCTP *Draft Strategic Plan*, once the FY 2006 budget is finalized, so that it is more closely aligned with the budget and can be released as supporting material at roll-out in February 2005. In addition, CCTP will assist Secretary Abraham in responding to technical inquiries in response to his forthcoming article in Policy Forum of Science magazine, which provides an overview of the Administration's approach to climate change, including CCTP.

Regarding the FY 2006 budget request, the existing CCTP *Draft Strategic Plan* may be used internally as a strategic planning guide. The *Plan* outlines six strategic goals, with supporting technology development strategies for each. Each CCTP agency is requested to review its proposed FY 2006 R&D activities in light of these goals, determine the adequacy of their respective portfolio contributions to make technical progress toward goal attainment, and identify high-priority R&D gaps and opportunities, if any. These, in turn, need to be weighed against other Administration priorities, so that adjustments can be made to the FY 2006 request, as appropriate. I have asked Dave to coordinate these agency reviews and report on the resulting findings and their status at the upcoming IWG meetings planned for September and November.

The President has articulated a bold vision for the role of innovation and technology in addressing the issue of climate change. With your guidance, and the support of your agencies, the IWG will be better able to ensure that the President's FY 2006 budget reflects a coordinated, multi-agency R&D investment approach to advancing his vision.

Distribution (Attached)

Distribution

Andrews, J. (DoD/ONR)
Asrar, G. (NASA)
Beato, C. (HHS/PHS)
Bement, A. (NSF)
Connaughton, J. (CEQ)
Dobriansky, P. (State)
Frankil, E. (DOT)
Garman, D. (DOE)
Griles, S. (DOI/IOS)
Holmstead, J. (EPA)
Johnson, S. (EPA)
Kassinger, T. (DOC)
Kearney, C. (DOI/IOS)
Laughtenbacher, C. (DOC/NOAA)
Mahoney, J. (CCSP, DOC/NOAA)
Marburger, J. (OSTP)
Martin, G. (NASA)
Mosely, J. (USDA)
O'Donovan, K. (EOP/VP)
Olsen, K. (OSTP)
Peacock (OMB)
Russell, R. (OSTP)
Simmons, E. (USAID)
Watson, H. (State)

Copies to:

Conover, D. (DOE, Director, CCTP)
Marlay, R. (DOE, Dep. Dir., CCTP)
CCTP Working Group Chairs
CCTP Agency Liaisons

Re Revised CIWG draft implemetation plan outline-please review by COB tomorrow
From: Parker.Kathryn@epamail.epa.gov
Sent: Monday, July 26, 2004 2:03 PM
To: Keya Chatterjee
Cc: ahsha.tribble@noaa.gov; gretchen.cook-anderson@nasa.gov; gwilliam@hq.nasa.gov; James R. Mahoney; samenow.jason@epamail.epa.gov; kbickel@oce.usda.gov; kchatter@hq.nasa.gov; kparker@usgcrp.gov; nsundt@usgcrp.gov; Hopkins, Robert; richard.moss@pnl.gov; rmoss@usgcrp.gov; scott.smullen@noaa.gov; spotter@usgcrp.gov; Holbrook, William F.
Subject: Re: Revised CIWG draft implemetation plan outline-please review by COB tomorrow

Thank you Keya! Yes, indeed let's discuss your questions on August 4. That will give the group time to review and contemplate, plus we'll be getting input from Wednesday's meeting that might need to be considered as well.

Kathryn

Kathryn Parker
Branch Chief
Global Change Information Branch
U.S. Environmental Protection Agency
Global Programs Division
Tel: (202) 343-9044
Fax: (202) 343-2337

Keya Chatterjee <keya.chatterjee@nasa.gov> 07/26/04 01:09 PM

To: kparker@usgcrp.gov, nsundt@usgcrp.gov, ahsha.tribble@noaa.gov, kbickel@oce.usda.gov, Jason Samenow/DC/USEPA/US@EPA, scott.smullen@noaa.gov, gwilliam@hq.nasa.gov, gretchen.cook-anderson@nasa.gov, wholbrook@ceq.eop.gov, rhopkins@ostp.eop.gov, kchatter@hq.nasa.gov, spotter@usgcrp.gov, Kathryn Parker/DC/USEPA/US@EPA

cc: richard.moss@pnl.gov, rmoss@usgcrp.gov, "James R. Mahoney" <james.r.mahoney@noaa.gov>

Subject: Re: Revised CIWG draft implemetation plan outline-please review by COB tomorrow

Hello all,
Also as promised, here is a template for questions to consider before producing

Re Revised CIWG draft implemetation plan outline-please review by COB tomorrow materials. Kathryn- can we discuss any comments on August 4?
Keya

At 12:50 PM 7/26/2004, kparker@usgcrp.gov wrote:
>Dear CIWG implementation plan subgroup members,
>
>As promised, I've attached a revised version of the draft implemetation
>plan outline that we discussed at our Thursday meeting. I have tried
to
>accurately incorporate your thoughts and ideas (as well as some
additional
>input since our meeting). Thank you for your attendance at Thursday's
>meeting and for your valuable input. Please review and comment by COB
>tomorrow, so that I can incorporate your comments prior to our CIWG
>meeting on Wednesday.
>
>Also, if you haven't done so already, please mark your calendars for
our
>next subgroup meeting on Wednesday, August 4 at 3 PM at the CCSP
Office.
>
>Thanks again for your contribution,
>
>Kathryn
>(202) 343-9044
>
(See attached file: Questions_to_consider.doc)

From: Scott Rayder [Scott.Rayder@noaa.gov]
Sent: Wednesday, July 28, 2004 6:19 PM
To: Cooney, Phil
Subject: Re: [Fwd: CEQ Regional Clips: July 28, 2004]
thx--wanted to make sure we were cool. Got another issue with CCSP and press releases--they apparently did not tell our press shop they were sending out a release on the first deliverable. I will take care of.

"Cooney, Phil" wrote:

> never in the doghouse -- impossible!!! it was small -- 100 people, including press and embassy reps. at EPA. We only invited the agencies participating (read: funding!) the initiative. Hope all's well and that you get those babies to the beach this summer! Phil
>
> -----Original Message-----
> **From:** Scott Rayder [mailto:Scott.Rayder@noaa.gov]
> **Sent:** Wednesday, July 28, 2004 3:54 PM
> **To:** Cooney, Phil
> **Subject:** [Fwd: CEQ Regional Clips: July 28, 2004]
>
> Why weren't we invited to the roll out on methane? Are we in the dog house?
>
> -------- Original Message -------- Subject: CEQ Regional Clips: July 28, 2004 Date: Wed, 28 Jul 2004 12:58:13 -0400 From: "Holbrook, William F." To: "Holbrook, William F." ------_=_NextPart_002_01C474C4.12242840 Content-Type: text/plain; charset="us-ascii" Content-Transfer-Encoding: quoted-printable CEQ Regional News Summary =20 Compiled by CEQ Communications =20 =20 =20 Wednesday, July 28, 2004 =20 Northeast =20 New water-use rules totally miss the boatThe Republican Park official urges land preservation pushThe Journal News.com Bush plans trade in methane to curb climate changeUSA Today=20 =20 Central =20 Platte County plant opponents bring up important questionsDispatch Tribune Newspapers Ducks Unlimited, USDA partner on wildlife habitat programAgriculture.com =20 =20 Southeast =20 RFK Jr. rips Bush on foreign policy, environmentAL.com Presidential politics shifts to higher gearArkansas News =20 Northwest =20 Nature's turn againEverett Herald US government-Chilean fishery talks begin today in JuneauJuneau Empire Environmentalists rally in BostonOregonian =20 ------_=_NextPart_002_01C474C4.12242840 Content-Type: text/html; charset="us-ascii" Content-Transfer-Encoding: quoted-printable
> **CEQ Regional News = Summary**
>
> Compiled by CEQ Communications
>
> ☒
>
> ***Wednesday, July 28, = 2004***
>
> **Northeast**
>
> **New water-use rules totally miss the boat*The Republican***

CommWG Re CIWG documents for today's meeting (for easy reference)
From: outreach-bounces@usgcrp.gov on behalf of kparker@usgcrp.gov
Sent: Wednesday, July 28, 2004 2:37 PM
To: outreach@usgcrp.gov; cbell@usgs.gov; patricia.klintberg@usda.gov
Cc: rmoss@usgcrp.gov; james.r.mahoney@noaa.gov
Subject: [CommWG] Re: CIWG documents for today's meeting (for easy reference)

I wanted to provide everyone with copies of the information materials we'll be discussing at today's meeting, especially for those of you attending via conference call. For those of you attending in person, we'll have hard copies available. The documents are:

1. Last set of meeting minutes (6/30) for approval 2. Revised draft terms of reference 3. Draft implementation plan

See you soon!

Kathryn

> As a final reminder, the next CIWG meeting will be tomorrow at 3 PM at
> the CCSP Office, 1717 Pennsylvania Ave (Suite 250). We'll be
> approving minutes from our last meetings, discussing the revised terms
> of reference, updating you on the implementation plan subgroup
> progress, and hearing from each agency on their communications
> activities (a reminder of the questions to keep in mind in your ~5
> minute presentation is included below).
>
> Please try to make it in person, if possible. If you must call in, the
> number is the same as last time:
>
> dial 1 800 516 9896, and at the prompt enter code 888502.
>
> See everyone tomorrow!
>
> Kathryn
> (202) 343-9044
>
> Agency Reports, please include the following:
>
> 1. Climate communications activities in which your agency is currently
> involved.
>
> 2. Opportunities in your current communications activities for
> collaboration/support from CCSP agencies or the CCSP office.
>
> 3. Climate communications activities/topics you'd suggest as
> priorities for the coming 1-year period.
>
>

From: ccsp-bounces@usgcrp.gov on behalf of Jack A. Kaye [Jack.A.Kaye@nasa.gov]
Sent: Wednesday, July 28, 2004 7:10 AM
To: ccsp@usgcrp.gov; ccsp_info.gov@hq.nasa.gov
Cc: seden@usgcrp.gov
Subject: [ccsp] Please hold Friday, July 30, 10 AM - 11 AM for telecon on CCSP review of NRC relationship

All: this is a heads up (on behalf of Ghassem Asrar) of our intent to hold a telecon on Friday, July 30 from 10 AM - 11 AM as the next step of the CCSP review of CCSP's relationship with the NRC.

A more descriptive letter with the call-in information, along with copies of some previous documents, should be forthcoming later this morning. Please let me know if you have any questions. - Jack Kaye

--

Dr. Jack A. Kaye
Director, Research Division
NASA Office of Earth Science
Mail Code YS
300 E St., S.W.
Washington, DC 20546

Ph (202) 358-2559
Fax (202) 358-2770
E-mail: Jack.A.Kaye@nasa.gov

From: ccsp_info-bounces@usgcrp.gov on behalf of Jack A. Kaye [Jack.A.Kaye@nasa.gov]
Sent: Thursday, July 29, 2004 10:23 AM
To: ccsp_info@usgcrp.gov
Subject: [ccsp_info] Fwd: Information for Friday 7/30 10 AM telecon on CCSP review of NRC relationship
This is a copy of what got sent out to the principals yesterday. - Jack Kaye

Date: Wed, 28 Jul 2004 16:35:26 -0400
To: ccsp@usgcrp.gov
From: "Jack A. Kaye" <Jack.A.Kaye@nasa.gov>
Subject: Information for Friday 7/30 10 AM telecon on CCSP review of NRC relationship
Cc: rmoss@usgcrp.gov,seden-usgcrp.gov
Bcc:
X-Attachments: :Macintosh HD:133456:JAKforGAsrar_July2804.doc: :Macintosh HD:133456:CCSP_NRC_study_workplan 1.doc: :Macintosh HD:133317:global change reports 199 2.xls:

All: this is the follow up to my earlier message concerning the upcoming telecon (Fri, 7/30, 10 AM - 11 AM). There are 3 files attached - a cover memo, a repeat of the underlying information, and a listing of global change reports. The first of these (the actual letter from Dr. Asrar) is pasted in below.

Please let me know if you have any questions about this. - Jack Kaye for Ghassem Asrar.

To: ccsp@usgcrp.gov
cc: ccsp_info.gov
From: Jack Kaye on behalf of Ghassem Asrar
Subject: Next CCSP meeting on CCSP-NRC review

On Friday, July 30, at 10 AM, we will be holding a teleconference of CCSP Principals to take the next steps in our review of the relationship between the CCSP and the National Academies / National Research Council. This review is addressing issues of funding of the NRC by CCSP participating agencies, CCSP-supported NRC reports, and other key issues.

The CCSP Office will set up the conference call. Your procedure for connecting is:
Dial 800-516-9896
At prompt, enter the passcode 888503
If you cannot participate at this time, you should designate an alternate. Please notify Susanna Eden in the CCSP Office (seden@usgcrp.gov, 202-419-3481) who will be participating from your agency.

A workplan for the review was generally agreed upon at our first meeting on May 27 and is attached to this message. As I indicated at our first meeting, I

anticipate that the review will require holding a total of up to four meetings to complete. I have written to Bruce Alberts, the President of the National Academy of Sciences, to inform him that the CCSP review process is underway and to enlist the participation of the NAS/NRC in working with us to address the issues that are part of the review.

At the meeting of the NRC Coordinating Committee on Global Change on Friday, July 16, Jim Mahoney and I discussed the CCSP-NRC review with the committee. The meeting also included a discussion of how external advice may be able to be obtained for the CCSP Synthesis and Assessment products. We will report on these discussions during the conference call.

Finally, I remind you one more time and urge you to move expeditiously to submit the write-ups I requested, pursuant to our workplan for the review. While it would be most helpful for us to have these in time to be distributed prior to the upcoming meeting, we recognize that with the limited time remaining, that would be impossible. Therefore, we ask agency representatives/Points of contact to please send your agency's response to the following items to Richard Moss (rmoss@usgcrp.gov) and Susanna Eden in the CCSP Office by August 6 (although we hope that you will be able to share some preliminary versions of this information at Friday's teleconference):

(a) describe your agency's support for NRC activities related to climate and global change research during the past 5 years (compendium of NRC studies is attached);
(b) assess the effectiveness of relevant NRC studies and prepare to discuss that with the CCSP review group;
(c) provide some sense of how your agency responded to particular NRC recommendations, at least from those reports you regard as being of greatest relevance and value; and
(d) provide your input on questions for this review that both the CCSP and the NRC should consider, so that when we come together with the NRC they will have gone through a similar process to that of the CCSP review.

Thank you for your cooperation. I look forward to a productive discussion.

--

--

Dr. Jack A. Kaye Ph (202) 358-2559
Director, Research Division Fax (202) 358-2770

NASA Office of Earth Science E-mail: Jack.A.Kaye@nasa.gov
Mail Code YS
300 E St., S.W.

Washington, DC 20546

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Dr. Jack A. Kaye Ph (202) 358-2559
Director, Research Division Fax (202) 358-2770
NASA Office of Earth Science E-mail: Jack.A.Kaye@nasa.gov
Mail Code YS
300 E St., S.W.
Washington, DC 20546

CommWG Greenwire article on CCSP

From: outreach-bounces@usgcrp.gov on behalf of Nicholas Sundt [nsundt@usgcrp.gov]
Sent: Thursday, July 29, 2004 1:51 PM
To: outreach@usgcrp.gov
Cc: Richard Moss (E-mail)
Subject: [CommWG] Greenwire article on CCSP

Dear Communications Working Group,

Below I provide a copy of the article Kent Laborde referred to in our meeting yesterday. The Greenwire article, published yesterday (Wed, 28 July) discusses one of the 21 "Synthesis and Assessment" products the CCSP will be producing under the Strategic Plan: "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences."
Richard Moss spoke to the Greenwire author, Andrew Freedman, on the record on Tuesday afternoon and is quoted briefly in the article. As an aside, I should note that Richard was on vacation at the time.

On 7 July, the CCSP Office posted a prospectus for the report and an invitation for people to comment. These are available at:
http://www.climatescience.gov/Library/sap/sap1-1/sap1-1prospectus-draft-invite.htm
The Greenwire article says a "CCSP document provides the organization's rationale for pursuing the study." This refers to the prospectus.

In addition to being prominently listed on the site's home page (www.climatescience.gov) since 7 July, links to the prospectus and invitation are provided in several other locations on the site. The "Invitation to Comment on Draft Prospectus for Synthesis & Assessment Product 1.1" also was published in the Federal Register and emailed via many of our email lists, including the mailing list from our Dec 2002 workshop -- with more than1,000 email addresses. The invitation was emailed to many people in the agencies and in EOP offices (CEQ, OSTP and OMB) -- including several members of our working group (Kent Laborde, Tom Spence, Ahsha Tribble, Bill Hohenstein, Chip Groat, Bryan Hannegan, Jason Rothenberg, Erin Wuchte, and perhaps others).

However, we did not send it to the outreach@usgcrp.gov mailing list per se; so many of you were not informed directly by us about the prospectus. We should have sent the announcement to the outreach mailing list and will do so with future broadcasts. More importantly, we'll make a concerted effort to give the working group a heads up as early as possible for future releases. I'll go ahead and forward the original 7 July 2004 announcement to you shortly.

Regarding early notification of future publications, I should re-emphasize that the FY2004-05 Our Changing Planet should be released on 11 August.
This is a very useful document and includes summaries for each agency and for each research area (carbon cycle, water cycle, etc.). It will be available online (HTML & PDF) and in hard copy from the GCRIO Online Catalog. In addition, parts of it can be used to produce CCSP fact sheets.
Of course your agencies can also use some of the material (such as the agency summaries) on your own web sites and publications.

Cheers,
Nick

****

CLIMATE CHANGE

CCSP's first major study important but unlikely to break new ground, experts say
Andrew Freedman, Greenwire reporter

More than two years after its inception, the Bush Administration's Climate Change Science Program is moving ahead with the first of 21 major climate science assessments, raising questions about the program's priorities amid a tight fiscal climate.

The Bush Administration created CCSP in 2002 as an outgrowth of the U.S. Global Change Research Program, which dated back to the administration of President George H.W. Bush. The aim of the program is to unify disparate federal climate change research programs and foster research to better inform decisionmakers on climate-related policy. Program managers are planning to commission at least 21 studies on climate change topics ranging from a "re-analyses" of historical climate data to a study of the North American carbon budget.

The first assessment will delve into the long-running debate over whether discrepancies exist between warming rates at the Earth's surface and readings taken in the middle troposphere, where most weather occurs. The study will add to the already voluminous body of literature on the topic, and some outside of CCSP question whether it will generate policy-relevant information or simply rehash existing knowledge.

"The big challenge is, are they going to say anything different than the academy concluded a couple of years ago?" asked Anthony Janetos of the H. John Heinz III Center for Science, Economics, and the Environment, referring to a 2000 National Academy of Sciences study on the temperature data.

The apparent difference between the rate of warming at the Earth's surface and the middle layer of the atmosphere has proven to be one of the most enduring issues of contention in climate change science. Computer models used to simulate climate conditions have tended to predict significant warming in the middle atmosphere, while observations taken from satellites and other sources such as weather balloons have contradicted those predictions by showing that the surface has warmed at least twice as fast as the atmosphere since 1980. This disparity has led many to criticize computer model results, which are the bedrock of climate change projections, as unreliable.

The large body of work already completed on the atmospheric/surface-based temperature discrepancy raises the question of the need for CCSP to devote its resources to the topic. In addition to the National Academy of Sciences report on the subject, the Intergovernmental Panel on Climate Change investigated it in its 2001 report, and there have been numerous studies produced since that time.

For example, in a study published in the May issue of Nature, researchers from the University of Washington concluded temperatures in the Earth's lower atmosphere have been rising "much faster" than experts thought, by about 0.4 degrees Fahrenheit per decade (Greenwire, May 6).

A CCSP document provides the organization's rationale for pursuing the study, stating: "The complexities of the issue coupled with shortcomings of the available observing systems prevent resolution of a number of fundamental questions."

Janetos said he is skeptical the CCSP has developed a clear system for prioritizing research needs. Janetos served on a National Research Council panel that reviewed CCSP's strategic plan in 2002 and again last year. He said the major question with the first assessment is similar to what needs to be asked with all CCSP-sponsored research: Will it advance scientific knowledge and provide policymakers with information they need to make decisions on climate change mitigation?

Janetos said it is not clear how the topics of the 21 studies were chosen, but CCSP seems open to altering its plan as the studies move forward.
"What was it about the issues that they selected ... that was really going to feed into making better decisions?" Janetos asked.

John Christy, a professor at the University of Alabama at Huntsville who developed

one of the most-cited datasets showing the temperature discrepancy, said the CCSP research is essential to take into account the peer-reviewed studies that have been published in the past two to three years. "An update at a minimum is what's needed on this issue," Christy said.

"When you're dealing with the bulk of the atmosphere you would assume that climate model representations would be at least somewhat accurate in that regard. We're not talking about a small part of the climate system," he said. For Christy, the study could result in a renewed committment to monitor "to high precision" the atmospheric and ground-based data, potentially including the development of new instrumentation.

The skepticism regarding the first assessment is reminiscent of the criticism NRC leveled at CCSP's strategic plan. In its initial review in 2002, the panel said, "The draft plan lacks most of the basic elements of a strategic plan: a guiding vision, executable goals, clear timetables and criteria for measuring progress."

At that time, the panel said President Bush's plan listed dozens of contrasting goals without setting priorities, and its proposals for research appeared to focus on questions many experts say have been answered. A subsequent review of a revised strategic plan was far more positive, stating it had vastly improved its goals (Greenwire, Feb. 19).

Money crunch

Like other federal scientific research and development programs, CCSP finds itself coping with flat or declining funding. According to data from the nonpartisan Pew Center on Global Climate Change, CCSP would receive essentially flat funding between fiscal years 2004 and 2005 at about $2 billion annually. This also would be consistent with expenditures for CCSP's predecessor organization, which received about $2 billion from 1995 through 1997 before dropping off slightly thereafter.

The agencies that fund climate change research have recently been forced to make significant cuts. The Bush administration's fiscal year 2005 budget request for the National Oceanic and Atmospheric Administration would eliminate the government's abrupt climate change research program as well as cut its paleoclimatology laboratory by half, potentially compromising the agency's ability to conduct climate research to support policy decisions.

According to a budget document from NOAA's Office of Oceanic and Atmospheric Research, the request would reduce the climate and global change research budget by $9.2 million below fiscal year 2004 levels, including the complete elimination of the $2 million abrupt climate change program and the $1.3 million paleoclimate program. The cuts would also end
$1.3 million in funding for postdoctoral programs and zero out research programs on the health and human dimensions of climate change (Greenwire, June 3).

"They felt they didn't really have much of a choice. That's a really tough position for the agencies to be in," Janetos said.

It was apparent from the beginning that CCSP would be underfunded, Janetos added. "It was pretty clear to the NRC committee that, even without a lot of specific funding information, they had added to the list of things they wanted to do quite substantially," he said. "The prospects for a lot of new funding are really quite dim."

Janetos said the NRC panel urged CCSP to develop the clearest set of priorities possible to decide where scarce funding should go. "They're not going to get all the money they would need to implement the strategic plan fully. How are they going to choose?" he asked.

In addition to moving ahead with the study, CCSP has made progress on one of the NRC's major recommendations: that climate change budget requests be consolidated or submitted jointly to the White House Office of Management and Budget by the 14

different agencies involved. Richard Moss, CCSP office director, said climate change-related agencies are currently working to create "harmonized budget requests" that should be ready in time for the president's fiscal year 2006 budget request.

Ben Preston of the Pew Center said although the Bush administration has touted CCSP as a cornerstone of its strategy to address climate change, CCSP is not all that different from the program it superceded, both in terms of scope and expenditures. "This isn't some kind of miracle Manhattan project of science that's going to propel us in new directions, it's really a renaming of the status quo," Preston said.

Invitation to Comment on Draft Prospectus for CCSPSynthesis and Assessment Product 1.1 (dtd 7 Ju

From: outreach-bounces@usgcrp.gov on behalf of Nicholas Sundt [nsundt@usgcrp.gov]
Sent: Thursday, July 29, 2004 2:02 PM
To: outreach@usgcrp.gov
Subject: [CommWG] Invitation to Comment on Draft Prospectus for CCSPSynthesis and Assessment Product 1.1 (dtd 7 July 2004)

Dear Communications Working Group,

Here is a copy of a message the CCSP Office broadcast on 7 July 2004. As noted in my previous message, we originally neglected to send this via the outreach mailing list -- though some of you received it through our other email lists. In addition, it also was sent to many others within the agencies and the EOP; so some of you may have already received copies from your colleagues.

For those of you who did not receive timely notice of this, please accept my apology.

Cheers,
Nick

-----Original Message-----

Washington DC
7 July 2004

Invitation to Comment on Draft Prospectus for Synthesis and Assessment Product 1.1

CLIMATE CHANGE SCIENCE PROGRAM

Prospectus for Synthesis and Assessment Product 1.1:
Temperature Trends in the Lower Atmosphere:
Steps for Understanding and Reconciling Differences

Public Comment Period:
7 July - 12 August 2004

Dear Colleague -

You are invited to provide comments on the prospectus for Climate Change Science Program (CCSP) Synthesis and Assessment Product 1.1, "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences." This report is the first of 21 synthesis and assessment products that will be prepared by the CCSP.

The Climate Change Science Program coordinates and directs U.S. research efforts in the areas of climate and global change. These efforts include the U.S. Global Change Research Program (USGCRP) authorized by the Global Change Research Act of 1990 and the Climate Change Research Initiative (CCRI), launched in 2001. CCSP integrates the activities and work of 13 participating Federal agencies and departments. The Program completed and released a Strategic Plan in July 2003 to guide its activities. More information about the CCSP can be found in the "Strategic Plan for the U.S. Climate Change Science Program" (see <http://www.climatescience.gov/Library/stratplan2003/>).

The Strategic Plan commits the program to prepare synthesis and assessment products to support informed discussion and decisionmaking regarding climate variability and change. The CCSP Strategic Plan sets forth general guidelines for its approach to decision support:

- Analyses structured around specific questions
- Early and continuing involvement of stakeholders
- Explicit treatment of uncertainties
- Transparent public review of analysis questions, methods, and draft results
- Ongoing CCSP analyses that build on the lessons learned.

The first set of products is described in the strategic plan, and status reports on the preparation of the products can be found on the Program's website at <http://www.climatescience.gov/Library/sap/sap-summary.htm>.

The purpose of this prospectus is to describe the proposed focus and the process that will be used to prepare the product. Expert and public comments are requested to ensure that the product meets the highest scientific standards, that the information provided is relevant, and that the preparation process is open and perceived to be fair.

To ensure openness and transparency, draft guidelines have been prepared for developing the CCSP products (see <http://www.climatescience.gov/Library/sap/sap-guidelines-29mar2004.pdf>). A public comment period on the guidelines has just been completed, and the guidelines are being revised, taking into consideration the comments received. A final version of the guidelines will be available on <www.climatescience.gov> in the near future. This prospectus will be revised if necessary to conform fully with the final version of the guidelines.

You are invited to participate in the public comment period for this product, "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences," by reviewing the prospectus and providing comments on the proposed scope, contents, and comprehensiveness of this report. Dr. Tom Karl of the National Climatic Data Center, who has published widely and is recognized as a leader in this field of research, will serve as the chief editor of the product.

Comments are due by 12 August 2004. All comments submitted by that time will be posted on the web site for public review, and all will be thoroughly evaluated and, if appropriate, incorporated in the final prospectus, which will be posted on the CCSP website when finalized. This final prospectus will include the final time table, which will highlight opportunities for further public engagement. Your comments should be submitted electronically to <1.1-temptrends@climatescience.gov> by the due date. Please refer to the instructions for formatting and submitting comments to facilitate incorporation into a master set for review by Dr. Karl and the lead authors.

We appreciate your participation and constructive comments.

Sincerely,

Dr. James R. Mahoney
Director, Climate Change Science Program

Please send your comments by e-mail, by 12 August 2004, to <1.1-temptrends@climatescience.gov>.

To begin the review, go to <http://www.climatescience.gov/Library/sap/sap1-1/sap1-1prospectus-draft.htm> to view the prospectus in both HTML and PDF formats, and for the instructions on how to provide comments to the Climate Change Science Program Office (CCSPO).

---

701 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2696
Telephone 202-508-5000

Copies for - (date)
B. Hannegan
H. Dreyfuss
P. Cooney
H. Pearce
K. Onley
K. Peel

EEI **EDISON ELECTRIC INSTITUTE**

July 30, 2004

Mrs. Ellen Russell
Office of Fossil Energy (FE-27)
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585
E-mail: *Ellen.Russell@hq.doc.gov*

Re: Comments on Imperial-Mexicali 230-kV Transmission Lines Draft Environmental Impact Statement, 69 *Fed. Reg.* 26089, 26817, 29934 (May 11, 14 and 26, 2004)

Dear Mrs. Russell:

The Edison Electric Institute (EEI) is responding to the above-referenced Department of Energy (DOE) notices of the availability of the Imperial-Mexicali 230-kv Transmission Lines Draft Environmental Impact Statement (EIS), DOE/EIS-0365, for public review and comments by July 30, 2004. On May 14, 2004, the Environmental Protection Agency (EPA) also issued a "Notice of Availability" of the Draft EIS on the Internet, as filed by DOE with EPA.

EEI is the association of U.S. investor-owned electric companies, international affiliates and industry associates worldwide. EEI's U.S. members serve more than 90 percent of all customers in the shareholder-owned segment of the industry, generate approximately three-quarters of all electricity in the country, and serve about 70 percent of all ultimate customers in the nation.

In developing this response to the DOE notice, EEI is especially interested in how the draft EIS addresses carbon dioxide (CO_2) emissions from the power plants in question. This is because EEI has long been a participant in matters related to global climate change and greenhouse gas emissions, including the development and implementation of the Framework Convention on Climate Change (FCCC) and the related activities of the Intergovernmental Panel on Climate Change (IPCC), and because of the ubiquitous and global nature of CO_2 and other greenhouse gases. Thus, EEI provides the enclosed comments focusing on the EIS process and on Chapter 4, "Environmental Consequences," of the draft EIS.

EEI appreciates the opportunity to provide comments. If you have any questions about our comments, please contact me ((202) 508-5617; bfang@eei.org) or Eric Holdsworth, EEI's Director, Climate Programs ((202) 508-5103; eholdsworth@eei.org).

Sincerely,

William L. Fang
Deputy General Counsel and
Climate Issue Director

WLF:tm
Enclosure

cc (w/ enc):
Kyle McSlarrow
Deputy Secretary of Energy

Larisa Dobriansky
Deputy Assistant Secretary for
National Energy Policy

Lynda Kastoll
Bureau of Land Management
U.S. Department of the Interior

Ken Mittelholtz
Environmental Protection Specialist
Office of Federal Activities
Environmental Protection Agency

James L. Connaughton, Esq.
Chairman
Council on Environmental Quality

Dr. Harlan L. Watson
Senior Climate Negotiator and
Special Representative
U.S. Department of State

Enclosure

COMMENTS OF THE EDISON ELECTRIC INSTITUTE ON THE DEPARTMENT OF ENERGY/BUREAU OF LAND MANAGEMENT MAY 2004 IMPERIAL-MEXICALI 230-KV TRANSMISSION LINES DRAFT ENVIRONMENTAL IMPACT STATEMENT

July 30, 2004

I. Environmental Impact Statement Process Comments

On December 5, 2002, pursuant to Executive Order Numbers 10485 and 12038 and relying on an environmental assessment (EA) and finding of no significant impact (FONSI), the Department of Energy (DOE) issued presidential permits to Sempra Environmental Resources and Baja California Power, Inc. for two transmission lines to cross the U.S. international border in California and connect with natural gas-fired electric power plants in Mexico. The notice indicates that the lines were constructed and operational by July 2003. However, the lines are the subject of two court orders, dated May 2 and July 8, 2003, resulting from litigation in *Border Power Plant Working Group et al. v. Department of Energy et al,* Case No. 02-CV-513-IEG (S.D. Cal.).

Those orders remanded the National Environmental Policy Act (NEPA) review back to DOE and the Bureau of Land Management (BLM), while deferring action on the permits and the FONSI. The federal court ruled in the May 2 order that the EA and FONSI were deficient in various respects, including failure to examine the impact of carbon dioxide (CO_2) emissions from the generating units. In its July 8 order, the court stated, "Because Plaintiff has not positively demonstrated to the Court the likelihood of a significant

environmental impact from the proposed actions, the Court finds that it is not appropriate to constrain the agencies' decision-making by ordering an EIS [environmental impact statement] on remand." Order at 11. Nevertheless, by notice of October 30, 2003, DOE and BLM decided to prepare an environmental impact statement (EIS), stating that such a process would "increase opportunities for public and stakeholder participation in the environmental review" and address any environmental impacts "as if the transmission lines did not exist." 68 *Fed. Reg.* 61798.

In its May 12, 2004, "Memorandum of Points and Authorities in Support of Federal Defendants' Unopposed Motion for the Court to Continue to Defer the Setting Aside of Presidential Permits," the federal government advised the court that DOE/BLM had prepared the draft EIS, that it was available for public comment, that the plaintiffs requested an extension of the public comment period on the draft EIS to July 30, 2004, and that normally the NEPA process would be complete by the end of November. The Memorandum also notes that with the comment period extension the EIS process "may" extend "into early 2005." Nevertheless, the government concluded that deferral just until December 2004 of the decision on the permits was appropriate, subject to a second request from federal defendants for additional time should circumstances change as the NEPA process moves forward. The Memorandum indicates that the plaintiffs would "not oppose an extension of up to 60 days beyond December 15, 2004." Consequently, the court issued a new order on May 19, 2004, deferring action on the permits until completion of the EIS process, or December 15, 2004, "whichever is earlier."

As noted by the above-referenced Memorandum, when DOE proposed in October 2003 to "skip straight to the more complex and detailed EIS process," EEI was initially concerned because the DOE proposal to have an EIS address CO_2 emissions from such generating units may be misunderstood by some to imply that such emissions are capable of creating "significant" environmental impacts, which is the criterion for an EIS under NEPA. The explanation for this choice given in the Memorandum – namely, that the decision to "complete a full-blown" EIS, although "not required" by the court's order, would increase "opportunities for public participation in the NEPA process" and shorten "the steps in the NEPA process," coupled with a similar explanation in the DOE October 2003 *Federal Register* notice – although important, did not fully allay our concerns.

However, it is obvious from our review of the draft EIS that factors other than CO_2 emissions from an electric generating project or group of such projects were the real basis for preparing this EIS. Absent such factors, an EA would more than likely have sufficed to address the subject of CO_2 emissions from one or more such projects in the global context if that was the only or prime environmental consequence. We consider this issue to be very important, because no one generating project or group of such projects could reasonably create a "significant" impact on global climate, particularly since the sum of greenhouse gases, including CO_2, emitted from any such projects is minuscule compared with the enormous global atmospheric pool of such gases. As DOE and BLM know, 40 C.F.R. § 1508.27(a) provides that the significance of a federal action must be judged in

context. In addition, CO_2 emitted from multiple sources worldwide mixes in the global atmosphere and is considered by scientific experts as one of the "well-mixed gases." Thus, the context for addressing CO_2 impacts from any given project or group of projects is the entire world. Viewed in that context, DOE/BLM must conclude that the CO_2 impacts from such projects are perforce insignificant, as is the case in the draft EIS.

II. Chapter 4 Comments on CO_2 Emissions

As set forth in the draft EIS, Bája California Power, Inc. (InterGen) and Sempra Energy Resources (Sempra) each applied for presidential permits to construct two 230-kV transmission lines from Mexico across the U.S. border. The InterGen line extends from the La Rosita Power Complex (LRPC) in Mexico across the border and BLM-managed land to a San Diego Gas & Electric substation in California. That complex consists of two natural gas-fired combined-cycle generating units with a total capacity of 1,060 megaWatts (MW). The entire electrical output of one unit is designated only for the U.S. market and can be exported only over this line. Some of the capacity from the other unit is also designated for the U.S. and can be transported over the new line or an existing line. The Sempra line extends from a natural gas-fired power plant in Mexico developed by Termoelectrica de Mexicali (TDM) over BLM land to the same substation. The entire capacity is designated exclusively for export to the U.S. over the new line.

A. Section 4.3 – Air Quality

Chapter 4 of the draft EIS "discusses" the environmental consequences of the "four alternatives" set forth in Chapter 2, which are the two lines and the TDM and LRPC

power plants, no action, alternative technologies, and mitigation measures. Section 4.3 of the chapter "analyzes the impacts" of those alternatives "on air quality in the United States" and states that such "impacts" may result from air emissions produced during construction and maintenance of the lines and from operation of the plants. One of the five "[m]ajor issues pertaining to air quality" listed in the section is the impacts "in the United States" of CO_2 emissions from the TDM and LRPC power plants, which were compared with both the total U.S. emissions from fossil fuel combustion and total global emissions from such combustion.

We are concerned that DOE would list CO_2 emissions as a "major" issue pertaining to air quality. As we already observed, while various energy projects are likely to produce CO_2 emissions in differing amounts annually, their emissions are insignificant in the global context of such emissions and other greenhouse gases. Indeed, the draft EIS states that such emissions from these plants are about "0.023% compared with global emissions" and that the "expected impacts to global climate change would be negligible" (p. 4-55). In fact, an energy project's CO_2 emissions should remain relatively constant over time once it reaches full output, while global greenhouse gas emissions – particularly from developing countries like China, India, Brazil and Indonesia – continue to rise substantially. Thus, greenhouse gas emissions from energy projects, such as these, are quite insignificant from a global climate change perspective. In this regard, we point out that the definition of "climate change" as used in the Framework Convention on Climate Change (FCCC) "means a change of climate which is attributed directly or indirectly to

human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." Since the FCCC is binding on the U.S., we must assume that when using that term, DOE/BLM do so in the context of that definition.

B. Section 4.3.4.4.3 – "Global Climate Change and Carbon Dioxide Emissions"

This section properly notes that "there is no Federal regulatory guidance on CO_2 emissions." Indeed, just prior to DOE issuing its October 2003 notice of its intention to prepare an EIS, EPA decided on August 28, 2003, that CO_2 is not an air pollutant for any regulatory purpose under the Clean Air Act (CAA) and that EPA lacks congressional authority to regulate CO_2 emissions. That decision was published on September 8, 2003. 68 *Fed. Reg.* 52922. As recognized by EPA, important to its decision is the 2001 report of the National Research Council titled "Climate Change Science: An Analysis of Some Key Questions." Since the EPA decision relying on that report is the Executive Branch's latest review on the record of global climate change science, DOE/BLM should, in addition to noting no federal regulatory guidance, give deference to the EPA decision in considering CO_2 emissions from these projects.

Relying on NEPA-related regulations of the Council on Environmental Quality (CEQ), the above-referenced court opinions were critical of the EA not comparing the alleged environmental impacts of the proposed project with alternatives. 40 C.F.R. § 1502.14. In light of the fact that no energy project will emit a meaningful amount of CO_2 compared

with global emissions, there is no sound basis, despite the court's comments, for saying that any one project or alternative is preferable to another as a result of lower (or no) CO_2 emissions. Accordingly, the draft EIS properly does not conclude that there are meaningful distinctions with the proposed project and alternatives based on CO_2 emissions.

Finally, in certain circumstances the CEQ regulations require that EISs include a cumulative impact analysis. 40.C.F.R. §§ 1508.7 and 1508.8. Because of the very small quantity of CO_2 emissions produced by a particular project, such as the projects which are the subject of this EIS, a cumulative review of energy projects subject to some form of federal approval would not justify a finding of significant impact. The CO_2 emissions of all such projects would still be so small as to fall well below the significance threshold.

CommWG Re Follow-up to Wednesday's meeting-Please review draft IP and mark your calendars
From: outreach-bounces@usgcrp.gov on behalf of kparker@usgcrp.gov
Sent: Friday, July 30, 2004 10:28 AM
To: outreach@usgcrp.gov; cbell@usgs.gov; patricia.klintberg@usda.gov; daytond@onr.navy.mil
Cc: rmoss@usgcrp.gov; james.r.mahoney@noaa.gov
Subject: [CommWG] Re: Follow-up to Wednesday's meeting-Please review draft IP and mark your calendars

Dear CIWG members,

Thank you for your attending Wednesday's successful CIWG meeting, and for your agency communications update. A couple of reminders:

1. Please review the draft implementation plan (again attached) and provide input by COB Tuesday, August 3.
2. Those of you on the implemetation plan subgroup, don't forget our next meeting is next Wednesday, August 4 at 3 PM at the CCSP office. We'll be incorporating info from the meeting and comments received from the group into the draft.
3. Mark your calendars for our next CIWG meeting, Wednesday, August 25 at 2:30 PM (note earlier time).
4. If you are interested in serving as a co-chair, please let me know ASAP.

Meeting minutes to follow soon,

Kathryn
(202) 343-9044

> I wanted to provide everyone with copies of the information materials we'll be discussing at today's meeting, especially for those of you attending via conference call. For those of you attending in person, we'll have hard copies available. The documents are:
>
> 1. Last set of meeting minutes (6/30) for approval 2. Revised draft
> terms of reference 3. Draft implementation plan
>
> See you soon!
>
> Kathryn
>
>> As a final reminder, the next CIWG meeting will be tomorrow at 3 PM
>> at
the
>> CCSP Office, 1717 Pennsylvania Ave (Suite 250). We'll be approving minutes from our last meetings, discussing the revised terms of reference,
>> updating you on the implementation plan subgroup progress, and
>> hearing
from each agency on their communications activities (a reminder of the questions to keep in mind in your ~5 minute presentation is included below).
>> Please try to make it in person, if possible. If you must call in,
>> the
number is the same as last time:
>> dial 1 800 516 9896, and at the prompt enter code 888502.
>> See everyone tomorrow!
>> Kathryn
>> (202) 343-9044
>> Agency Reports, please include the following:
>> 1. Climate communications activities in which your agency is
>> currently
involved.
>> 2. Opportunities in your current communications activities for
>> collaboration/support from CCSP agencies or the CCSP office.
>> 3. Climate communications activities/topics you'd suggest as

CommWG Re Follow-up to Wednesday's meeting-Please review draft IP and mark your calendars
>> priorities
for the coming 1-year period.
>

From: ccsp-bounces@usgcrp.gov on behalf of JKaye@hq.nasa.gov
Sent: Friday, July 30, 2004 2:18 PM
To: James.R.Mahoney@noaa.gov; Jack.A.Kaye@nasa.gov
Cc: ccsp_info@usgcrp.gov; Ahsha.Tribble@noaa.gov; ccsp@usgcrp.gov; gasrar@hq.nasa.gov
Subject: Re: [ccsp] Re: [IPO] [ccsp_info] Fwd: Information for Friday 7/30 10AM telecon on CCSP review of NRC relationship

I didn't prepare the spreadsheet, so can't take any credit for it. I got it from Richard Moss, if I remember correctly. !

A good weeend to all! - Jack

----- Original Message -----
From: ccsp-bounces
Sent: 07/30/2004 02:21 PM
To: "Jack A. Kaye" <Jack.A.Kaye@nasa.gov>
Cc: ccsp@usgcrp.gov; Ahsha Tribble <Ahsha.Tribble@noaa.gov>; ccsp_info@usgcrp.gov; Ghassem Asrar <gasrar@hq.nasa.gov>
Subject: [ccsp] Re: [IPO] [ccsp_info] Fwd: Information for Friday 7/30 10 AM telecon on CCSP review of NRC relationship

To Jack Kaye and our other CCSP colleagues,

I found the Excel spreadsheet that Jack sent, summarizing all NRC reports prepared for CCSP and individual agencies since the Pathways report, to be very useful. I have modified the format to make it more easily readable as a reference file. I attach my revised format file for any of you who may wish to save it. Thanks for preparing this, Jack.

Jim Mahoney

Jack A. Kaye wrote:

> This is a copy of what got sent out to the principals yesterday. - Jack Kaye
>
> > Date: Wed, 28 Jul 2004 16:35:26 -0400
> > To: ccsp@usgcrp.gov
> > From: "Jack A. Kaye" <Jack.A.Kaye@nasa.gov>
> > Subject: Information for Friday 7/30 10 AM telecon on CCSP review of NRC relationship
> > Cc: rmoss@usgcrp.gov,seden-usgcrp.gov
> > Bcc:
> > X-Attachments: :Macintosh HD:133456:JAKforGAsrar_July2804.doc: :Macintosh HD:133456:CCSP_NRC_study_workplan 1.doc: :Macintosh HD:133317:global change reports 199 2.xls:
> >
> > All: this is the follow up to my earlier message concerning the upcoming telecon (Fri, 7/30, 10 AM - 11 AM). There are 3 files attached - a cover memo, a repeat of the underlying information, and a listing of global change reports. The first of these (the actual letter from Dr. Asrar) is pasted in below.

Please let me know if you have any questions about this. - Jack Kaye for Ghassem Asrar.

To: ccsp@usgcrp.gov
cc: ccsp_info.gov
From: Jack Kaye on behalf of Ghassem Asrar
Subject: Next CCSP meeting on CCSP-NRC review

On Friday, July 30, at 10 AM, we will be holding a teleconference of CCSP Principals to take the next steps in our review of the relationship between the CCSP and the National Academies / National Research Council. This review is addressing issues of funding of the NRC by CCSP participating agencies, CCSP-supported NRC reports, and other key issues.

The CCSP Office will set up the conference call. Your procedure for connecting is:
Dial 800-516-9896
At prompt, enter the passcode 888503
If you cannot participate at this time, you should designate an alternate. Please notify Susanna Eden in the CCSP Office (seden@usgcrp.gov, 202-419-3481) who will be participating from your agency.

A workplan for the review was generally agreed upon at our first meeting on May 27 and is attached to this message. As I indicated at our first meeting, I anticipate that the review will require holding a total of up to four meetings to complete. I have written to Bruce Alberts, the President of the National Academy of Sciences, to inform him that the CCSP review process is underway and to enlist the participation of the NAS/NRC in working with us to address the issues that are part of the review.

At the meeting of the NRC Coordinating Committee on Global Change on Friday, July 16, Jim Mahoney and I discussed the CCSP-NRC review with the committee. The meeting also included a discussion of how external advice may be able to be obtained for the CCSP Synthesis and Assessment products. We will report on these discussions during the conference call.

Finally, I remind you one more time and urge you to move expeditiously to submit the write-ups I requested, pursuant to our workplan for the review. While it would be most helpful for us to

have these in time to be distributed prior to the upcoming meeting, we recognize that with the limited time remaining, that would be impossible. Therefore, we ask agency representatives/Points of contact to please send your agency's response to the following items to Richard Moss (rmoss@usgcrp.gov) and Susanna Eden in the CCSP Office by August 6 (although we hope that you will be able to share some preliminary versions of this information at Friday's teleconference):

(a) describe your agency's support for NRC activities related to climate and global change research during the past 5 years (compendium of NRC studies is attached);
(b) assess the effectiveness of relevant NRC studies and prepare to discuss that with the CCSP review group;
(c) provide some sense of how your agency responded to particular NRC recommendations, at least from those reports you regard as being of greatest relevance and value; and
(d) provide your input on questions for this review that both the CCSP and the NRC should consider, so that when we come together with the NRC they will have gone through a similar process to that of the CCSP review.

Thank you for your cooperation. I look forward to a productive discussion.

--

--

Dr. Jack A. Kaye
Director, Research Division
NASA Office of Earth Science
Mail Code YS
300 E St., S.W.

Washington, DC 20546

Ph (202) 358-2559
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Dr. Jack A. Kaye
Director, Research Division

Ph (202) 358-2559
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Georgia-Pacific

Dr. Sergio F. Galeano
133 Peachtree Street NE
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 652-4654
sfgalean@gapac.com

July 31, 2004

RE: Impending Issuance of 1605(b) Protocols on Carbon sequestration- Concerns

TO: Dr. Bryan J. Hannegan, Director for Energy & Transportation (CEQ),
Mr. William Hohenstein, Director Global Change Program Office, USDA,

Cc : Honorable James L. Connaughton, Chairman Council for Environmental Quality
Ms. Margo Anderson, Director, DOE

Dear Bryan and Bill:

Last April 1, you, and John Staub, kindly met with me on the matter of certain issues in relation to the 1605(b) registry improvement project. Some of the conversation hinged around the possibility and benefits of the registry to contemplate registration of both carbon sequestration in forest and product sinks. GP has been probably the first company with a developed quantification method that we implement in our own corporate GHG Protocol and inventory (www.gp.com/enviro/strategy/protocol) and adopted by the AF&PA, thus your interest to know more about this approach was and is appreciated.

At that time, the writer documented Georgia-Pacific's and his personal involvement in the concept and quantification methodology of product carbon sequestration and provided different evidence. It is not clear in my notes, if at that time the work of the California Climate action on a proposal to incorporate carbon sequestration was discussed.

Nevertheless, these notes are prompted by unverified comments about the impending possibility of the 1605 (b) protocols to be issued this Fall, incorporating a product carbon sequestration scheme based on the ill-fated proposal of the California Climate Action for the California registry back in May- June. This type of information and its circulation concerns us greatly since that approach was opposed by us and our reasons amply documented to the CA Registry in the commenting period and during individual conference calls requested by the principal actors of the CA registry proposal with the writer, both policy and technical ones. As a result, the CA registry recognized these shortcomings and other issues and properly retired the proposal.

001927

Greenhouse Effects/1605(b)
Public Workshop 3/11/03

Different issues were subject of our constructive criticism as well as of different forest manufacturing associations, very much surprised and shocked by the provision of the proposal that permits a) only the forestry entity to register both forest and product carbon pools credits, and b) the quantification methodology. It was further identified and demonstrated that;

a-The proposal, by providing rights of registration to the forest entity, deprived arbitrarily and unfairly the rights of property and value added of the manufacturer whose products make possible the product carbon sink. A log in the forest does not make a product carbon sink. The investment, innovation and value added on that log, by the manufacturer, makes possible the product carbon sink. The demand side of the equation was forgotten albeit the Climate Action proposers indicated candidly to the writer that it was not their intention but an unintended consequence.

b- The manner the CA registry proposal factors the product carbon contributions created a de facto "loop hole" whereby the traditional and well accepted balance between harvest and growth, to reflect volumetric sustainability, is disrupted permitting additional harvesting. The political implications of such unintended consequences is now apparent.

c- The political reaction to this proposal is registered on the public record available in the internet. In spite of the unusual short notice for commenting and the lack of information on this particular proposal (no stakeholders really participating in its development) a substantial number of manufacturing associations objected to this approach. Here, the CA registry [analogous to a possible outcome in 1605(b)] rather than increasing registry participation by thousands of small and large biomass products manufacturers (the obvious condition to register the product carbon sequestration credit would be to register the emissions. My own thinking is that they all will do)

d- There are issues of required accuracy, reliability, data accessibility and costs differentiating the product carbon sequestration quantification methods proposed by the CA registry proposal and the ones sponsored, not only by GP (GPCARB) but by the industry under a more generic name of "100-year" method. As candidly commented by one of the actors of the CA registry proposal, once they knew about the other approach, accuracy in the CA registry proposal is a joke!

e- For all the reasons and documentation provided to the CA registry during the commenting period, they wisely decided to retired the proposal and are pondering on next steps, convinced of the insurmountable shortcomings of the initial proposal.

f- We believe that absent of public or governmental public policy on the matter, the right to register carbon sequestration both in the forest and product sinks, is driven by the merits of the quantification methodology. In fact, even in the presence of government policy this is a truism because good public or government policy would factor the essential accuracy, cost and duly distribution of incentives among affected sectors.

g- Further, although enabling California law provides the Climate Action voluntary effort to register GHG emissions, it is not specific about carbon sequestration least the rights for registration. This is in contrast with specific state legislation like Georgia SB 356 provides for a registry to include both forest and product carbon sequestration

according to the entities engaged on the activity. Very soon, the Forestry Commission would commence work on the pertinent protocols and the "100-yr" method is the offered method of choice.

i- A federal program such as the 1605(b) and the role of the USDA must factor the obligations of the Department for both forest and forest products. Not recognizing the demand side would be tantamount as eliminating commercial forestry and moving it from a conservationist to a preservationist. Without demand for raw materials to manufacture products and consequently the creation of the product carbon sink, the forestry entity of the CA registry would have nothing to register because nothing would be harvested. Such contravenes all evidence from economic and social studies. An absurdity!

A proper protocol provision in 1605(b) would proactively address the role of global climate action since it would help, in the long run, the cultural transformation to a society needing reliance on less fossil carbon intensity. Such government policy would provide albeit partially, a needed stimulation to innovation efforts in the biomass manufacturing sector, now very much limited by the recognized "market failure" because commercial manufacturing firms (and in this time of increasing and accelerated commoditization), are never able to appropriate and recover all benefits derived from their investment and efforts.

Due to the recognized failure of the CA registry proposal it would unimaginable that the new improved 1605(b) would repeat on known and important shortcomings amply recognized. As commented during conversations with the CA registry, methodology moves rapidly and they acknowledged not knowing about the "100-yr" method (the GPCARB provided to you earlier). I believe the CA registry actors must be commended for the responsible position taken in view of new information and superior methodology.

As indicated in the attachment to this memo, this quantification method, having the endorsement by the US industry, is also seriously contemplated at the international level by most of the association of the forest and paper industries, International Council of Forest and Paper Associations, ICFPA. We consider these are credentials enough (besides other recognition in the peer review process of experts in the ISO environmental management standard ISO 14047) to justify its recommendation as the proper quantification methodology for the forest product manufacturer to register these credits, with its GHG emissions, in the new, really improved 1605(b).

We stand ready to provide further information and explanation on the matter. We appreciate your consideration to this memo and attachments.

Sincerely,

Sergio F. Galeano, Ph.D.
Senior Manager, Product Policy and Assurance

Attachments- a) NCASI's document on methodologies. b) GP comments to the CA registry (by e-mail)

Characterizing carbon sequestration in forest products in use

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Abstract

In recent years, much attention has been focused on carbon accounting for harvested wood products in the context of national greenhouse gas inventories. The methods used for national accounting, however, are not suitable for corporate or value chain accounting. This is partly due to the practical difficulties that companies face in assembling the historical production data and other information required by the methods. In addition, national accounting methods yield results that are heavily influenced by historical data and past practices. As a result, these methods provide little insight into opportunities for improvement.

In this paper, a method is described for corporate and value chain accounting of carbon in forest products that avoids many of the difficulties associated with national accounting methods. The method focuses on the long-term effects of current production on future stocks of carbon sequestered in forest products. It estimates the amount of carbon in products expected to remain in use for at least 100 years and, therefore, the method is called the 100-year method.

Data from the U.S. are used to demonstrate the application of the 100-year method. The results indicate that the forest products put into use in the U.S. in 1998 sequestered almost 12 million tonnes of carbon.

Keywords: Carbon sequestration; Forest products industry; Harvested wood products; Carbon accounting; Greenhouse gas emissions; Pulp and paper; Lumber; Wood panels

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1. Introduction

Almost all of the sequestered carbon in the forest industry value chain is contained in three "pools" – the forest (including above-ground and below-ground biomass), products-in-use, and products disposed in landfills. This paper describes methods for characterizing carbon sequestration in what is perhaps the most often ignored of these three pools – i.e. the pool of carbon in forest products-in-use.

2. An overview of the forest industry value chain

Before examining methods for estimating carbon sequestration, it is helpful to have a general understanding of overall climate profile of the forest products industry.

2.1 Forests

Enormous quantities of atmospheric carbon are stored in forests and forest soils - more than 1,100 gigatonnes (Gt) divided between forest vegetation (approximately 350 Gt) and forest soils (approximately 800 Gt). By comparison, the atmosphere contains about 800 Gt of carbon and the world's oceans contain almost 40,000 Gt [1].

Stocks of carbon in mid- and upper-latitude forests are growing. Stocks of carbon in tropical forests appear to be decreasing, primarily due to deforestation, but there is significant uncertainty in these estimates. Globally, the stocks of forest carbon are thought to be declining, but this will remain uncertain until the estimates for tropical forests are improved [1], [2]. Attempts to develop a global carbon budget suggest that net terrestrial uptake of carbon, including uptake by forests, is in the range of –0.3 to +1.7 Gt/y. This can be compared to global emissions of carbon equal to approximately 6 Gt/y [1], [2].

Although forest carbon stocks are very important to the industry's climate profile, they cannot be viewed in isolation because a sizable fraction of the carbon removed in harvested wood adds to the stocks of carbon stored in products.

2.2 Harvesting and transporting wood to manufacturing facilities

The amounts of greenhouse gases (GHGs) emitted in harvesting and transporting wood to manufacturing operations are primarily determined by the distance traveled and the mode of transportation. Energy data from a U.S.-focused study suggest that GHG emissions from wood harvesting and transport amount to approximately 0.03 tonnes of carbon per tonne of paper [3]. A European-focused study found that total emissions from transport (including raw materials and final products) were approximately 0.02 tonnes of carbon per tonne of paper [4]. The U.S. and European estimates represent perhaps 10 to 20 percent of the manufacturing emissions from the forest products sector. A Canadian study found that wood transportation accounts for nearly 60 percent of the Canadian forest product sector's fossil fuel consumption, a parameter that is highly correlated with GHG emissions [5]. The differences between these studies may be related to the methods used to develop the estimates or to actual differences in transportation distances and other factors.

2.3 Manufacturing forest products

The forest products industry relies heavily on carbon-neutral biomass fuels.[2] According to statistics from the Organization for Economic Co-operation and Development (OECD), the

[2] The term "carbon-neutral" is used to reflect the fact that the carbon in biomass fuels was removed from the atmosphere by photosynthesis and when burned is simply returned to the atmosphere, resulting in no net addition of carbon to the atmosphere.

forest products industry derives more of its energy from biomass than any other industry [6], [7]. None-the-less, most of the GHGs emitted by forest products industry are associated with the burning of fossil fuels.

Based on information from industry associations and government agencies, it can be estimated that the direct GHG emissions[3] from the pulp and paper industry in Australia, Canada, Japan, the United States, and the European Union (EU) plus Norway and Switzerland amount to approximately 41 million tonnes of carbon [9], [10], [11], [12], [13]. Statistics from the Food and Agriculture Organization of the United Nations (FAO) indicate that these regions produce approximately 63% of the paper and paperboard in the world [14]. This suggests that the GHG emissions from the global pulp, paper and paperboard industry are approximately 65 million metric tonnes of carbon per year.

GHG emissions from wood products manufacturing in OECD countries are approximately 5 million tonnes of carbon per year.[4] FAO statistics indicate that the OECD produces about 70% of the sawn wood and wood panels, suggesting that global GHG emissions from wood products plants are approximately 7 million tonnes of carbon per year [6], [7], [14].

In total, therefore, the direct emissions from the forest products industry can be estimated to be approximately 72 million tonnes of carbon per year, which represents just over one percent of global GHG emissions (estimated to be about 6 Gt) [1], [2], [15].

Many forest products manufacturing facilities also purchase electricity. There are no publicly available data, however, that allow the indirect emissions associated with these purchases to be estimated for the global forest products industry. For the pulp and paper industry in Europe, indirect emissions associated with purchased power are approximately 30% less than the industry's direct emissions (estimated from [11] and [16]). In the United States, they are

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[3] Direct emissions are from sources owned or controlled by the forest products industry. They do not include emissions associated with purchased electricity, nor do they include CO_2 emissions from biomass combustion (which are reported separately and not totaled with fossil fuel-related CO_2 emissions) [8].

[4] Wood product manufacturing emissions have been estimated from OECD/IEA statistics [6] [7], which exclude fuels used to produce electricity. Unlike pulp, paper, and paperboard mills, however, few wood products facilities produce electrical power from fossil fuels.

about 40% less than direct emissions [13]. In the wood products sector, indirect emissions often exceed direct emissions, although they are still less than the emissions attributable to electricity purchases by pulp and paper mills (for instance, see [17]).

2.4 Transporting final products to users

The emissions associated with this segment of the value chain are affected by the same factors that influence emissions in transporting raw materials – i.e. transport distance and mode of transport. Like emissions associated with raw material transport, these emissions would be expected to be highly variable.

2.5 Products-in-use

The product use phase of the forest products life cycle is important to the GHG profile of the forest products industry for several reasons. First, emissions are associated with using some forest products. Fossil fuel-derived energy is used, for instance, to heat wood-framed and -sided homes. The differences in energy efficiency between wood-based and other types of homes, and the differences in embodied energy and emissions of the respective building materials (i.e. substitution effects) can be very important to the value chain climate profile.

In addition, this part of the value chain is important because while products are being used, they continue to sequester carbon. This sequestration is an important element of the climate profile of the forest industry value chain. It has been estimated that 40 million tonnes of carbon are sequestered annually in products-in-use [18]. This represents more than one-half of the sector's global direct emissions (estimated above). Carbon sequestration in products-in-use is examined in much great detail later in this paper.

2.6 *End-of-life management*

After use, most forest products are recycled, landfilled, or burned for energy. This part of the value chain has several effects on the climate profile of the forest products industry.

Perhaps most obviously, when discarded biomass-based forest products are burned for energy they often displace fossil fuels, resulting in avoided GHG emissions.

In addition, used forest products must be collected, a process that requires fossil fuel for transport. Different studies have come to varying conclusions about whether transportation emissions from recovered fiber transport are greater or smaller than those related to wood transport, undoubtedly reflecting, at least in part, differing local circumstances [3][4].

A large fraction of used forest products are recycled, an activity that has multiple and complicated effects on GHG emissions and sequestration along the value chain. Increased recycling may reduce forest harvests and allow longer rotation times, but the benefits to carbon sequestration in the forest are likely to be obscured by the effects of market forces on decisions regarding harvesting and land use. Recycling avoids emissions of methane, a potent greenhouse gas, by keeping used forest products out of municipal solid waste landfills (although increasingly this methane is captured and burned as a biomass fuel, offsetting fossil fuels). Recycling also reduces the amount of carbon sequestered in landfills.

Large amounts of carbon are sequestered in forest products in landfills. In the U.S., for instance, it is estimated that forest products in landfills contain over 1,300 million metric tonnes of carbon and the net additions to these carbon stocks exceed 40 million metric tonnes of carbon per year [19].

To further complicate the analysis of the end-of-life portion of the value chain, in some market segments recycled and virgin fibers compete so that substitution effects within the value chain can become important.

3.0 Options for characterizing carbon sequestration in products-in-use

The products manufactured by the forest products industry contain large amounts of sequestered atmospheric carbon. Worldwide, the industry's annual production (considered equal to total production of paper, paperboard, wood panels and sawn wood) contains approximately 290 million tonnes of carbon [18]. This new production represents additions to existing stocks of carbon in products-in-use. These additions are offset by losses of carbon from the existing stocks as products are removed from service.

Over the last forty years, the net additions to stocks of carbon in products-in-use have varied between 30 and 60 million tonnes of carbon per year. In 2000, these carbon stocks were increasing at a rate of approximately 40 million tonnes of carbon per year [18]. Due to the long useful lifetimes for many of the industry's products and increased consumption caused by increasing standards of living, stocks of carbon in products-in-use are growing and are expected to continue to grow for the foreseeable future [1], [18].

There are two basic options for estimating changes in the amounts of carbon sequestered in products-in-use. One is to use the methods developed for national accounting of carbon in harvested wood products (HWP). The second is a variation on the national accounting approach that may be better suited to corporate, sector and value chain accounting. Both are explained below.

Before examining the methods, it is important to consider the differences between the issues encountered in preparing national GHG emissions inventories and those associated with corporate, sector, or value chain inventories.

In national accounting one of the most important issues is how to account for the carbon that crosses national boundaries in imports and exports. This is not normally an issue in corporate or value chain accounting because the boundaries for these inventories are usually not set at national borders. Similarly, in national accounting, essentially all forests within the

nation's borders are included whereas, in corporate and value chain accounting, it is the forest that provides fiber to the forest products industry that is usually of primary concern.

In national accounting, a very broad definition of "products" is appropriate so the accounting is done on "harvested wood products" or HWP – a term that includes all wood removed from the forest, regardless of its use. In corporate and value chain accounting, a different definition of "product" may be more appropriate because the focus is usually on the valued-added output of the forest products industry.

In addition, national accounting methods are often impractical for use at smaller scales. As explained below, for a company to use them, it must have records of its annual production for many years into the distant past. These data seldom exist, in part because of the numerous corporate mergers, acquisitions, spin-offs and closures that have occurred over time.

For these and other reasons, the approaches used for carbon accounting in national inventories may not be appropriate for corporate, sector, or value chain accounting in the forest products industry. It is important to understand national inventory methods, however, because it is desirable for corporate, sector, and value chain accounting methods to be as consistent as possible with national accounting methods.

3.1 The national inventory method

For national GHG inventories, the Intergovernmental Panel on Climate Change (IPCC) indicates that changes in stocks of carbon in products-in-use can be estimated by several methods. IPCC's Tier 1 method assumes no change in stocks of carbon in products-in-use, but its Tier 2 method estimates stock changes by netting annual additions to stocks in-use against annual losses occurring in the same year [20]. The result is the actual year-to-year change in current stocks of carbon in products-in-use. In this paper, the Tier 2 method is referred to as the "national inventory method."

Using the national inventory method, the change in stocks of carbon is equal to the difference between annual additions to and losses from current stocks of carbon in products in use. Additions to stocks of carbon in products in-use are estimated from annual production and consumption statistics. From these annual additions are subtracted the annual losses from carbon stocks in-use.

A number of methods have been described for estimating annual losses from current stocks of carbon in products-in-use. IPCC's *Good Practice Guidance for Land Use, Land Use Change, and Forestry* suggests that losses from current stocks be estimated by using the following first order decay equation [20] although other relationships can also be used.

Equation 1: Fraction lost per year = Ln(2) / product half-life in years

Because *Equation 1* expresses losses as a fraction of the current pool, one must either measure or mathematically reconstruct the current pool of products-in-use. In IPCC's Tier 2 approach, this is done by starting at a point in the past (the year 1900 is often used) and determining the additions and losses to the product pool year-by-year up to the current time [20]. This requires historic production information and information on how products were used over time. The estimates derived by this method can sometimes be checked against periodic surveys of, for instance, housing inventory.

The Tier 2 national inventory method requires past production and product-use data that cannot be disaggregated down to the individual company level. In addition, because losses from the current pool of carbon are estimated as a fraction of the current pool, the results are heavily influenced by the factors that influence the size of the current pool, i.e. the amounts of past production and time-in-service of past production. The significant influence of past conditions makes national accounting methods unsuited to examining forward-looking opportunities for improvement.

3.2 *The 100-year method*

An alternative method is available that is better suited to corporate, sector or value chain accounting. Under this alternative, current year additions to stocks of carbon in products-in-use are netted against *future* losses from current year additions. The result, therefore, is the amount of carbon in the current year's production that is expected to remain in-use for a defined period of time.

In several other applications, IPCC has used 100 years to define similar long-term effects. National inventories submitted under the United Nations Framework Convention on Climate Change (UNFCCC) are prepared using global warming potentials that are derived by "integrating the total radiative forcing of an emissions pulse over a 100-year time horizon...."[1] It has been suggested that a similar approach, involving a 100-year time horizon, could be used to characterize removals via sequestration. The IPCC Special Report on Land Use, Land Use Change, and Forestry, for instance, suggests the following application of a 100-year time horizon in the "ton-year" approach.

> "If the ton-year approach is adopted, incremental credit can be awarded for each year that carbon stocks remain sequestered. The cumulative award of credit would equal the credit from a "permanent" emission reduction of the same magnitude if the stocks remained intact for 100 years. If the stocks were released at any time prior to the 100-year time horizon, only the appropriate amount of partial credit would have been awarded."[1]

Using an analogous approach, a 100-year time horizon can be used to estimate the amount of long-term carbon sequestration that can be expected from newly produced biomass-based products. In this paper, the approach is called "the 100-year method." The 100-year method was first suggested and applied by Dr. Sergio Galeano of Georgia-Pacific Corporation

[21]. It is also described in an example of life cycle impact assessment published by the International Standards Organization (ISO) [22].

The 100-year method is conceptually and mathematically simple so it is easy to perform and more likely to be applied consistently from one assessment to the next than the national inventory method. The 100-year method also yields results that reflect conditions and opportunities that are most likely to be influenced by current manufacturers – i.e. those conditions and improvement opportunities that are, or can be, applied to current production.

The primary disadvantage of the 100-year method is that it requires the acceptance of a 100-year time horizon for quantifying long-term sequestration. Other time horizons could, of course, be used but at present it appears that the 100-year horizon is the only one with precedent in the areas of carbon accounting and climate change. This is likely due, at least in part, to (a) the uncertainties associated with projections over longer time periods and (b) an expectation that 100 years will be long enough to develop and deploy permanent solutions for controlling atmospheric CO_2 levels.

4.0 Using the 100-year method

The 100-year method involves four steps.

1. Identify the types and amounts of biomass-based products (e.g. softwood lumber) that are made in the year of interest.
2. Express this annual production in terms of the amount of biomass carbon per year for each product.
3. Divide the final products into categories based on function and allocate the carbon to the functional categories. Some of the functions for softwood lumber, for instance, would be single-family homes, home repair, multifamily residences, shipping containers, and railroad ties.

4. Use decay curves or other time-in-use information to estimate the fraction of the carbon in each functional category, expected to remain in use for 100 years.
5. Multiply the amount of carbon in annual production in products in each functional category by the fraction remaining at 100 years. The result is the amount of sequestered carbon in the products in each functional category attributable to this year's production.

For steps 1 and 2, data on current production is obtained from production records or statistics and the carbon content is estimated by multiplying the production by its carbon content. A common default assumption for paper, paperboard and wood products is that they are 50% carbon by weight (dry) [20]. In general, this is more accurate for wood products than for paper products, which sometimes contain a considerable amount of inorganic material (i.e. filler and coating). Nonetheless, for purposes of estimating stocks of carbon in-use, an assumed carbon content of 50% is probably adequate because only a very small fraction of paper remains in use for 100 years.

Forest products have a variety of uses and a wide range of expected times-in-use. Tissue products are unlikely to remain in use for a year while a significant fraction of the sawn wood used in single family home construction will still be in use in 100 years. Even within a single product type, however, times-in-use can vary substantially. Sawn wood used in shipping containers, for instance, remains in use for a far shorter time than sawn wood used in home construction. It is important, therefore, to understand how forest products are used, not only because product lifetimes vary, but also because time-in-use information is typically associated with specific end use functions. The third step in the process, therefore, is to divide current production into the functional categories for which time-in-use estimates are available.

The time-in-use distributions needed in Step 4 are often represented by mathematical equations that describe decay curves. A key parameter in these equations is usually the product

half-life – i.e. the time over which one-half of the original material leaves the pool of products-in-use.

IPCC suggests the use of a simple first order relationship to convert the half-life value into a decay curve that allows one to calculate the fraction remaining as a function of time [20]. The first order decay time-in-use curve is represented by the following equation.

Equation 2: First Order Decay Curve

$$FR = \left(\frac{1}{1 + (0.69315 / HL)} \right)^{Y}$$

Where: FR = *Fraction of carbon remaining in use in year Y*

HL = *half-life (years)*

Y = *elapsed time (years)*

Other relationships have been used, however, to convert half-life information into decay curves for time-in-use. The European Forest Institute (EFI) has used the equation shown in *Equation 3* [23].[5]

Equation 3: EFI Decay Curve

$$FR = 1.2 - \left(\frac{1.2}{1 + (5 * e^{-(Y / HL)})} \right)$$

[5]The equation is slightly different than the version shown in reference [23] so that the result can be shown as a fraction instead of a percentage.

Where: *FR = Fraction of carbon remaining in use in year Y*

HL = half-life (years)

Y = elapsed time (years)

A third option for converting half-life values into decay curves has been used by Row and Phelps and is described by *Equations 4a, 4b, and 4c* [24].[6] The Row and Phelps approach divides the decay curve into three pieces. The Row and Phelps decay curves have been used by the US in preparing its national inventory for UNFCCC.

Equation 4: Row and Phelps Decay Curve

Equation 4a: *If:* $Y < HL/2$

$$FR = 1 - \left(0.4191 * \frac{Y}{HL}\right)$$

Equation 4b: *If:* $Y > HL/2$ *and* $Y < HL$

$$FR = 1 - \left(\frac{0.5}{1 + (2 * \ln(HL / Y))}\right)$$

Equation 4c: *If:* $Y > HL$

$$FR = \left(\frac{0.5}{1 + (2 * \ln(Y / HL))}\right)$$

[6] The original Row and Phelps 1996 publication [24] contained typographical errors in the equations. The equations shown here have been corrected.

Where: FR = *Fraction of carbon remaining in use in year* Y

HL = *half-life (years)*

Y = *elapsed time (years)*

The effects of selecting different decay curves are illustrated in *Figure 1*. The primary differences occur at times longer than the half-life of the product. This is important because the 100-year method uses only the estimated fraction remaining at 100 years.

Figure 2 shows the results of using the three different decay curves to predict the fraction of the carbon remaining in use at 100 years as a function of product half-life. For products with half-lives of 40 years or less, the Row and Phelps decay curve predicts the largest amount of carbon remaining in use. For products with half-lives between 40 and 100 years, the first order decay curve predicts the largest amount of carbon remaining in use. The EFI model predicts the smallest amount of carbon remaining in use until product half-lives are 80 years or greater, at which point its estimates are close to the Row and Phelps estimates.

Although this discussion has highlighted three decay curves, others are also available [5], [25]. It is not possible to identify one of these as being the most appropriate for all situations. Indeed, it is reasonable to assume that different decay curves will be appropriate under different circumstances. There are several factors, however, that may influence the decision on which curve to select.

First, of the decay curves identified in the literature, only the Row and Phelps decay curve reflects the "archive effect" – i.e. a certain fraction of product is predicted to be stored for 100 years in places such as archives and libraries even though the half-lives are short. As illustrated in *Figure 2*, the first order and EFI decay curves (and others in the literature), fail to incorporate this phenomenon. On the other hand, the first order decay curve is most comparable to the approaches currently described by IPCC in its good practice guidance for national

inventories [20]. The importance of these and other considerations will likely vary depending on specific circumstances.

Half-life estimates also vary. It is reasonable to expect some variability between countries due to different building practices, for instance. Some of the differences, however, are probably due to different approaches to estimating product half-life. A summary of much of the available information on half-lives and times-in-use for various forest products is contained in IPCC's *Good Practices Guidance for Land Use, Land Use Change, and Forestry* [20]. The half-life estimates published by Skog and Nicholson in 1998 for the U.S. are summarized in *Table 1* [26].

5.0 Applying the 100-year method to the U.S.

For illustrative purposes, the 100-year method can be applied to the U.S.. There are several souces of U.S. forest products production and consumption data. For this example, data published by the U.S. Forest Service have been used [27], [28].

The 1998 wood products consumption data shown in *Table 2* have been used with the Row and Phelps decay model, the half-life data shown in *Table 1*, and conversion factors explained in *Table 2* to derive an estimate of the carbon in wood products that will remain sequestered in-use for 100 years. The analysis indicates that almost 10 million metric tonnes of carbon, attributable to products put in use in 1998, are expected to remain sequestered in wood products for at least 100 years.

Due to the shorter times in use, the amounts of carbon sequestered in paper and paperboard products are smaller, but still significant. The calculations in *Table 3* indicate that over two million tonnes of carbon are expected to remain sequestered in 1998 paper products for 100 years.

In total, therfore, almost 12 million metric tonnes of carbon, attributable forest products put in use in 1998, were expected to remain sequestered in use for at least 100 years. This

sequestration represents approximately one-half of the U.S. forest product industry's direct emissions, estimated by the U.S. Department of Energy to be approximately 22 million metric tonnes of carbon in 1994 [17]. The carbon sequestered in forest products during use clearly represents an important part of the forest product industry's carbon balance.

The estimate of net carbon sequestration developed using the 100-year method (12 million metric tonnes of carbon) is close to the estimate of 14 million tonnes of carbon developed for 1998 by the U.S. government using the national inventory method [19]. Although the two estimates are in reasonable agreement, it must be noted that they are estimates of two different quantities. The national inventory method estimates the *actual change in current stocks of carbon in products-in-use* whereas the 100-year method estimates *the long-term additions to stocks of carbon in products-in-use attributable to newly manufactured products.*[7]

6.0 Summary

Carbon sequestered in forest products represents an important part of the carbon profile of the forest products industry. Attempts are being made to account for this sequestration so that it can be included in corporate, sector, and value chain carbon balances.

National accounting methods are not suited for corporate accounting because they require data that are usually unavailable at the sub-national level. In addition, national inventory methods yield results that are heavily influenced by past production levels and historical product use patterns, making it difficult to use the results to characterize current performance. Finally, because national inventory methods are focused on current and past conditions, they are not particularly useful for examining opportunities for future improvement.

An alternative method described in this paper, the 100-year method, is available for corporate, sector, and value chain carbon balances where it is important to characterize carbon

[7] A less important difference that is specific to the estimates shown here is that the U.S. inventory estimate is based on domestic production while the 100-year method estimate is based on domestic consumption. The 100- year method can be used, however, to develop production- or consumption-based estimates.

sequestration in products-in-use. The method uses information on the expected time-in-use of products to estimate the amount of carbon therein that will still be sequestered in products-in-use in 100 years. The method uses readily available data, is simple and transparent, and can be used to characterize current performance and examine improvement opportunities.

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Figure 1. Decay curves for a 50-year half-life product

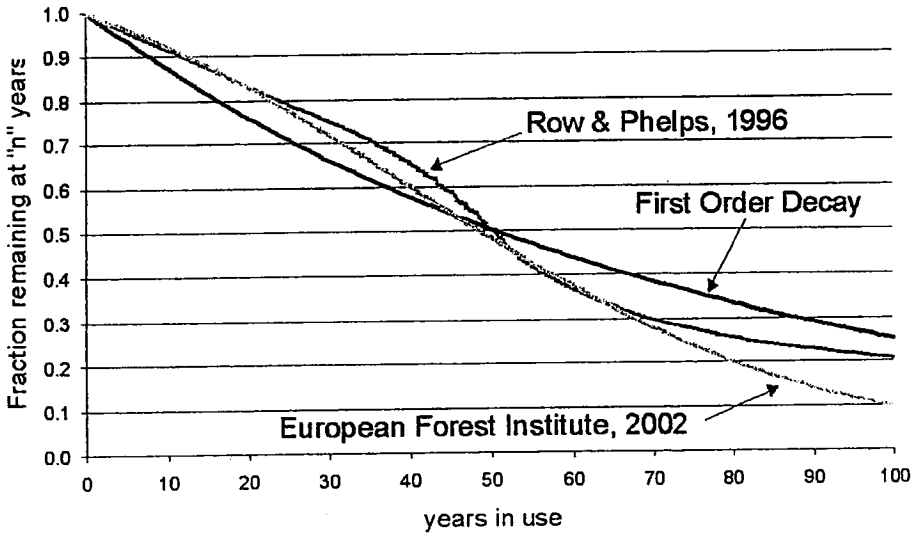

Figure 2. Fraction remaining at 100-years as a function of product half-life

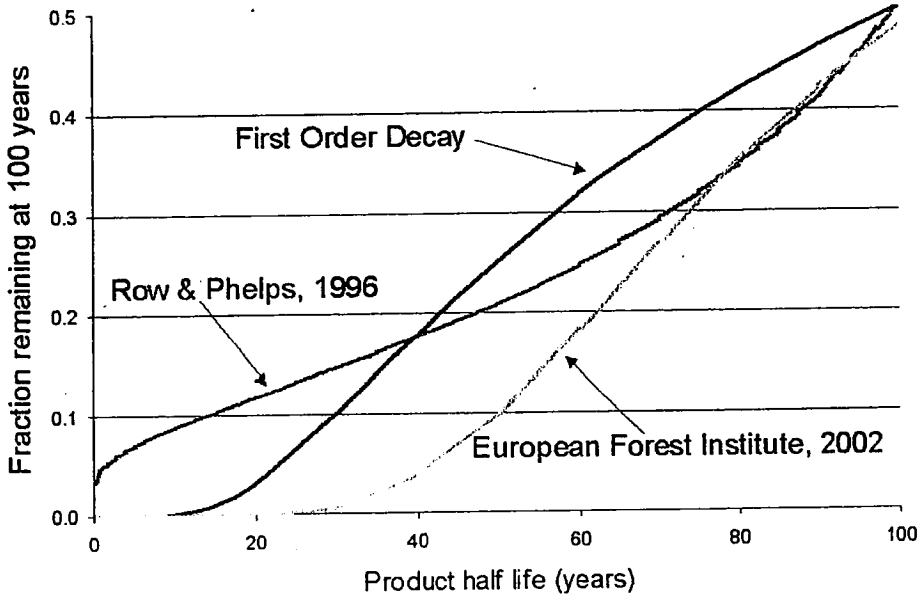

Table 1. Duration of carbon sequestration in end uses of wood and paper (Skog and Nicholson 1998) [26]

	Half-life of carbon (years)
Single-family homes (pre-1980)	80
Single-family homes (post-1980)	100
Multifamily homes	70
Mobile homes	20
Nonresidential construction	67
Pallets	6
Manufacturing	12
Furniture	30
Railroad ties	30
Paper (free sheet)	6
Paper (all others)	1

Table 2. Carbon sequestration in wood products in 1998

		single family residential	multifamily residential	mobile homes	residential upkeep	Non-residential construction	railroad ties	manufacturing - furniture	manufacturing - other	pallets and shipping	Other	
Consumption data for wood products from Reference 27												
Lumber	million bd. ft.	18352	1712	2100	14108	4617	700	5222	3155	7235	6874	
Structural panels	million sq. ft.	16282	1425	1688	7269	2879		1872	1862	622	890	
Nonstructural panels	million sq. ft.	3166	454	909	2710	1285		8634	2291	127	3385	
Conversion of wood product consumption data into carbon and sequestration estimates												
Total carbon in wood products	million metric tonnes carbon	15.04	1.40	1.77	9.93	3.48	0.35	4.83	2.61	3.86	4.37	
Fraction Remaining after 100 years	Fraction	0.346	0.292	0.119	0.119	0.278	0.147	0.147	0.095	0.075	0.072	TOTAL
Metric Tonnes Carbon Remaining after 100 years	million metric tonnes carbon	5.20	0.41	0.21	1.18	0.97	0.05	0.71	0.25	0.29	0.31	9.6

Notes:

Conversion from production statistics to tonnes of production based on conversion factors in Reference 28 and production statistics in Reference 27 (which were used to develop production-weighted conversion factors)

All products assumed to contain 50% carbon

Row and Phelps decay curves used to estimate fraction of carbon remaining in use after 100 years [24].

Table 3. Carbon sequestration in paper and paperboard products in 1998

1998 Paper and Paperboard Consumption [27]	101.1 million short tons
Carbon contained in 1998 consumption	46 million metric tonnes
Assumed half-life	1 year
Fraction remaining after 100 years	0.049
Tonnes carbon remaining in use after 100 years	2.25 million metric tonnes
Notes: All products assumed to contain 50% carbon Row and Phelps decay curves used to estimate fraction of carbon remaining in use after 100 years [24].	

Draft Proposal to ICFPA

submitted by
Reid Miner
NCASI, Research Triangle Park, North Carolina, USA
phone +(919) 941-6407
email rminer@ncasi.org

A project to
1. Develop a report- and spreadsheet-based calculation tool for estimating carbon sequestration in forest products-in-use
and
2. Work with WRI and WBCSD to gain recognition of the tool under the GHG Protocol

Background:

In 2003, the International Council of Forest and Paper Associations (ICFPA) retained NCASI to review options for estimating carbon sequestration in forest products. The objective was to identify a method suitable for corporate, sector and value chain assessments of carbon sequestration. The results of the review were summarized in a report that has been posted on NCASI's public web site, www.ncasi.org.

ICFPA used the review to identify the most appropriate method for corporate, sector, and value chain assessments of carbon sequestration in products-in-use. The method selected by ICFPA is known as the 100-year method because it estimates the amount of carbon that is expected to be sequestered in forest products that remain in use for at least 100 years. The method was developed by Dr. Sergio Galeano of Georgia-Pacific Corporation and has been used in Georgia-Pacific Corporation's greenhouse gas inventory [9] and in an ISO report that illustrates its use in the context of LCA Impact Assessment.[10]

ICFPA requested NCASI to pursue peer-reviewed publication of a paper describing, and presenting the rationale for, the 100-year method. In response, in April 2004, NCASI submitted a manuscript to the international journal *Biomass and Bioenergy* published by Elsevier.

ICFPA more recently requested that NCASI submit a proposal to ICFPA for a project wherein (a) a report- and spreadsheet-based calculation tool be developed based on the 100-year method,

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[9] Georgia-Pacific Corporation. Protocol for the inventory of greenhouse gases in Georgia-Pacific Corporation. Georgia-Pacific Corporation, Atlanta 2002. Available on the Internet at http://www.gp.com/enviro/strategy/protocol.pdf.

[10] International Standards Organization (ISO). Environmental management – life cycle impact assessment – examples of application of ISO 14042. Technical Report ISO/TR 14047:2003(E). International Standards Organization, Switzerland, 2003.

and (b) NCASI work with WRI and WBCSD to gain acceptance of the tool for use under the GHG Protocol. The following proposal has been prepared in response to that request.

Developing a report- and spreadsheet-based calculation tool:

NCASI will use the manuscript submitted to *Biomass and Bioenergy* as the basis for preparing the report-based portion of the tool. The manuscript is appended to this proposal. The report will describe the rationale for the 100-year method, how it works, and how to apply it.

NCASI will use the GPCarb® Excel® spreadsheet as a starting point for developing the spreadsheet-based part of the tool. GPCarb® was developed by Georgia-Pacific Corporation for performing calculations using the 100-year method. It will be modified and expanded to address a global audience and will be fitted with a Visual Basic interface to improve ease of use. Georgia-Pacific Corporation has agreed to this use of GPCarb® and the company's contributions to the ultimate spreadsheet-based tool will be recognized.

Gaining acceptance of the use of the tools under the WRI/WBCSD GHG Protocol:

Based on NCASI's past experience, it is recommended that the process of gaining acceptance of the tool under the WRI/WBCSD GHG Protocol begin by contacting Ms. Janet Ranganathan of WRI and Mr. James Griffiths of WBCSD. These organizations will probably undertake internal reviews of the tools and provide ICFPA and NCASI with comments. NCASI will work with ICFPA, WRI and WBCSD to address these comments.

The next step will be the WRI/WBCSD stakeholder peer review. Again, it will be necessary to address comments that arise in this review process. Based on past experience, this process is expected to take several months.

Following peer review and agreement by WRI and WBCSD that the comments have been adequately addressed, the tools will be posted on the WRI/WBCSD GHG Protocol website (assuming this is acceptable to WRI and WBCSD).

Approximate schedule:

We envision an 8-month process, much of which is devoted to the review activities in WRI, WBCSD and the stakeholder peer review.

Month 1: Convert manuscript into a draft report-based tool for the 100-year method and obtain ICFPA approval to take the draft report to WRI and WBCSD.

Months 2, 3, and 4: Submit the report to WRI and WBCSD, allow them to review the report and work with ICFPA to respond to their comments.

Months 5, 6, and 7: WRI and WBCSD perform their stakeholder peer review process and ICFPA and NCASI respond to comments generated in that process. Also in this time period, the draft spreadsheet-based tool is developed.

Month 8: Deal with any remaining issues related to the report and perform final testing on the spreadsheet-based tool. Work with WRI and WBCSD to post the report- and spreadsheet-based tool on the GHG Protocol website.

Project staff:

The project leader will be Mr. Reid Miner, Vice President-Sustainable Manufacturing of NCASI in Research Triangle Park, North Carolina, United States. Mr. Miner will be responsible for writing the report-based tool, managing the interaction with ICFPA, WRI and WBCSD, and overseeing the project.

Computer programming work will be done at NCASI's Statistics and Model Development Group in Lowell, Massachusetts.

Budget:

NCASI is proposing to complete this work for $US 10,000 assuming that all travel will be within the U.S. (Note: Ms. Ranganathan and other key WRI staff are located in Washington, D.C.).

However, if a trip to Europe is required to consult with ICFPA and/or WBCSD, to total cost will be $US 12,000.

Georgia-Pacific

Dr. Sergio F. Galeano
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P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 652-4654
sfgalean@gapac.com

May 23, 2004

Docket Unit
California Energy Commission
Docket No. 01-GGE-1
1516 Ninth Street, MS 4
Sacramento, California 95814-5512
DOCKET@energy.state.ca.us

RE: Comments on Proposal
Project Protocol

Dear Sir/ Madame:

Georgia-Pacific Corporation, GP, is one of the leading global forest product manufacturers with different forest products and chemical manufacturing facilities in California. The corporation, for years, has been involved in all variables of the climate change equation from development of technology and quantification methodologies to management of systems and emerging policy issues. The proposal we are commenting on appears to create an emerging policy issue about which we wish to offer our comments and recommendations.

Because of GP involvement in the early development of the concept and quantification of product carbon sequestration as a justifiable reduction element in the GHG inventory of entities and projects, we are very appreciative of the Registry's willingness and initiative to recognize such as a valid element in an entity's GHG inventory and registry. This step of the registry, although not explicitly mentioned in any of the three enabling pieces of California law- SB 1771, 527 and 812, it is neither prohibited.

In this sense, California law differs from Georgia law, substitute of SB 356, which establishes a registry for carbon sequestration but considers the registrant as any entity involved in any of three different listed human-induced activities creating removals by carbon sinks including product sinks since it adds "products" to ecosystem and crops in the Act's definition of sinks.

In spite of our support for the recognition of the concept and practice of product carbon sequestration we have concerns and objections to specific concepts and requirements of this draft proposal. Suffice to say that this announcement as it trickles down to different stakeholders in the product value chain, is creating concerns and stresses not unique to

GP's. We would like to note that early on April 28 the author, partially aware of the direction the drafting of Step 7 was taking, alerted the registry via e-mail to Ms. Jill Gravender and Ms. Michelle Passero of these concerns, suggesting another alternative based on the producer's registration with a developed methodology on this approach far superior in accuracy to the one proposed. No acknowledgement or response has been yet received on it. We are attaching the ZIP file included in the above mentioned communication since it is still pertinent to these proceedings.

In the following and in spite of the short time for commenting, we are submitting important points for your consideration and action. We reserve the right given to us in the announcement of May 13, to resubmit or add comments by the June 3 deadline.

Specific comments and suggestions.

1 This complex stage in the registry's development and the issuance of the proposal have been done in an accelerated fashion without proper involvement of different stakeholders who will be directly affected by this action or who have a reasonable interest on the issue.

2- The comment period for this proposal is extremely short without proper preparation for commenting (May 24) for a workshop (May 27) and final comments deadline by June 3. It is open for speculation the impact of biases that could be generated on comments received because of these two different commenting deadlines. As now scheduled, the practicality of the workshop to reflect comments received is certainly very limited and its usefulness questionable. In fact, it may help to perpetuate and reinforce misconceptions and errors without proper analysis of differences in opinion.

3- The proposal, as it pertains to the recording of projects into the registry as well as the calculation step No. 7, excludes without justification the manufacturers of the biomass products on which the calculations are made. Only the "forest entity" can register any quantity of the product carbon pool based on very inaccurate estimations. The rights of the manufacturer, who separately are encouraged to register its direct emissions in the registry, are ignored when the reporting and crediting are defined, this in spite the fact that there has been a purchasing transaction and discernable chain of custody. There is no reference about the "forest entity" accruing for the GHG emissions of the manufacturers in the production of those products. Thus this proposal structure penalizes the manufacturer for its GHG emissions but provides no credit for their contribution to the carbon product pool.

4- Nothing in the enabling statutes invoked by the registry seems to support either the granting to the "forest entity" the right of registration of credits or the prohibiting the manufacturer of these products from registering the credits. In fact paragraph 2) in the digest of SB 812 clearly states that the bill would "require the registry to adopt procedures and protocols for the reporting and certification of GHG emissions reductions resulting from a project or an action of the participant." It seems obvious that the only actions leading to the creation of products resulting in carbon sequestrations are those of the manufacturers.

5- Further, section 42801.1 (a) provides a definition for " Annual emissions results" Indicating that in addition to annual emissions results, the participant may report data annually on emissions reductions from a project or other action, including the sequestration of stocks of carbon in forest. Such definition, under its "other action" language does not exclude the inclusion of sequestration in the carbon pool. In fact, it reflects very accurately a forest product manufacturing facility with the reporting of GHG emissions (direct, indirect, etc) and the product carbon sequestration from its annual production.

6- Consequently, it becomes evident that the registry proposal fails to heed the mandate in section 42823(c) by which the registry "shall adopt procedures and protocols for the reporting and certification of GHG emission reduction resulting from a project or an action of the participant". The registry has excluded the manufacturing as a valid participant in contradiction and disregard to the mandate of the statute.

7- Likewise, the manufacturers of forest products are deprived of receiving one of the purposes of SB 1771, Article 2 (e); to recognize, publicize and promote registrants making voluntary reductions.

8- These statements about interpretations on the enabling statutes are the result of a reality not to be forgotten on these proceedings. It is that the product element in the sequestration was not envisioned during the legislative proceedings as it was clearly and explicitly discussed in the Georgia law. The proposal is an afterthought. Such a situation raises the question about the appropriateness of asking the legislature to clarify the controversy about the registration of this element of sequestration.

9- There are no scientific or economical reasons to deprive the manufacturers of the right to record in the registry. The harvested boles or longwood felled in the forest floor would become one more element of the "lying in the soil" component of the forest sequestration calculation were it not for manufacturing. It is the manufacturer, its investments, labor, innovations and the registry of its GHG emissions as a result of the manufacturing what makes possible the valid justification for recording its production in the registry. We clarify here that we do not see any damage to the forest entities by having the manufacturers register the carbon sequestration estimates. The market will take care of any real or perceived value added in the merchantable wood and reward the forest entities with adequate compensation.

10- The implications of this proposal that deprives the manufacturers of the due credit for its products are ecological, economical and political. An important one is the consideration of volumetric or material sustainability, one of the different elements in forest sustainability. Traditionally, the balance of harvest v. growth has been considered the criterion for this material sustainability. The proposal changes this traditional balance, by providing an additional quantity of harvesting to equate the new balance equation. The long-standing implications of this new consideration are difficult to quantify or define entirely in the brief time allocated for commenting but it appears significant. It is not difficult to anticipate unjustified allegations and misperceptions to and about the forestry sector inn respect to a

de facto additional logging. These misperceptions would not contribute to the best utilization of resources and in the efforts for climate change amelioration.

11- We consider that the registration of both forest and product carbon sequestration should be extended to products of agricultural origin that may have limited but significant life cycle in use.

12- Regardless if the action by the state of California could be in theory limited to the state, and many commenters may or may not be considered "forest entities", the fact is that the California experiment demonstrates that regulations from the state are frequently reflected beyond its boundaries affecting many other entities outside the state or even those without facilities in California. This is important in the consideration of who are the stakeholders on this issue and in the request for extension on the commenting period. California is too big and important a state to limit the stakeholders to a small circle.

13- A very preliminary review of the calculation step reveals quite a number of levels of estimation in order to ascertain the final product carbon pool quantity for crediting. Rather than starting at the manufacturer level, where production figures are very accurate and official, since they are part of the accounting and tax calculation and reporting, the proposal moves upstream without a tracking chain of custody. There is a complete lack of chain of custody from harvesting to production output. The levels of inaccuracy are compounded along the way from the boles that are brought to the manufacturing site and there converted into useful products. As proposed, questionable assumptions in the material or volumetric conversion of wood fiber into products have been made. Proper tracking into the different categories of forest products is also ignored. This process will inevitably be less accurate in quantifying the product carbon pool or would require excessive costs that will discourage prospective registrants.

14- Validators or certifiers of these credits in the manner proposed, and in view of the chain of custody deficiencies indicated in the above, will be hard pressed to provide a proper verification when so many different estimation steps are staggered in time. They could be open to all sorts of objections and added liabilities making the system unworkable by absenteeism.

15- The registry appears to have ignored other methods, more standing in longevity and peer scrutiny that the proposed. Such method, with international recognition by peers is available in an ISO publication, ISO 14047 and in other references on the web, and through the AF&PA and NCASI organizations of the industry. It is based on the accurate production output at the facility or entity and includes wide variety of forest products, solid wood and paper. Such information was advanced in a ZIP file to some members of the registry and review panel as mentioned above.

16- As indicated above, during the drafting process of the registry, some of its officials and members of the review committee, were alerted to such an alternative that more accurately and fairly allows the registration of the carbon

credits by the manufacturer. The accelerated manner and limited participation of stakeholders in this process may have made the commenting not timely enough for consideration in the initial draft proposal but certainly we respectfully submit it must be considered seriously in the course of these proceedings.

17- While we support as valid the concept of registering product carbon sequestration in products in use, and for a wide variety of product categories including paper and wood products, we firmly object to the manner in which reporting and crediting have been arbitrarily assigned to the "forest entity".

18- We respectfully request the extension of the commenting period for 60 more days and the re-proposing of this flawed proposal, at least in its product carbon sequestration element and pertinent links with the forest sequestration reporting.

We appreciate the opportunity to offer these comments and requests and stand ready to answer any questions or additional information to help in the establishing of a fair, practical and effective Protocol.

Respectfully,

Sergio F. Galeano, Ph.D.
Senior Manager, Product Policy and Assurance

Enclosure- Zip file as mentioned in item 15 and above

Cooney, Phil

From: Berg, David [David.Berg@hq.doe.gov]
Sent: Monday, August 02, 2004 5:28 PM
To: Cooney, Phil; Dobriansky, Larisa
Subject: up-to-date agenda for Thursday attached

Please find attached the up-to-date draft agenda for Thursday. Call me if you have any questions. --

David

<<New Homes RT v072704.doc>>

July 27, 2004

Climate VISION Roundtable for Energy Efficient Homes

Objective: Discuss how, by working together, government and the private sector can transform the housing market so that builders construct and buyers demand cost-effective energy efficient designs and features in both new and existing homes.

AGENDA

August 5, 2004
National Association of Home Builders
1201 15th Street, N.W., Washington, DC
Hosted by NAHB and CEEP, Inc.

10:00 **Opening (Context and Goals) & Introductions** — Larisa Dobriansky
Co-chairs: Kyle McSlarrow, Deputy Secretary, DOE
Joyce Mason, Vice President, Marketing, Pardee Homes
Peter Garforth, Advisor, Owens-Corning

10:30 **Framing Comments on the Key Market Factors and Challenges**
- Overview of key challenges — David Berg, DOE, policy office
- Beyond RD&D: DOE as a partner — Ed Pollock, DOE, buildings program

Roundtable Discussion — Andy Paterson, moderator

12:00 **Working lunch**
Short Presentation: Ad Council Campaign on Energy Efficiency — Kathy Crosby

1:00 **Three Approaches to Transforming Housing Markets: Potential State Pilots**
(Different climates, energy use patterns, policies… drive different approaches)
- Potential Pilot in Texas — Malcolm Verdict, Texas A&M
- Potential Pilot in New York State — Rick Gerardi, NYSERDA
- Potential Pilot in California — Art Rosenfeld, California Energy Commission

Discussion from various perspectives: — Andrew Paterson, moderator
Builders, Builders' suppliers, Builders' lenders, Energy raters,
Federal government agencies, State government, Local government,
Homebuyers, Mortgage industry, Realtors, Insurers, Utilities

4:00 **Distilling the Key Points:** — Private-Sector Co-chairs and DOE
Defining the objective
(1) Supply / Build Side and (2) Demand / Buy Side

4:45 **Wrap-up & Next Steps** — Larisa Dobriansky

quest for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessmen
From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Friday, August 06, 2004 2:40 PM
To: ccsp@usgcrp.gov
Cc: michael.hales@noaa.gov; wg_irc@usgcrp.gov; Linda Moodie; wgcc@usgcrp.gov; ipo@usgcrp.gov; ccsp_info@usgcrp.gov
Subject: [ccsp] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

TO: CCSP Principals
CC: Co-Chairs of Interagency Working Groups
RE: Request for inputs for US position on the recommendations of the IPCC Third Assessment Report

At COP-IX, the UNFCCC Secretariat organized a side event on "Research in Response to the Third Assessment Report of the IPCC." The agenda for the event is attached to this message. Three key considerations emerged from the event:

1) The need to assess the adequacy of research activities and their international coordination to meet the needs of the Convention (as distinct from the IPCC);
2) The importance of social as well as natural sciences and the interaction between the two in responding to the research needs arising from the assessment reports of the IPCC;
3) The enhancement of the capacity and participation of developing countries to contribute to the global climate change research efforts, such as those coordinated by the WCRP, IGBP, IHDP, and DIVERSITAS.

The US Government, as a party to the UNFCCC, is preparing a statement of its views on these conclusions. Linda Moodie (NOAA) is coordinating this process and has requested that the CCSP provide observations about these points. Please send your agency's or working group's comments to Linda Moodie <Linda.Moodie@noaa.gov> by September 8. Please copy David Allen <dallen@usgcrp.gov>. My understanding is that Linda will integrate the inputs she receives into a draft for the Department of State, which will then finalize the statement for submission to the UNFCCC.

Thank you for your cooperation.

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessm
From: Cooney, Phil
Sent: Friday, August 06, 2004 2:50 PM
To: Peel, Kenneth L.
Subject: FW: [ccsp] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

-----Original Message-----
From: ccsp-bounces@usgcrp.gov [mailto:ccsp-bounces@usgcrp.gov] On Behalf Of Moss, Richard H
Sent: Friday, August 06, 2004 2:40 PM
To: ccsp@usgcrp.gov
Cc: michael.hales@noaa.gov; wg_irc@usgcrp.gov; Linda Moodie; wgcc@usgcrp.gov; ipo@usgcrp.gov; ccsp_info@usgcrp.gov
Subject: [ccsp] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

TO: CCSP Principals
CC: Co-Chairs of Interagency Working Groups
RE: Request for inputs for US position on the recommendations of the IPCC Third Assessment Report

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Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

) Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Asses:
From: Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Friday, August 06, 2004 5:23 PM
To: Hannegan, Bryan J.
Subject: RE: [ccsp_info] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

Hi Bryan-

Not sure what's going on with the attachment. Its not all that informative, but here it is--if it makes it through this time.

You asked a few days ago about the launch strategy for OCP. My understanding is that Dr. Mahoney provided information about this, but if not, please let me know and I will do so on Monday.

Have a good weekend.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

-----Original Message-----
From: Hannegan, Bryan J. [mailto:Bryan_J._Hannegan@ceq.eop.gov]
Sent: Friday, August 06, 2004 5:20 PM
To: Moss, Richard H
Subject: RE: [ccsp_info] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

Richard -- no attachment was received. Also, Ken Peel (CEQ-International) will respond for us with any comments. Thanks, Bryan

-----Original Message-----
From: ccsp_info-bounces@usgcrp.gov [mailto:ccsp_info-bounces@usgcrp.gov] On Behalf Of Moss, Richard H
Sent: Friday, August 06, 2004 2:40 PM
To: ccsp@usgcrp.gov
Cc: michael.hales@noaa.gov; wg_irc@usgcrp.gov; Linda Moodie; wgcc@usgcrp.gov; ccsp_info@usgcrp.gov
Subject: [ccsp_info] Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Assessment Report

TO: CCSP Principals
CC: Co-Chairs of Interagency Working Groups
RE: Request for inputs for US position on the recommendations of the IPCC Third Assessment Report

At COP-IX, the UNFCCC Secretariat organized a side event on "Research in Response to the Third Assessment Report of the IPCC." The agenda for the event is attached to this message. Three key considerations emerged from the event:

) Request for inputs for US position in the UNFCCC on the recommendations of the IPCC Third Asses

1) The need to assess the adequacy of research activities and their international coordination to meet the needs of the Convention (as distinct from the IPCC);
2) The importance of social as well as natural sciences and the interaction between the two in responding to the research needs arising from the assessment reports of the IPCC;
3) The enhancement of the capacity and participation of developing countries to contribute to the global climate change research efforts, such as those coordinated by the WCRP, IGBP, IHDP, and DIVERSITAS.

The US Government, as a party to the UNFCCC, is preparing a statement of its views on these conclusions. Linda Moodie (NOAA) is coordinating this process and has requested that the CCSP provide observations about these points. Please send your agency's or working group's comments to Linda Moodie <Linda.Moodie@noaa.gov> by September 8. Please copy David Allen <dallen@usgcrp.gov>. My understanding is that Linda will integrate the inputs she receives into a draft for the Department of State, which will then finalize the statement for submission to the UNFCCC.

Thank you for your cooperation.

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office
(Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

Hannegan, Bryan J.

From: Friedrichs, Mark [Mark.FRIEDRICHS@hq.doe.gov]

Sent: Tuesday, August 17, 2004 2:58 PM

To: Gayer, Ted; Adele Morris (Adele.Morris@do.treas.gov); Lee, Amanda I.; Arthur Rypinski (Arthur.Rypinski@ost.dot.gov); Bill Hohenstein (whohenst@oce.usda.gov); Bill Irving (irving.bill@epa.gov); Hannegan, Bryan J.; Bryce Stokes (bstokes@fs.fed.us); Dobridge, Christine L.; Cristo Artusio (ArtusioCF@state.gov); Toy, Edmond; Joel Brown (joelbrow@nmsu.edu); Josh Graff Zivin (jgraffzi@cea.eop.gov); Katie Bickel (kbickel@oce.usda.gov); Ken Andrasko (Andrasko.ken@epa.gov); Lisa Hanle (Hanle.Lisa@epamail.epa.gov); Marilyn Buford (mbuford@fs.fed.us); McDonald, Christine A.; Pablo Valdez (ValdezPM2@state.gov); Reid Harvey (Harvey.Reid@epamail.epa.gov); Richard Birdsey (rbirdsey@fs.fed.us); Richards, Richard (EIA); Anderson, Margot; Anderson, Margot (EIA); Bowers, Mike; Calopedis, Stephen (EIA); Cobb, Al; Conover, David; Karpoff, Peter; McArdle, Paul (EIA); Mondshine, Michael (EIA); Prince, Raymond

Subject: Draft revised 1605(b) guidelines beginning formal interagency cle arance process

Follow Up Flag: Follow up

Flag Status: Flagged

All: It has been more than two months since you last heard from us on this subject. After an internal review and clearance process, the draft guidelines are expected to be transmitted to OMB for formal interagency review later today. We are hopeful that this interagency process can be completed over the coming weeks, so that the revised guidelines can be published during September for 60 days of public comment.

[redacted]

<<Changes since May 26.doc>>

[redacted]

Electronic files of all of the draft guidelines are attached: General Guidelines, with Preamble [1605(b)OMB.doc]; and Technical Guidelines [Chapter 1 Inventory guidelines, Parts A-I; Chapter 2 Reduction guidelines and Glossary]. While we expect that all agency comments on these drafts will go through OMB, I would appreciate a heads-up of any significant concerns.

Thanks for your continuing help.

<<1605(b)OMB.doc>>
<<TG Chap 1 Part A OMB.doc>> <<TG Chap 1 Part B OMB.doc>> <<TG Chap 1 Part C OMB.doc>> <<TG Chap 1 Part D OMB.doc>> <<TG Chap 1 Part E OMB.doc>> <<TG Chap 1 Part F OMB.doc>> <<TG Chap 1 Part G OMB.doc>> <<TG Chap 1 Part H OMB.doc>> <<TG Chap 1 Part I OMB.doc>>

<<TG_Chap_2_OMB.doc>>
<<Glossary OMB.doc>>

004267

CEQ 006577

CCSP REMINDER--RESPONSE REQUESTED BY AUGUST 26 Draft Prospectuses and an Update for CCSP Review

From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Monday, August 23, 2004 11:59 AM
To: ccsp@usgcrp.gov
Cc: wgcc@usgcrp.gov; ipo@usgcrp.gov; jhaynes@nasa.gov; ccsp_info@usgcrp.gov; Terry.McPherson@ssc.nasa.gov
Subject: [ccsp] REMINDER--RESPONSE REQUESTED BY AUGUST 26: Draft Prospectuses and an "Update" for CCSP Review

Dear Colleagues,

This is a gentle reminder to please provide comments on the attached documents by Thursday August 26 to Sandy MacCracken (smaccrac@usgcrp.gov). This message was originally sent out on August 5.

THANK YOU.

Richard

----------original message----------
TO: CCSP Principals
CC: Interagency Working Group Co-Chairs

Attached to this email are three documents for your review:
1. A draft prospectus for Synthesis and Assessment Product 2.1 (Emissions scenarios)
2. A draft prospectus for Product 4.7 (transportation sensitivities, potential impacts, and response options); and 3. An "update" covering the approach to preparation of Synthesis and Assessment Product 2.3 (aerosol properties and their impacts on climate).

Comments are requested on these documents, which will then be revised.
Please note that this is an internal government review--do not circulate the drafts to those outside government.

After revision, the prospectuses will be made available for public comment.

The "update" for the aerosol product is the first of its kind and is intended to provide information to the research community, stakeholders, and the interested public on the general approach to preparing the product. It should not be confused with a prospectus, since it is less specific; the prospectus for this product will be prepared and circulated for comment in the future. The update describes scientific reviews that are being prepared as a result of the CCSP process. The update also describes the relationship of the CCSP activities to assessments in preparation through the IPCC process. As many of you know, the relationship of CCSP products and the IPCC assessment has surfaced as an important issue within the research community. The update will clarify the relationship and thus defuse potential misperceptions that the CCSP products duplicate IPCC activities.

Please submit comments on the two prospectuses and the update by August 26 to Sandy MacCracken (smaccrac@usgcrp.gov). We will be preparing a separate collation of comments for each document, so follow these steps to ensure that your comments are collated correctly:

1. Submit comments on each document in a separate email message.

2. Include the prospectus number and a short qualifier in the email message (e.g., 2.1 emissions scenarios).

3. List general comments first, followed by specific comments; use page and line number of each specific comment.

4. Include your contact information (email and phone) in case we need to reach you

CCSP REMINDER--RESPONSE REQUESTED BY AUGUST 26 Draft Prospectuses and an Update for CCSP Review for clarification.

Thank you.

Richard Moss

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

ccsp_info REMINDER--RESPONSE REQUESTED BY AUGUST 26 Draft Prospectuses and an Update for CCSP Re\

From: Hannegan, Bryan J.
Sent: Friday, August 27, 2004 4:43 PM
To: Moss, Richard H
Subject: RE: [ccsp_info] REMINDER--RESPONSE REQUESTED BY AUGUST 26: Draft Prospectuses and an "Update" for CCSP Review

Richard, apologies, was on travel -- will review this weekend and provide comments. Thanks, Bryan

-----Original Message-----
From: ccsp_info-bounces@usgcrp.gov [mailto:ccsp_info-bounces@usgcrp.gov] On Behalf Of Moss, Richard H
Sent: Monday, August 23, 2004 11:59 AM
To: ccsp@usgcrp.gov
Cc: wgcc@usgcrp.gov; jhaynes@nasa.gov; ccsp_info@usgcrp.gov; Terry.McPherson@ssc.nasa.gov
Subject: [ccsp_info] REMINDER--RESPONSE REQUESTED BY AUGUST 26: Draft Prospectuses and an "Update" for CCSP Review

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THANK YOU.

Richard

----------original message----------
TO: CCSP Principals
CC: Interagency Working Group Co-Chairs

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ccsp_info REMINDER--RESPONSE REQUESTED BY AUGUST 26 Draft Prospectuses and an Update for CCSP Re
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3. List general comments first, followed by specific comments; use page and line number of each specific comment.

4. Include your contact information (email and phone) in case we need to reach you for clarification.

Thank you.

Richard Moss

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

Cooney, Phil

From: Greene, William
Sent: Wednesday, September 01, 2004 9:14 AM
To: Cooney, Phil
Subject: climate change memo staffing...

...is cleared.

001596

Hannegan, Bryan J.

From: Lee, Amanda I.
Sent: Wednesday, September 01, 2004 11:08 AM
To: david.conover@hq.doe.gov
Cc: Hannegan, Bryan J.
Subject: 1605b

Hi David,

Here are some preliminary thoughts to the informal draft of 1605(b). Please call me (395-5129) if you have any questions or clarifications. Thanks,

Amanda

_info Follow-up to CCSP meeting on NRC-CCSP interactions -- Response requested by Thursday 9 Sep
From: ccsp_info-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Thursday, September 02, 2004 5:33 PM
To: ccsp@usgcrp.gov
Cc: staff@usgcrp.gov; Schwab, Margo; ccsp_info@usgcrp.gov
Subject: [ccsp_info] Follow-up to CCSP meeting on NRC-CCSP interactions -- Response requested by Thursday 9 September

Follow Up Flag: Review
Due By: Thursday, September 09, 2004 5:00 PM
Flag Status: Flagged

On behalf of Ghassem Asrar, thanks to all for a productive meeting.

Attached are some notes from the meeting, cast in the form of a description of key advisory functions that we might ask the NRC to fill.
The draft makes no assumptions about the structures that the NRC will need to maintain or establish to provide this support--that remains a matter for discussion with the Academy.

This list is now being circulated for comment by CCSP Principals. Please send comments to smaccrac@usgcrp.gov, with copies to rmoss@usgcrp.gov; rpiltz@usgcrp.gov, and seden@usgcrp.gov by COB Thursday September 9.
Please refer to page and line numbers in your comments.

THANKS.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

ccsp LAST CHANCE Draft Prospectuses and an Update for CCSPReview
From: ccsp-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Friday, September 03, 2004 4:34 PM
To: ccsp@usgcrp.gov
Cc: DAlbritton; Clarke, Leon E; Rickey Petty; ipo@usgcrp.gov; jhaynes@nasa.gov; ccsp_info@usgcrp.gov; Bork,Karrigan; SA_leads@usgcrp.gov; wgcc@usgcrp.gov; JHoughton; Terry.McPherson@ssc.nasa.gov
Subject: [ccsp] LAST CHANCE: Draft Prospectuses and an "Update" for CCSPReview

Importance: High

Follow Up Flag: Reply
Due By: Thursday, September 09, 2004 5:00 PM
Flag Status: Flagged

Jim Mahoney and I have today reviewed the status of CCSP interagency comments received relative to three documents being prepared for public comment or distribution. These were initially transmitted to the full CCSP distribution on August 5 with response requested by August 26. A reminder note was also sent to the full CCSP list on August 23. We have received very few comments on these documents and are preparing to release them after resolving the limited number of interagency comments we have received.

The prospectuses are for product 2.1 (emissions scenarios) and 4.7 (transportation sensitivities, potential impacts, and response options).
The product "update" is for product 2.3 (aerosol properties and their impacts on climate). The two prospectuses will be posted for public review on the CCSP website, in accordance with the draft guidelines. The aerosol product update will be released for public information. A copy of all three documents are again attached with this note.

We estimate that the necessary revisions to prospectus 2.1 will be completed quickly, and we plan to release this prospectus for public comment as quickly as we can ensure that all comments are properly resolved. We estimate that approximately 2 weeks may be required to resolve comments relative to product 4.7. We received no comments on the aerosol product update prepared by Dan Albritton and his team, and are thus prepared to release this document during the week of September 6.

If you have comments on any of these three documents, please send them to me (<rmoss@usgcrp.gov>), copied to Jim Mahoney (<james.r.mahoney@noaa.gov>) and Sandy MacCracken (<smaccrac@usgcrp.gov>), by COB Thursday 9 September.

Jim has asked me to advise you that in order to maintain progress on the reports in preparation, in the future we will take the absence of any response at the expiration of the CCSP review period as your concurrence.

Please contact me if you have any immediate questions or concerns.

----------original August 5 message----------
TO: CCSP Principals
CC: Interagency Working Group Co-Chairs

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CCSP LAST CHANCE Draft Prospectuses and an Update for CCSPReview
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Thank you.

Richard Moss

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

FW CommWG Alert re heightened interest in the connection betweenhurricanes and climate change.
From: Holbrook, William F.
Sent: Sunday, September 05, 2004 5:55 PM
To: Cooney, Phil; Perino, Dana M.
Subject: Fw: [CommWG] Alert re heightened interest in the connection betweenhurricanes and climate change.

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-----Original Message-----
From: outreach-bounces@usgcrp.gov <outreach-bounces@usgcrp.gov>
To: JAMES MAHONEY (E-mail) <James.R.Mahoney@noaa.gov>; Richard Moss (E-mail) <rmoss@usgcrp.gov>; Rick Piltz (E-mail) <rpiltz@usgcrp.gov>; David Allen (E-mail) <dallen@usgcrp.gov>; outreach@usgcrp.gov <outreach@usgcrp.gov>
Sent: Sun Sep 05 17:47:00 2004
Subject: [CommWG] Alert re heightened interest in the connection betweenhurricanes and climate change.

There is a rapidly increasing level of chatter about the connections between climate change and hurricanes. Today, the issue was raised in the NY Times, in CNN's "Late Edition," and by the Independent (UK). In addition, we are seeing a surge in traffic to our web sites by visitors interested in hurricanes. We should expect additional inquiries, especially if Ivan hits the US mainland (a possibility that global forecast models are hinting at).

Among the notable developments regarding hurricanes over the last 6 months are the following:

5 SEPT 2004:. The National Hurricane Center says (11 am EDT) that Ivan, the fifth hurricane of the 2004 Atlantic hurricane season, was "the strongest tropical cyclone for such a low latitude in the Atlantic Basin records." Later in the day (5 pm EDT) it reiterated that "it is unprecedented to have a hurricane this strong at such a low latitude in the Atlantic Basin."

3 SEPT 2004: William Gray and Philip J. Klotzbach issue their "Forecast of Atlantic Hurricane Activity for September and October 2004 and Seasonal Update Through August." They say: "Since the start of Atlantic basin aircraft reconnaissance flights into hurricanes at the end of World War II there has never been a previous August to have three intense or major (Cat. 3-4-5) hurricanes (Alex, Charley, and Frances) develop in the Atlantic basin. Only August 1995 (5) saw more Atlantic basin hurricanes develop...This will be a topic for much future research...An important enhancing factor (that we appear to have underestimated) was the influence of the unusually strong positive sea-level temperature anomaly (SSTA) patterns in the eastern Atlantic. A very similar warm Atlantic SSTA pattern occurred in 1995 when August also had one of the highest recorded named storm totals (7)."

In this regards, it is worth noting the research findings of Mark A. Saunders and Andrew R. Harris of University College (London, UK), published in "Statistical Evidence Links Exceptional 1995 Atlantic Hurricane Season to Record Sea Warming," Geophysical Research Letters (16 May 1997). They found that record sea-surface temperatures in areas of the Atlantic "had statistically the dominant influence" on hurricane development in 1995.
According to climate scientists at the University of East Anglia (UK), 1995 was also the hottest year in records extending back to 1860. One reason for the record high global average air temperature was the high sea-surface temperatures in the Atlantic, Saunders told me in 1997. In the area where many of the 1995 hurricanes developed, sea-surface temperatures in 1995 were the highest since records began in 1865. "If one accepts that the sea-surface warming caused the high number of hurricanes," Saunders said, "then there is a suggested link to global warming."

Nevertheless, at the end of 1995, William Gray said "there is no plausible way that

Fw CommWG Alert re heightened interest in the connection betweenhurricanes and climate change.
increases in man-induced greenhouse gases can be even remotely related to this year's extremely active Atlantic basin hurricane season."
Similarly, Gray says in his 3 September 2004 report that, "the Florida landfall of Major Hurricanes Charley and Frances ... should not be taken as indicating that Florida is experiencing anything different than what it has seen in the past...One should not invoke global warming or any other special or unique climate change processes to explain the two recent Florida landfalls of major Hurricane Charley and Frances occurring only three weeks apart."

MARCH 2004: tropical cyclone Catarina formed off the coast of Southern Brazil. It was the first recorded in the South Atlantic. The UK Met said:
"Climate change scientists, working in the Met Office Hadley Centre for Climate Prediction and Research, recognised this as a feature they see in their climate model. In a world made warmer by increased greenhouse gasses, their model shows that this is one of the areas to watch in the future as there may indeed be more tropical storms for the South Atlantic. The signal is not clear, however, as some aspects of the model are not realistic and don't exactly match the current storm, but the potential is there and the event is part of the climate change jigsaw, which experts are piecing together. "

I have often said that public interest in climate change depends on the weather. I vividly remember the summer of 1988 when extreme drought conditions and high temperatures helped ignite public concern about climate change. Interest in the issue since then has fluctuated, often stimulated by extreme or unusual weather. Given Florida's experience with Charley and Frances, Ivan's looming threat just over the horizon, and the unusual hurricane-related developments of the last 6 months, I think we may be on the edge of one of those periods where we see a spike in public interest in climate change.

Nick

Nick Sundt
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Email: nsundt@usgcrp.gov
Web: www.usgcrp.gov
www.climatescience.gov
www.gcrio.org

Prospectus for Synthesis and Assessment Product 3.1

Climate Models: Their Strengths and Limitations, Sensitivities, Feedbacks, and Uncertainties

Lead Agency: DOE
Supporting Agencies: NASA, NOAA, NSF

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1. Description of Topic, Audience, Intended Use, and Questions to be Addressed

Computer simulation models of the coupled atmosphere-land surface-ocean-sea ice system are essential scientific tools for understanding and predicting natural and human-caused changes in the Earth's climate. Coupled climate system models (called "climate models" herein) provide scientists a way to integrate their knowledge about elements of the climate system in a numerical simulation laboratory that can then be used to conduct numerical experiments. The topic of this CCSP Product is the strengths and limitations of climate models at different spatial and temporal scales. Its purpose is to provide guidance for the appropriate application of climate models and results of climate model experiments (*CCSP Strategic Plan*, page 19). This CCSP Product will focus on natural and human-caused factors influencing climate variability and change, during the period 1800 to 2000, and will characterize sources of uncertainties in comprehensive coupled climate models. (Note: Discussion of future projections of climate will be limited in this Product, because Product 3.2 will deal with climate projections. This Product will focus on the models, sensitivity, feedbacks, and uncertainties, rather than future projections.)

The intended audience of this CCSP Product is decisionmakers and scientists that use climate model output as input to studies or analyses in their respective, non-climatic disciplines (e.g., ecosystem science, hydrology and water resources, economics, human health, and agriculture and forestry). In order to facilitate decisionmaking using climate model information for the above-mentioned sectors, an evaluation and assessment of limitations of state-of-the-science coupled climate models is essential. This Product is directed towards this goal. Users often need climate information at regional scales and Question 5 (see below) addresses issues related to dynamical downscaling of climate projections.

The intended use of this CCSP Product is to educate those decisionmakers and scientists about the uncertainty and limitations associated with using models to predict (project) the potential effects of human activities on climate and sea-level rise. The product will be developed addressing scientific issues through a comprehensive, objective, open, and transparent basis. It will be based on rigorous results from the peer-reviewed literature; however, the final product will be such that it is accessible, understood, and useful to the well-informed general reader and decisionmaker.

Specific questions to be addressed by this CCSP Product are:

1) *What are the major components and processes of the climate system that are included in present state-of-the-science climate models, and how do climate models represent these*

aspects of the climate system? This section will include descriptions of the major feedbacks in the climate system (e.g., clouds, atmospheric water vapor, surface albedo, and soil moisture).

2) *How are changes in the Earth's energy balance incorporated into climate models? How sensitive is the Earth's (modeled) climate to changes in the factors that affect the energy balance?* This section will explain current techniques (methodologies?) employed by modelers to include changes in radiative forcing from both natural and human factors since the pre-industrial era. These include changes resulting from greenhouse gas and trace constituent emissions into the atmosphere, volcanic eruptions, and variations in the sun's intensity. This section will present a brief overview of the global mean response of the climate system, as derived from climate model results, for the various forcings (e.g., solar, volcanic, aerosols, anthropogenically derived greenhouse gases). (Note: Product 2.3 will focus on aerosols and their relationships to climate change, so aerosols will be treated briefly.)
3) *How uncertain are climate model results? In what ways has uncertainty in model-based simulation and prediction both increased and decreased over time with increased knowledge about the climate system?* This section will be a discussion of the major sources of uncertainty in climate model results including the identification of the major sources of uncertainty in model assumptions and the characterization of radiative forcing. A description (or acknowledgement) of how increased knowledge can lead to greater uncertainty by increasing the number and complexity of processes included in climate models will be included.
4) *How well do climate models simulate natural variability and how does variability change over time?* This section will discuss the ability of climate models to simulate known modes of natural variability, such as the Madden-Julian Oscillation, the El Niño-Southern Oscillation, the North-Atlantic Oscillation, and the Pacific Decadal Oscillation. Included will be a section of how these modes of variability have changed over time.
5) *How well do climate models simulate regional climate variability and change?* This section will discuss how changes in certain regions (e.g., the North Atlantic or Tropical Pacific) can influence global climate change. It will also discuss limitations of "downscaling" methodologies, including regional climate modeling, used to obtain regional information from global simulations.
6) *What are the tradeoffs to be made in further climate model development (e.g., between increasing spatial/temporal resolution and representing additional physical/biological processes)?* This section will consider the opportunities and constraints on future model development (e.g., additional computational cycles and lack of process knowledge). It will outline prospects for when we can expect models to be improved so that they have increased utility in policymaking and decisionmaking.

Answers to each of these questions will include clear description of the spatial and temporal aspects of climate models as they relate to each of the questions—for example, how uncertainty at the mean annual global scale (e.g., mean annual global surface temperature) is related to uncertainty at a continental or sub-continental scale. In addition to sea level, the two climatic variables to be emphasized in this CCSP Product are surface temperature and precipitation, because these are the components of the climate system most often considered by decisionmakers and non-climate scientists concerned with climate variability and change.

2. Contact Information for Responsible Individuals at the Lead and Supporting Agencies

Department of Energy (DOE), lead agency

Dr. Anjuli Bamzai
anjuli.bamzai@science.doe.gov
(301) 903-0294

National Aeronautics and Space Administration (NASA), supporting agency

Dr. Don Anderson
danders1@hq.nasa.gov
(202) 358-1432

National Oceanic and Atmospheric Administration (NOAA), supporting agency

Dr. Ants Leetmaa
Ants.Leetmaa@noaa.gov
(609) 452-6502

National Science Foundation (NSF), supporting agency

Dr. Jay Fein
jfein@nsf.gov
(703) 292-8527

3. Authors and Reviewers

3.1. Author Qualifications

Lead and contributing authors of Product 3.1 shall be scientists or individuals with technical expertise on successful development, evaluation, and/or uses of climate models to improve understanding of effects of natural forcing and human activities on climate variability and change on decadal to centennial time scales. These individuals shall be known through their publications [or other accomplishments if publication is not standard practice in their field (e.g., engineering)]. Guidelines provided by the CCSP Office will be followed.

The list of lead authors is expected to include:

- Dr. David Bader/PCMDI LLNL (coordinating lead author)
- Dr. Curtis Covey/PCMDI LLNL
- Dr. Isaac Held/NOAA GFDL
- Dr. Jeffrey Kiehl/NCAR
- Dr. David Rind/NASA GISS

Brief bios for each of the above are provided in Appendix A. Additional lead and contributing authors will be finalized by the lead agency contact, in consultation with the supporting agencies.

3.2 Expert Reviewers

The lead and supporting agencies will develop a pool of technical reviewers to review the draft Product. The review will be equivalent to a journal peer review with each reviewer preparing an independent review. At least 10 reviews will be conducted by scientific experts. Nominations for reviewers can be made to the lead agency at any time prior to the expert review of the draft Product.

At least three independent reviews will be obtained from non-climate scientists, selected by the lead and supporting agencies, to comment on how understandable and useful the draft product is to non-specialists.

All selected authors and reviewers will be provided with the information quality guidelines issued by the Department of Commerce and NOAA, which also incorporate compliance with the overall Office of Management and Budget (OMB) guidelines: *OMB Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*. This CCSP Product will be an "interpreted product" as that term is used in the NOAA guidelines. Namely, an interpreted product is one that has "... been developed through interpretation of original data and synthesized products. In many cases, this information incorporates additional contextual and/or normative data, standards, or information that puts original data and synthesized products into larger spatial, temporal, or issue contexts. This information is subject to scientific interpretation, evaluation, and judgment. Examples of interpreted products include journal articles, scientific papers, technical reports, and production of and contributions to integrated assessments."

4. Proposed Plans for Drafting, Reviewing, Producing, and Disseminating the Product

The lead authors—organized by the coordinating lead author—will meet in person, through email exchanges, and via teleconferences (as they see fit) to draft answers to, and discussion about, the six key questions. They will also prepare an introductory section to describe the topic, the audience, and the intended use of this Product. After this Product is drafted, the lead authors (or coordinating lead author and the authors responsible for each of the six questions) will write a non-technical summary of the Product.

The coordinating lead author may assign primary responsibility for drafting the text associated with each question to a specific author. The lead authors will take information (text) from any contributing authors and incorporate it into the draft Product as they see fit. Lead and contributing authors will base all their writing on published, peer-reviewed scientific literature. Lead authors will consider the full range of relevant peer-reviewed information. Both the main Product and the non-technical summary will identify disparate views, where appropriate.

The lead and supporting agencies will generate a charge statement, which will be distributed with the draft Product and the non-technical summary for review by the identified specialist and non-specialist experts.

Following this review, the lead authors will revise the draft Product by incorporating comments and suggestions from the reviewers, as the lead authors deem appropriate.

Following this revision, the draft Product will be released for public comment following the CCSP guidelines. The review period will be 45 days.

The lead authors will revise the draft Product to incorporate the public comments. The Product then will be reviewed by the CCSP in tandem with a National Science and Technology Council (NSTC) process. The product will be cleared for publication via the CCSP and NSTC processes. Differences in interpretation will be reviewed by the National Research Council (NRC), as described in the CCSP guidelines.

The final, approved, and cleared product will be turned over to the CCSP Office for production. A communications plan will be developed by the lead agency, in collaboration with the supporting agencies, and working with the CCSP Office.

5. Proposed Approach for Evaluation and Communication of Uncertainty and Confidence Levels of Climate Model Output

A central theme of this CCSP Product will be uncertainty and confidence levels of climate model output with respect to climate change and sea-level rise, caused by natural forces and human activities during the period 1800-2000. Thus, no special approach will be needed/used to evaluate and communicate uncertainty and confidence levels. They will be a central theme of the Product and considered throughout its development.

6. Relationship to Other National and International Assessment Processes

This CCSP Product will build on previous Intergovernmental Panel on Climate Change (IPCC) assessments (e.g., First, Second, and Third Assessment Reports) and NRC reports (e.g., *Climate Change Science: an Analysis of Some Key Questions*). It is expected that this CCSP Product will provide input to the Fourth Assessment Report of the IPCC and to future NRC reports on climate models.

7. Proposed Timeline

2004	
Jan - Mar	Lead agency produces draft prospectus [DONE]
Apr	Draft prospectus review/revision by agencies and IWG [DONE]
May	Draft prospectus submitted to CCSP Principals for initial approval [DONE]
Late June	Received comments from CCSP office on draft prospectus [DONE]
Sept - Oct	Draft prospectus posted for public comment on CCSP web site (45 days)
Nov	Draft prospectus submitted to CCSP Principals for final approval
Dec	Approved prospectus posted on CCSP web site, and lead and contributing authors selected by lead agency
Dec - May 2005	Draft Product written by lead authors, with input from contributors
2005	
May	Peer reviewers selected by lead and supporting agencies; product available for public comment
May - June	Draft Product reviewed by specialist and non-specialist peer reviewers
June	Lead authors revise draft Product based on peer reviews
July	Revised draft Product sent to CCSP Principals
July	Draft Product made available for public comment (30 days)
Aug - Sept	Draft Product revised based on public comments
Oct	Revised Product submitted to CCSP Principals
Nov	Revised Product distributed for NSTC clearance
Dec	Final Product delivered to CCSP Office for production
Dec	Final Product produced and disseminated

APPENDIX A—Bios for Potential Lead Authors

DAVID BADER

CURT COVEY

ISAAC HELD

Isaac Held is a Senior Research Scientist at NOAA's Geophysical Fluid Dynamics Laboratory, where he conducts research on climate dynamics and climate modeling, and is head of the Weather and Atmospheric Dynamics Group. After receiving his Ph.D. at Princeton University, and after a short stint at Harvard University, he joined GFDL in 1978 and has remained there ever since. He is also a lecturer with rank of Professor at Princeton University, in its Atmospheric and Oceanic Sciences Program, where he has supervised over a dozen Ph.D. theses. He also serves as an Associate Faculty member in Princeton's Applied and Computational Mathematics Program and in the Princeton Environmental Institute, and has taught at Woods Hole Oceanographic Institution. Dr. Held is a Fellow of the American Meteorological Society (1991) and the American Geophysical Union (1995), and a member of the National Academy of Sciences (2003). He has received the Meisinger Award of the AMS (1987) for "outstanding contributions to the study of climate dynamics...," the Bernhard Haurwitz Memorial Lectureship of the AMS (1999), the Rosenstiel Award from the University of Miami (1994) "for breadth and incisiveness is attacking fundamental problems of geophysical fluid dynamics, the general circulation of the atmosphere, and climate dynamics," and the Department of Commerce Gold Medal (1999) "for world leadership in studies of climate dynamics."

JEFFREY KIEHL

DAVID RIND

Dr. David Rind is a climate modeler at the NASA Goddard Institute for Space Studies, and an adjunct professor in the Department of Earth and Environmental Sciences of Columbia University. He received his Ph.D. from Columbia University in 1976, and has been working with NASA since 1978. He has published more than 200 papers in the fields of climate modeling, paleoclimate studies, and atmospheric dynamics. He's received NASA awards for Special and Superior Achievement, been on various NRC and AMS panels, and was an AGU Charney Lecturer. His particular emphasis has been on the potential for climate change associated with increasing atmospheric greenhouse gases and its associated impacts. He has also been working on evaluating the importance of other forcing factors, such as varying solar radiation.

ccsp_info Concurrence check for revised product 3.1 prospectus
From: ccsp_info-bounces@usgcrp.gov on behalf of Moss, Richard H [Richard.Moss@pnl.gov]
Sent: Wednesday, September 08, 2004 2:52 PM
To: ccsp@usgcrp.gov; wgcc@usgcrp.gov
Cc: ccsp_info@usgcrp.gov; SA_leads@usgcrp.gov
Subject: [ccsp_info] Concurrence check for revised product 3.1 prospectus

TO: CCSP Principals and Interagency Working Group Co-Chairs

I am forwarding a revised draft prospectus for S&A Product 3.1 along with a collated set of CCSP comments with the annotated responses.
Anjuli Bamzai, the DOE lead for the product, indicates that the prospectus has been revised in response to comments made during CCSP review prior to releasing the prospectus for public comment, as described in the draft S&A product guidelines. I note that biographical information is still to be added for a few of the authors before the prospectus is posted.

Because some time has elapsed since the previous review, Jim Mahoney has asked me to circulate this revised prospectus for a quick final check.
Please make sure your previously submitted comments have been acted upon in a satisfactory fashion.

Please let me know by noon on Monday September 13 if there is any reason not to move forward with posting the prospectus for public comment. We will do so early next week unless we receive comments to the contrary.
If you have other questions, please contact Dr. Bamzai directly at <anjuli.bamzai@science.doe.gov> or (301) 903-0294.

Thanks for your cooperation.

Richard

Richard H. Moss, Ph.D.
Director, Climate Change Science Program Office (Incorporating the US Global Change Research Program and the Climate Change Research Initiative) 1717 Pennsylvania Avenue NW, Suite 250 Washington, DC 20006
Email: rmoss@usgcrp.gov
Telephone: 1 (202) 419-3476
Fax: 1 (202) 223-3065

003876A

Hannegan, Bryan J.

From: Gabriel, Clifford J.
Sent: Tuesday, September 14, 2004 12:42 PM
To: Hannegan, Bryan J.
Cc: Olsen, Kathie L.
Subject: Kathie's modifications to the climate facts sheet

CEQ 340 PC

A G E N D A

MEETING OF THE SUB-PCC ON CLIMATE CHANGE

Monday, September 20, 2004
(2:30 – 4:30 p.m.)
Room 7516 - Department of State

Introductions and Purpose of Meeting	Harlan Watson
Preparations for COP 10	Harlan Watson

- Overview
- U.S. objectives and expectations
- Schedule
- High-Level Segment
- Side Events
- U.S. participation
- Comments

USAID's Adaptation Compendium	Franklin Moore
Bilateral and Multilateral Cooperation	Harlan Watson
Fourth National Communication (CAR4)	Dan Reifsnyder
IPCC	Harlan Watson
Upcoming Climate Change-Related Events/Meetings	Harlan Watson
Comments and Wrap-up	Harlan Watson

or a political

Cooney, Phil

From: Holbrook, William F.

Sent: Thursday, September 30, 2004 8:26 AM

To: Perino, Dana M.; Connaughton, James; Hannegan, Bryan J.; Peel, Kenneth L.; van Hoogstraten, David; 'Turekian, Vaughan C'; 'sowardsml@state.gov'; Boyd, Allison; Silverberg, Kristen; Cooney, Phil

Subject: FW: AP - Russian Cabinet approves Kyoto Protocol, will send it to parliament for ratification

In case you missed...

-----Original Message-----
From: Sherzer, David
Sent: Thursday, September 30, 2004 7:25 AM
Subject: AP - Russian Cabinet approves Kyoto Protocol, will send it to parliament for ratification

Russian Cabinet approves Kyoto Protocol, will send it to parliament for ratification

By VLADIMIR ISACHENKOV, Associated Press Writer

MOSCOW (AP) Russia's Cabinet approved the Kyoto Protocol on global warming Thursday, clearing the way for the worldwide adoption of the document once the Russian parliament ratifies it as widely expected.

The protocol must be ratified by no fewer than 55 countries that accounted for at least 55 percent of global emissions in 1990, and Russia's participation would tip the scale.

The United States, China and some other big industrial nations have rejected the treaty. It seeks to reduce emissions of carbon dioxide and other greenhouse gases, which are widely seen as a key factor behind global warming.

In May, President Vladimir Putin pledged to speed up approval in return for European Union support of Russia's bid to join the World Trade Organization. Many of his advisers have opposed, arguing that joining would stymie Russia's economic growth and make Putin's goal of doubling gross domestic product in a decade out of reach.

A government official, who spoke on condition of anonymity, said the ratification bill would be submitted soon to the lower house of parliament, or State Duma, so it can be ratified before the year's end. The Duma is dominated by the Kremlin-directed United Russia party and approval is almost certain.

Still, Russian Prime Minister Mikhail Fradkov said on a trip to Netherlands Thursday that the Duma would likely have a "difficult debate" on the document a statement that appeared to signal that the Russian officialdom is still divided on the issue despite the Cabinet's support of the bill.

Putin economic adviser Andrei Illarionov voiced his opposition at the Cabinet meeting.

"It's a political decision, it's a forced decision," Illarionov said, according to the Interfax news agency. "It's not the decision we are making with pleasure."

Some observers have speculated that Russia is jockeying for more favorable terms when rules are worked out for a mechanism under which countries that come in with emissions levels below the targets can sell pollution credits.

In its decision Thursday, the Cabinet said that government ministries and agencies should come up with proposals on how best to fulfill Russia's obligations under the pact.

Russia's emissions have fallen by about a third since 1990, largely because of the post-Soviet industrial meltdown. But pollution has started to rise again because of an economic

revival in recent years.

Enhancing the U.S. Department of Energy's Voluntary Reporting of Greenhouse Gases (1605(b)) Program

Dave Conover
Senior Policy Advisor to the Secretary

September 30, 2004

Presidential Directive – February 14, 2002

- DOE to work with Commerce, Agriculture, and EPA to propose improvements
- Enhance:
  - Measurement accuracy
  - Reliability
  - Verifiability
- Working with and taking into account emerging domestic and international approaches

Objectives for Revising 1605(b)

- Encourage reporters to provide a more accurate, consistent, complete and transparent record of emissions and emission reductions;
- Recognize entities that contribute to the President's goal of reducing the emissions intensity of the U.S. economy;
- Create a central program for recording achievements associated with voluntary emission reduction programs, such as Climate Leaders and Climate VISION.
- Balance rigor with practicality
- Accommodate a broad range of different entities (large, small, generators, users, manufacturers, farms, service providers, households).

Revision Process

- Established interagency working groups
- Issued a public Notice of Inquiry, May 2002.
- Held workshops; met with stakeholder groups.
- Proposed General Guidelines (November 2003)
- Release Revised General Guidelines, Draft Technical Guidelines, Fall 2004.
- EIA developing forms and instructions, also for public review.
- Initiate revised program in early 2005.

Key Features of Proposed Revisions

1. **Emphasizes entity-wide inventories and entity-wide reductions (for large emitters).** Entities may *register* reductions if they provide entity-wide emissions data and can demonstrate they achieved entity-wide emission reductions after 2002. *Major change from current 1605(b), which focuses primarily on project reporting.*

2. **Enhances corporate responsibility for GHG report**. Companies are encouraged to report at the highest level (but may report at a subsidiary or affiliate level). More clearly defines responsibility for emissions and reductions. High-level official must certify reports. Independent verification is encouraged. *Major change from current 1605(b), where any level of reporting is acceptable and responsibility not clear.*

3. **Provides for simplified reports by small emitters and entities that do not want to "register" reductions.** Entities may report emissions and reductions without providing an entity-wide inventory or accounting for entity-wide emissions.

November 2003 Proposal

All Reporters: Require Legal Basis for Entity; 'Encourage' Highest Level

Small Entities	Large Entities	"Reporting Only" Entities
Inventory of Emission for Selected Activities	Entity-wide Emission Inventory	
Calculate Reductions for Relevant Activities, e.g. forested land	Calculate Reductions **Across Entire Entity** (may include sub-entity reductions such as plants, facilities, projects)	Calculate Reductions at any level for any year: project; facility; pre-2002, etc. (Inventory not required)
		Reported Reductions

Potential Offset + Oil and Gas Production Activities + Avoided Emissions + Forest Sequestration project

Sum

Registered Emission Reductions

Some Key Issues Raised in Comments

- Flexible entity boundaries should be maintained
- De minimus should be raised
- Tracking terrestrial sinks for carbon stock should be limited
- Specifics on CHP and exported energy needed
- More on geologic carbon sequestration needed
- Variety of physical measures for GHG intensity definition
- Don't exclude output or product change related reductions
- Simplify and enhance flexibility of certification and verification requirements
- Clarify guidance versus "rulemaking"

ccsp Fwd CCSP FY 2006 Budget Analysis
From: ccsp-bounces@usgcrp.gov on behalf of James R. Mahoney [James.R.Mahoney@noaa.gov]
Sent: Thursday, October 07, 2004 11:53 AM
To: ccsp@usgcrp.gov
Subject: [ccsp] [Fwd: CCSP FY 2006 Budget Analysis]

To: CCSP Senior Representatives

From: Jim Mahoney

Please see the attached email and the attached PDF file. This is the information provided to the EOP senior representatives, except that the FY06 budget information has been removed from the attached file. Thank you all for your collaboration in preparing this information. Also, we will need to turn to the issue of renewing priorities for development of FY07 budgets in the immediate future.

PEW CENTER ON Global CLIMATE CHANGE

For Immediate Release
October 2004

Contact: Katie Mandes
703-516-4146

CLIMATE POLICY AND TECHNOLOGICAL CHANGE

New report examines how climate policies affect the cost of greenhouse gas mitigation

WASHINGTON, DC — With Russian ratification of the Kyoto Protocol now likely, the development and deployment of technologies to reduce global emissions is more critical than ever. While technological change occurs naturally as companies compete in the marketplace, climate policies can spur additional or "induced" technological change (ITC).

Induced Technological Change and Climate Policy, by Larry Goulder of Stanford University, explores the use of ITC in climate policy, using state-of-the-art economic modeling and analysis. Goulder finds that models that include ITC produce lower cost estimates for GHG reductions, and that costs are lowest when climate policies are announced in advance. Furthermore, he finds that to reduce greenhouse gas emissions most cost-effectively, both policies that boost technological innovation, such as R&D funding, and policies that limit emissions, such as a GHG cap-and-trade program, are required.

"This research shows us that the costs of meeting a long-term CO_2 emissions target using both R&D subsidies and a carbon tax (or cap-and-trade) is roughly 10 times less than with R&D subsidies alone," said Eileen Claussen, President of the Pew Center on Global Climate Change.

A crucial point is that although studies show different implications of ITC on the overall timing of climate policy, all find that some abatement must begin now in order to jumpstart the critical process of technological change. "Timing is crucial for dealing with this issue in a cost-effective manner; the longer we wait, the more expensive it will be," said the Pew Center's Claussen.

The full text of this and other Pew Center reports is available at http://www.pewclimate.org.

Advancing the debate through credible analysis and cooperative approaches.

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ph (703) 516-4146
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www.pewclimate.org

About the Author

LAWRENCE H. GOULDER

Lawrence Goulder is the Shuzo Nishihara Professor in Environmental and Resource Economics at Stanford University. He is also a Senior Fellow at Stanford's Institute for International Studies and its Institute for Economic Policy Research; a Research Associate at the National Bureau of Economic Research; and a University Fellow of Resources for the Future, a non-profit environmental and natural resource research firm located in Washington, DC.

Goulder graduated from Harvard College with an A.B. in philosophy in 1973. He obtained a master's degree in musical composition from the Ecole Normale de Musique de Paris in 1975 and earned a Ph.D. in economics from Stanford in 1982. He was a faculty member in the Department of Economics at Harvard before returning to Stanford's economics department in 1989.

Goulder's research examines the environmental and economic impacts of U.S. and international environmental policies. He has focused considerably on policies to reduce emissions of "greenhouse gases" that contribute to climate change, and on "green tax reform" - revamping the tax system to introduce taxes on pollution and reduce taxes on labor effort or investment. In other work he has examined connections between environmental policies and technological innovation. His work often employs a general equilibrium analytical framework that integrates the economy and the environment and links the activities of government, industry, and households. The research considers both the aggregate benefits and costs of various policies as well as the distribution of policy impacts across industries, income groups, and generations. Some of his work is interdisciplinary, involving collaborations with climatologists and biologists. He has conducted analyses for several government agencies and environmental organizations.

The Pew Center was established in May 1998 by The Pew Charitable Trusts, one of the United States' largest philanthropies and an influential voice in efforts to improve the quality of the environment. The Pew Center is an independent, nonprofit, and non-partisan organization dedicated to providing credible information, straight answers, and innovative solutions in the effort to address global climate change. The Pew Center is led by Eileen Claussen, former U.S. Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs.

ICCF

Dr. Margo Thorning
Managing Director

INTERNATIONAL
COUNCIL FOR
CAPITAL FORMATION

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10/4/04 provided by Margo Thorning

International Council for Capital Formation

Highlights of Research and Event

Dr. Margo Thorning,
Managing Director

2002 ICCF Accomplishments

■ **Established a constructive dialogue with the Commission Directorate General for the Environment** and observed a real cooperative effort made by **DG Enterprise** and **DG Energy and Transport**. ICCF's activities have recently also raised the interest of **DG Economic and Financial Affairs**. The relationships established with these various Services have allowed ICCF to exert significant influence on the direction of the Commission's internal debate on climate change and related issues.

■ **Found key supporters among European Parliament's Members; made valuable contacts within the Permanent Representations of the EU Member States in Brussels** as a strategic vehicle to circulate ICCF's message throughout the Union. In consideration of the central role of, and influence wielded by, the holders of the EU Presidency, the ICCF fostered strong relations with the Greek and the Italian Representations, both of whom showed great interest in ICCF's activities and research studies.

■ **Set up extensive contacts with various stakeholders** including industry representatives, trade associations, the press and think tanks in Brussels, London, and several German cities.

■ **ICCF's 2002 research activities focused on analysis of the Kyoto Protocol's impact on the economies of EU countries.** Studies of four specific countries—the United Kingdom, Germany, the Netherlands, and Spain—were undertaken. The research illustrates how the economies of these countries would react to the implementation of the Protocol as foreseen by the European Union.

■ **The results of the studies were presented to policy makers, stakeholders and the media at an Open Forum entitled** ***Calculating the Costs of the Kyoto Protocol—How Will It Affect Europe's Competitiveness.*** This opening event allowed the ICCF to establish the foundations for subsequent work with EU institutions and stakeholders.

■ **The ICCF has set up strong links with European scholars and researchers with a view to developing effective collaboration on ICCF research projects.**

2003 ICCF Accomplishments

■ **The ICCF played an important role in influencing the ongoing EU debate on climate change policy.** The increased flexibility in the European Commission's Emission Trading Proposal is due, in part, to the publicity received by the ICCF analyzes of the cost of carbon emission reductions for EU member states.

■ **The ICCF has provided comprehensive reports to policy-makers, which showed the overall economic effects of emission cuts to GDP, employment and investment.** This information has boosted the Commission's willingness to allow the use of the Clean Development Mechanism and Joint Implementation to reduce the cost of cutting carbon emissions.

■ **In addition, a report released by the UK's Department of Trade and Industry makes reference to the ICCF's studies on the cost of meeting the Kyoto targets and the additional reductions planned for the second commitment period** (see www. dti.gov.uk/energy).

■ AUSTRALIA. **The ICCF's first series of programmes on climate change policy was held in Australia (Melbourne, Canberra and Perth)** in February and March 2003. These well-attended forums featured Hon. David Kemp, Australia's Minister for the Environment and Heritage, as well as prominent scientists and economists.

■ BRUSSELS. **The ICCF and FORATOM co-sponsored a climate policy conference in Brussels** on November 26. The conference proved a valuable opportunity for policy-makers, economists and the media to discuss several key technical aspects of global climate change policies immediately prior to the 9th Conference of the Parties in Milan.

The ICCF has also hosted three "Economic and Environmental Policy Evenings" in Brussels. The ICCF's dinner series brings together leading MEPs, business leaders and economists for lively discussions on a variety of economic and other policy issues.

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■ ITALY. The ICCF's second series of programmes, held in Italy in July 2003, was co-sponsored by the World Energy Council. The ICCF released a new analysis of the economic impact on Italy of the Kyoto Protocol and the additional emission reductions being discussed for the second commitment period. (This analysis is available at www.iccfglobal.org.) The forum hosted among others the Director General of the Italian Ministryfor the Environment, Mr. Corrado Clini, as a key speaker.

Managing Director Dr. Margo Thorning also presented ICCF's analysis of the economic impact of the Kyoto Protocol on the Italian economy at a forum sponsored by the the Istituto Bruno Leoni in Milan at the end of November. The ICCF's analysis was extremely well received by policy-makers, economists and media professionals. ICCF's analysis received extensive media coverage and appeared in several Italian publications, including *Avvenire*, *Corriere Della Serra* and *Finanza Mercati*.

■ RUSSIA. ICCF analysis of the economic cost of Kyoto on developed economies was featured during the recent World Climate Change Conference in Moscow (Sept. 29 to Oct. 3). Dr. Thorning's presentation was consistent with the approach taken by Russian President Vladimir Putin's economic advisers.

■ WASHINGTON D.C. The ICCF hosted an "Economic and Environmental Policy Evening" on "Strengthening EU-US Cooperation on Energy Supply and Climate Change Policies" on October 29, 2003 in Washington, D.C. Guests included the Honorable Giles Chichester, Member of the European Parliament's Committee on Industry, External Trade, Research and Energy, as well as high-ranking U.S. policy-makers and business leaders who focus on energy policy issues.

2004 ICCF ACCOMPLISHMENTS

■ The ICCF continues to build upon the success it experienced in 2003 with a robust calendar of events, research projects and other engagements planned for 2004.

■ The ICCF hosted a widely attended panel discussion on the impact of CO2 reductions on global economic development in Washington, DC on October 1. Dr. Andrei Illarionov, Senior Economic Advisor to Russian President Vladimir Putin, Mr. Julian Morris, Director of International Policy Network and ICCF Managing Director Margo Thorning, addressed the impact of climate policies on developing and industrialized countries before an audiance of media representatives and think tank scholars.

■ The ICCF has also demonstrated its effectiveness on a variety of economic issues, as evidenced by Dr. Margo Thorning's participation in three recent international conferences. Dr. Thorning traveled to Nassau, Bahamas, to participate in the **Association of Private Enterprise Education**'s 29th Annual Conference, "Institutions, Culture, and Ethics in a Market Economy." She moderated a panel at the "Liberal Agenda for the New Century: A Global Perspective" conference in Moscow, which was co-sponsored by the **Cato Institute**, the **Institute of Economic Analysis** and the **Russian Union of Industrialists and Entrepreneurs.** Dr. Thorning also presented at IBL's conference "The Kyoto Protocol: Costs and Benefits to Italy and Europe," which was held in Rome and co-sponsored by the **European Enterprise Institute** and **21^mo SECOLO.**

■ The ICCF co-hosted a forum with IBL on energy deregulation and climate change policy on May 22 in Milan. The forum featured two panels of energy experts and economists from academic, business and political circles. Reports on the forum appeared in "Finanza & Mercati, Il Riformista and Libero."

Studies available at: www.iccfglobal.org

LOOKING AHEAD IN 2004...

ICCF to Host Workshop in Brussels On Integrating Climate Change Policies in the Framework Of Global Economic Growth Efforts.

Giles Chichester, MEP and Chairman of the EP Committee on Industry, Research and Energy, and Alejo Vidal Quadros-Roca, Vice President of the European Parliament, will open the ICCF's workshop on ***Climate Change Policies and Economic Growth: What Way Forward to Ensure Both?*** in Brussels on Wednesday, November 24, at The European Parliament. With discussions on possible strategies and solutions to combat the problem of global warming to be resumed at the 10th Conference of the Parties to the Framework Convention on Climate Change in Buenos Aires in December, the ICCF believes that great attention should be given to the debate surrounding the climate change problem and the proposed solutions. The starting point of the ICCF workshop is that there is a need to integrate climate change policies in the framework of global economic growth efforts. The preliminary agenda for the ICCF workshop can be found at www.iccfglobal.org.

Temperature difference between NASA and Hadley calculations is largest for 1930s – the warmest decade for the USA in the 20th century. It virtually disappeared since 1950s when US temperature fell by 0,4 °C.

NASA-Hadley difference for the USA temperature 11YMA, 1890_2003

Sources: NASA, Hadley Centre.

Temperature anomalies for the USA produced by NASA and Hadley, 11YMA, 1890_2003
Degrees ?
0,6
0,5
0,4
0,3
0,2
0,1
0,0
-0,1
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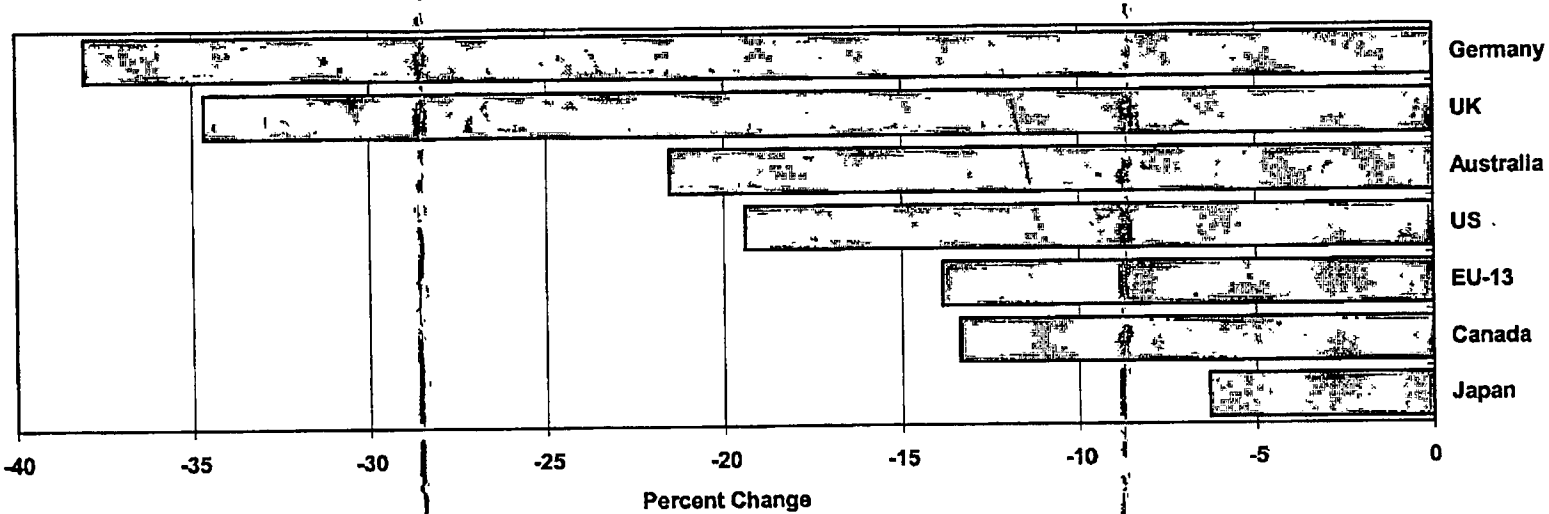
©
Sources: NASA, Hadley Centre.

Percent Change in
GHG Emissions Per Dollar of Real GDP -- 1990 to 2002



EU-15 GHG emissions data from EEA - *Annual European Community greenhouse gas inventory 1990-2002 and inventory report 2004 - Submission to the UNFCCC Secretariat.* Other countries from inventory reports on UN-FCCC Secretariat Internet site. Excluding LUCF. Real GDP from Energy Information Administrtion, *International Energy Annual 2002.*

7Oct04

10/4/04 provided by Margo Thorning

International Council for Capital Formation

Highlights of Research and Event

Dr. Margo Thorning,
Managing Director

2002 ICCF Accomplishments

■ **Established a constructive dialogue with the Commission Directorate General for the Environment** and observed a real cooperative effort made by **DG Enterprise and DG Energy and Transport**. ICCF's activities have recently also raised the interest of **DG Economic and Financial Affairs**. The relationships established with these various Services have allowed ICCF to exert significant influence on the direction of the Commission's internal debate on climate change and related issues.

■ **Found key supporters among European Parliament's Members; made valuable contacts within the Permanent Representations of the EU Member States in Brussels** as a strategic vehicle to circulate ICCF's message throughout the Union. In consideration of the central role of, and influence wielded by, the holders of the EU Presidency, the ICCF fostered strong relations with the Greek and the Italian Representations, both of whom showed great interest in ICCF's activities and research studies.

■ **Set up extensive contacts with various stakeholders** including industry representatives, trade associations, the press and think tanks in Brussels, London, and several German cities.

■ **ICCF's 2002 research activities focused on analysis of the Kyoto Protocol's impact on the economies of EU countries.** Studies of four specific countries—the United Kingdom, Germany, the Netherlands, and Spain—were undertaken. The research illustrates how the economies of these countries would react to the implementation of the Protocol as foreseen by the European Union.

■ **The results of the studies were presented to policy makers, stakeholders and the media at an Open Forum entitled** ***Calculating the Costs of the Kyoto Protocol—How Will It Affect Europe's Competitiveness.*** This opening event allowed the ICCF to establish the foundations for subsequent work with EU institutions and stakeholders.

■ **The ICCF has set up strong links with European scholars and researchers with a view to developing effective collaboration on ICCF research projects.**

2003 ICCF Accomplishments

■ **The ICCF played an important role in influencing the ongoing EU debate on climate change policy.** The increased flexibility in the European Commission's Emission Trading Proposal is due, in part, to the publicity received by the ICCF analyzes of the cost of carbon emission reductions for EU member states.

■ **The ICCF has provided comprehensive reports to policy-makers, which showed the overall economic effects of emission cuts to GDP, employment and investment.** This information has boosted the Commission's willingness to allow the use of the Clean Development Mechanism and Joint Implementation to reduce the cost of cutting carbon emissions.

■ **In addition, a report released by the UK's Department of Trade and Industry makes reference to the ICCF's studies on the cost of meeting the Kyoto targets and the additional reductions planned for the second commitment period** (see www. dti.gov.uk/energy).

■ **Australia.** The ICCF's first series of programmes on climate change policy was held in Australia (Melbourne, Canberra and Perth) in February and March 2003. These well-attended forums featured Hon. David Kemp, Australia's Minister for the Environment and Heritage, as well as prominent scientists and economists.

■ **Brussels.** The ICCF and FORATOM co-sponsored a climate policy conference in Brussels on November 26. The conference proved a valuable opportunity for policy-makers, economists and the media to discuss several key technical aspects of global climate change policies immediately prior to the 9th Conference of the Parties in Milan.

The ICCF has also hosted three "Economic and Environmental Policy Evenings" in Brussels. The ICCF's dinner series brings together leading MEPs, business leaders and economists for lively discussions on a variety of economic and other policy issues.

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■ ITALY. The ICCF's second series of programmes, held in Italy in July 2003, was co-sponsored by the World Energy Council. The ICCF released a new analysis of the economic impact on Italy of the Kyoto Protocol and the additional emission reductions being discussed for the second commitment period. (This analysis is available at www.iccfglobal.org.) The forum hosted among others the Director General of the Italian Ministryfor the Environment, Mr. Corrado Clini, as a key speaker.

Managing Director Dr. Margo Thorning also presented ICCF's analysis of the economic impact of the Kyoto Protocol on the Italian economy at a forum sponsored by the Istituto Bruno Leoni in Milan at the end of November. The ICCF's analysis was extremely well received by policy-makers, economists and media professionals. ICCF's analysis received extensive media coverage and appeared in several Italian publications, including *Avvenire, Corriere Della Serra* and *Finanza Mercati.*

■ RUSSIA. ICCF analysis of the economic cost of Kyoto on developed economies was featured during the recent World Climate Change Conference in Moscow (Sept. 29 to Oct. 3). Dr. Thorning's presentation was consistent with the approach taken by Russian President Vladimir Putin's economic advisers.

■ WASHINGTON D.C. The ICCF hosted an "Economic and Environmental Policy Evening" on "Strengthening EU-US Cooperation on Energy Supply and Climate Change Policies" on October 29, 2003 in Washington, D.C. Guests included the Honorable Giles Chichester, Member of the European Parliament's Committee on Industry, External Trade, Research and Energy, as well as high-ranking U.S. policy-makers and business leaders who focus on energy policy issues.

2004 ICCF ACCOMPLISHMENTS

■ The ICCF continues to build upon the success it experienced in 2003 with a robust calendar of events, research projects and other engagements planned for 2004.

■ The ICCF hosted a widely attended panel discussion on the impact of CO2 reductions on global economic development in Washington, DC on October 1. Dr. Andrei Illarionov, Senior Economic Advisor to Russian President Vladimir Putin, Mr. Julian Morris, Director of International Policy Network and ICCF Managing Director Margo Thorning, addressed the impact of climate policies on developing and industrialized countries before an audiance of media representatives and think tank scholars.

■ The ICCF has also demonstrated its effectiveness on a variety of economic issues, as evidenced by Dr. Margo Thorning's participation in three recent international conferences. Dr. Thorning traveled to Nassau, Bahamas, to participate in the Association of Private Enterprise Education's 29th Annual Conference, "Institutions, Culture, and Ethics in a Market Economy." She moderated a panel at the "Liberal Agenda for the New Century: A Global Perspective" conference in Moscow, which was co-sponsored by the Cato Institute, the Institute of Economic Analysis and the Russian Union of Industrialists and Entrepreneurs. Dr. Thorning also presented at IBL's conference "The Kyoto Protocol: Costs and Benefits to Italy and Europe," which was held in Rome and co-sponsored by the European Enterprise Institute and 21^moSECOLO.

■ The ICCF co-hosted a forum with IBL on energy deregulation and climate change policy on May 22 in Milan. The forum featured two panels of energy experts and economists from academic, business and political circles. Reports on the forum appeared in "Finanza & Mercati, Il Riformista and Libero."

Studies available at: www.iccfglobal.org

LOOKING AHEAD IN 2004...

ICCF to Host Workshop in Brussels On Integrating Climate Change Policies in the Framework Of Global Economic Growth Efforts.

Giles Chichester, MEP and Chairman of the EP Committee on Industry, Research and Energy, and Alejo Vidal Quadros-Roca, Vice President of the European Parliament, will open the ICCF's workshop on ***Climate Change Policies and Economic Growth: What Way Forward to Ensure Both?*** in Brussels on Wednesday, November 24, at The European Parliament. With discussions on possible strategies and solutions to combat the problem of global warming to be resumed at the 10th Conference of the Parties to the Framework Convention on Climate Change in Buenos Aires in December, the ICCF believes that great attention should be given to the debate surrounding the climate change problem and the proposed solutions. The starting point of the ICCF workshop is that there is a need to integrate climate change policies in the framework of global economic growth efforts. The preliminary agenda for the ICCF workshop can be found at www.iccfglobal.org.

Temperature difference between NASA and Hadley calculations is largest for 1930s – the warmest decade for the USA in the 20th century. It virtually disappeared since 1950s when US temperature fell by 0,4 °C.

NASA-Hadley difference for the USA temperature 11YMA, 1890_2003

Sources: NASA, Hadley Centre.

Temperature anomalies for the USA produced by NASA and Hadley,
11YMA, 1890_2003
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Sources: NASA, Hadley Centre
©

ICCF

Dr. Margo Thorning
Managing Director

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What's New...

U.S. NATIONAL

INTERNATIONAL

SCIENCE

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RUSSIAN CABINET CLEARS KYOTO FOR DUMA

1. On September 30, 2004, the Russian cabinet approved sending the ratification of the Kyoto Protocol to the parliament. The exact date for submitting the proposal to the Duma, the lower house, was not reported. The upper house would also have to approve the proposal. The same day, Russian Prime Minister Mikhail Fradkov met with acting Dutch Prime Minister Gerrit Zalm in The Hague, which currently holds the EU presidency. Fradkov said that "we are not going to interconnect" Russia-EU issues with the Kyoto Protocol decision "too rigidly". [If the parliament agrees, as expected by the end of the year, the protocol would enter into force 90 days later, or by the end of March 2005. This would clear the way for the first meeting of the Parties to the Protocol to take place during the 11th Conference of the Parties to the Framework Convention on Climate Change, now scheduled for November 7-18, 2005.] (See www.interfax.com and www.pointcarbon.com)

PUTIN ADVISOR ILLARIONOV SAYS KYOTO DECISION WAS "POLITICAL"

2. On October 1, 2004, President Putin's special economic advisor, Andrei Illarionov, said, at a forum hosted by the American Conference for Capital Formation at the National Press Club in Washington, that he is still opposed the Kyoto Protocol on economic and scientific grounds, but that the Russian government decision was taken for "political reasons", made necessary by "certain circumstances", about which he could not comment. He contended that "nobody among Russian officials believes the Protocol is good for Russia". He said he felt that there was only a slight chance that the Duma would not approve ratification. He noted that the legislative package for implementing the Protocol in Russia, the details of which are due within three months by government agencies, would be a separate, and possibly more controversial decision. He noted the present lack of a nationwide emissions inventory system. In response to a question, Illarionov said he would consider resigning his position if he thought it would impact the ratification decision. He also noted that under the terms of the Protocol, ratifying nations must accept its terms without qualifications or amendments.
(See www.interfax.com/com?item=Rus&pg=0&id=575886&req= and www.accf.org)

UN CLIMATE SECRETARIAT SAYS RUSSIAN DECISION 'INSPIRING"

3. On September 30, 2004, the executive secretary of the Framework Convention on Climate Change, Ms. Joke Waller-Hunter, said the decision of the Russian cabinet to submit the Kyoto Protocol to the Duma sends an "inspiring signal to the international community". She noted that the targets of the first commitment period (2008-12) are "only a first step", and that "talks on commitments for the post 2012 period are to start in 2005". (See www.unfccc.int)

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U.S. KYOTO POSITION UNCHANGED

4. On October 1, 2004, the *New York Times* reported that the senior U.S. climate negotiator Harlan Watson said that the Bush administration's opposition to the Kyoto Protocol was unchanged and it would, instead, continue to focus on long-range research to find new nonpolluting sources of energy or ways to limit the buildup of carbon dioxide. An unnamed spokesman for the John Kerry campaign claimed the administration had made a "catastrophic mistake" in not "fixing" the Protocol. [As noted above, the terms of the Protocol must be ratified as agreed in 1997 without change.] (See www.nytimes.com)

HOWARD GOVERNMENT POSITION ON KYOTO UNCHANGED

5. On October 1, 2004, industry minister Ian Macfarlane said the position of government of John Howard in opposing ratification of the Kyoto Protocol was unchanged despite the decision of the Russian cabinet. National elections are on October 9, 2004, and the opposition leader, Mark Latham of the Labor Party has said he would ratify Kyoto if elected.
(See www.pointcarbon.com/article.php?articleID=4682&categoryID=147)

JAPAN WELCOMES RUSSIAN KYOTO DECISION

6. On October 1, 2004, the new Japanese foreign minister Nobutaka Machimura issued a statement welcoming the decision of the Russian government to ratify the Kyoto Protocol and added that Japan will "cooperate with other countries to establish a set of common rules, in which all countries including the United States of America and developing countries will participate".
(See www.mofa.go.jp/announce/press/2004/10/1001.html)

CARBON MARKET SEES $10 BILLION FOR RUSSIA

7. On October 1, 2004, Point Carbon estimated that Russia could realize up to $10 billion through emissions trading under the Kyoto Protocol, but said that substantial work remains to be done before Russia can reap these benefits, such as establishing emission inventories and registries, rules for joint implementation and who controls the sale of emissions. (See www.pointcarbon.com)

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APPROVAL OF EU NATIONAL ALLOCATION PLANS FACING DELAY

8. On October 1, 2004, Point Carbon reported that the announcement by the European Commission approving the next group of national allocation plans under the EU emissions trading scheme, due to start in January, may be delayed beyond October 13th. Hungary, the Czech Republic, and Greece have yet to submit their plans, and France is revising its plan, which may not be submitted until November. (See www.pointcarbon.com)

CARB CLEARS AUTO GREENHOUSE GAS RULE FOR LEGISLATURE

9. On September 24, 2004, the California Air Resources Board (CARB), at the end of a two-day hearing, immediately announced unanimous approval of the proposed regulation to limit the emission of greenhouse gases from new cars and light trucks starting in 2009. The CARB staff estimates the costs of meeting standards, rising in steps, in 2016 at $1050 per vehicle but which would be "more than offset" by lowering operating costs" (fuel savings). The Board contends that this rule is not a "fuel economy" requirement and therefore is not preempted by the federal Energy Policy and Conservation Act. The Alliance of Automobile Manufacturers testified in opposition to the proposal asserting the cost would be at least $3,000 per vehicle, could not be met even by zero emission hydrogen fuel cell technology, and amounts to fuel economy regulation and is beyond the authority of California. The rule is expected to be submitted in early 2005 to the California legislature for final approval, but which will be unable to make amendments. (See www.arb.ca.gov and www.autoalliance.org)

UTILITIES CHALLENGE NY GLOBAL WARMING LAWSUIT

10. On September 30, 2004, several U.S. utility companies filed comments in response to a lawsuit filed by New York State attorney general Richard Blumenthal last July seeking to impose CO2 emissions reductions on the basis of a New York law. The utilities claim, in papers filed in the U.S. District Court in Manhattan, that the court would usurp the role of Congress and the President. (See www.pointcarbon.com/artricle.php?articleID=4679&categoryID=147)

UNION GROUP OPPOSES MCCAIN-LIEBERMAN BILL

11. The September issue of the newsletter of Unions for Jobs and the Environment, a group of 10 labor unions, including the Teamsters and Mine Workers, reports that it has lobbied the Senate not to bring to a vote in 2004 the McCain-Lieberman bill setting a cap on greenhouse gas emissions. The group says the bill would increase energy prices. (See www.ujae.org)

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CDM PROCESS CALLED "PURGATORY"

12. On September 30, 2004, Point Carbon reported that early applicants for Clean Development Mechanism (CDM) projects are frustrated by delays in processing and changes in rules by the executive board. Marcelo Junqueiro, a Brazilian bagasse project developer, who has called the CDM process, "purgatory", said it took 18 months to get approval, in part due to changes in "additionality" rules that did not exist when the project was first submitted. As a result of the changes required by the board, the project must be re-approved by Brazilian authorities.
(See www.pointcarbon.com/article.php?articleID=4671&categoryID=147)

DRAFT IPCC SPECIAL REPORT ON HFCS RELEASED

13. On September 22, 2004, the *Federal Register* contained a notice by the U.S. Climate Change Science Program and the State Department seeking public comments on a draft special report prepared jointly by the Intergovernmental Panel on Climate Change and the Technology and Economic Assessment Panel of the Montreal Protocol, "Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons". Comments are due November 2, 2004. (See www.climatescience.gov)

GLOBAL DIMMING: THE NEXT CATASTROPHE?

14. The September 21, 2004 issue of *EOS*, the newsletter of the American Geophysical Union contained a report, "Global Dimming Comes of Age", by Shabtai Cohen *et al* reviewing a May 2004 joint American and Canadian Geophysical Unions conference in Montreal which included research showing "severe changes" in global solar radiation, a 12% loss over the past four decades, and calling for a careful study of incoming radiation to determine the exact nature and causes of these changes. (See www.agu.org)

SOLAR RADIATION CRITICS OF IPCC ACCUSED OF "STRANGE ERRORS"

15. The September 28, 2004 issue of *EOS*, the newsletter of the American Geophysical Union, contains an article by Paul Damon *et al*, "Patterns of Strange Errors Plagues Solar Activity and Terrestrial Climate Data", which reviews the work of several scientists who have argued for a greater influence of solar activity in the global warming debate than credited by the Intergovernmental Panel on Climate Change. In particular, the authors express concern about a 2001 Danish TV documentary, "The

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Climate Conflict", featuring the "misleading" research work of Henrik Svensmark and Eigil Friis-Christensen, which Damon says has had a "tremendous impact on public opinion in Denmark and other countries" and won several awards. (See www.agu.org)

COMPUTER STUDY CLAIMS GREENHOUSE GAS-HURRICANE INTENSITY LINK

16. On September 30, 2004, *The New York Times* (Andrew Revkin) reported that a computer study published in the *Journal of Climate* says global warming is likely to produce a significant increase in the intensity and rainfall of hurricanes in coming decades, according to an ensemble of computer studies by the Geophysical Fluid Dynamics Laboratory in Princeton. (www.nytimes.com and www.gfdl.noaa.gov/reference/bibliography/2004/tk0401.pdf)

PIELKE ASKS: WILL GREENHOUSE GAS CONTROLS REDUCE HURRICANE INTENSITY?

17. On September 29, 2004, Roger A. Pielke, Jr, University of Colorado, on his website journal, Prometheus, said the real policy question raised by efforts to link global warming and hurricane intensity is : "When compare to other available options, how effective are greenhouse gas regulations as a means to modulate future impacts associated with hurricanes". He argues that energy policy changes would be insufficient. (http://sciencepolicy.colorado.edu./prometheus/archives/climate_change/index.html)

THE CLIMATE CHANGE AND MALARIA DEBATE

18. The October 1, 2004 issue of *Science* contains a letter to the editor by Indur Goklany and a response by Sir David King, Prime Minster Tony Blair chief scientific adviser. Goklany takes issue with King's citing of the risk of spreading malaria to support his claim that climate change is a more serious threat than terrorism. Goklany contends that efforts to reduce poverty and health measures to deal with malaria would be more cost effective than reducing greenhouse gases. (www.sciencemag.org)

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EU THREATENS UNILATERAL ACTION ON NUCLEAR FUSION CONSORTIUM

19. The October 1, 2004 issue of *Science* contains a report saying that the European Union may scrap its participation in the International Thermonuclear Experimental Reactor (ITER) over a dispute among the participants (EU, U.S., China, Japan, Russia and South Korea) on the location. The EU favors Cadarche in France, while Japan, the U.S. and South Korea favor a site in northern Japan. The EU is suggesting it may go it alone if the others don't agree to the French site. (www.sciencemag.org)

GRAY SAYS HURRICANE SEASON UNPRECEDENTED BUT WITHIN NATURAL VARIABILITY

20. On October 1, 2004, William Gray, the veteran Colorado State University tropical storm forecaster, issue a revised report, which says the August-September period was "unprecedented in terms of historical records going back 130 years, although they are well within the range of natural climate fluctuations". He projected the October would not be active. He noted that Florida has been lucky over the past 38 years in avoiding hurricanes that made landfall, and that if Charlie, Frances, Ivan and Jeanne had not made landfall, little notice would have been of them. He added, "Florida residents should not interpret the four damaging hurricane landfalls to their state in August-September to be related, in any way, to the much publicized human-induced global warming hypothesis ... these events are a rare combination of an above average season of major hurricane activity together with unusually favorable broad-scale steering currents that drove mid-Atlantic tropical cyclones westward instead of allowing them to recurve." Gray estimated the damage at $22.5 billion insured; $45 billion total. [The *Reuters* story on Gray's new report used only the "unprecedented" phrase without the caveats.]
(http://hurricane.atmos.colostate.edu/forecasts/2004/oct2004
www.planetark.com/dailynewsstory.cfm/newsid/27482/story.htm)

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PEOPLE, PAPERS & CALENDAR

PEOPLE

- **Yoriko Kawaguchi.** On September 28, 2004, Prime Minister Junichiro Koizumi announced a cabinet reshuffle, naming Nobutaka Machimura as foreign minister replacing Kawaguchi, who was appointed special adviser on diplomatic affairs. Kawaguchi, as environment minister led the Japanese delegation at the 7th Conference of Parties at Marrakech. The new environment minister is Yuriko Koike. (http://www.mofa.go.jp/announce/press/2004/9/0928.html)

PAPERS & MEDIA

- William O'Keefe, **No Emissions Reductions with Russian Ratification.** George C. Marshall Institute. Press Release. September 24, 2004. (www.marshall.org)
- Jeremy Lovell, **Scientist: Extreme Weather Will Kill Millions.** *Reuters.* September 8, 2004. The views of Professor Mike Pilling, Leeds University. (www.planetark.com/dailynewsstory.cfm/newsid/27006/story.htm)
- Jeffrey Ball, **California, Russia Take Steps to Combat Global Warming.** *Wall Street Journal.* September 27, 2004. (www.wsj.com)
- Katie Hune, **China's Energy Crisis Blankets Hong Kong in Smog.** *Reuters.* September 20, 2004. (www.planetark.com/dailynewsstory.cfm/newsid/27209/story.htm)
- Ralph Cicerone *et al*, **The Ocean in a High CO2 World.** *EOS.* American Geophysical Union. September 14. 2004.
- George W. Bush & John Kerry, **Presidential Candidates Speak Out on Science Politics.** *Physics Today.* October 2004. (www.physicstoday.org)

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- George W. Bush & John Kerry, **Bush and Kerry Offer Their Views on Science.** *Science.* October 1, 2004. (www.sciencemag.org)
- Peter Foukal *et al*, **A Stellar View on Solar Variations and Climate.** *Science.* October 1, 2004. (www.sciencemag.org)
- Richard A. Kerr, **A Bit of Icy Antarctic is Sliding Toward the Sea.** *Science.* September 24, 2004. (www.sciencemag.org)
-

CALENDAR 2004

OCTOBER 2004		
4-5	State Practices in Setting Mobile Source Emissions Standards National Academy of Sciences (www.nationalacademies.org)	Irvine, California
7	Climate Change, Wine Tasting and Science National Academies Keck Center (www.koshlandscience.org/events/upcomingevent.jsp?id=63)	Washington
9	Australian General Election	
12	FORUM: Risk, Science and Public Policy: The Copenhagen Consensus AEI-Brookings Joint Center 9-12:30, St Regis Hotel (www.aei.org/event917)	Washington
12	ROUNDTABLE: Global Earth Observation System George Marshall Institute 12:00 noon National Press Club (www.marshall.org)	Washington

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12-13	Transportation and Climate Change Workshop International Petroleum Industry Environmental Conservation Association (www.ipieca.org)	Baltimore
12-13	Conference on U.S. Climate Change Technology Program: Opportunities FY 2005. (www.climatescience.gov)	Washington
13-14	Global Environmental Health in the 21st Century: From Governmental Regulation to Corporate Social Responsibility National Academy of Sciences Institute of Medicine (www.iom.edu/event.asp?id=21301)	Washington
21-22	Clean Development Mechanism Executive Board 16th Meeting (www.unfccc.int/cdm)	Bonn
	NOVEMBER 2004	
TBA	International Methane to Markets Partnership Ministerial Meeting (www.state.gov/g/oes)	Washington
2	U.S. Elections	
3-5	Climate Change and Business Conference & Trade Expo (www.climateandbusiness.com)	Auckland, NZ
8-11	IPCC 22nd Plenary Session (www.ipcc.ch)	New Delhi
9-12	Arctic Climate Impact Assessment Ministerial Conference (www.acia.uaf.edu)	Reykjavik Iceland
17-19	Global Environmental Facility Council Meeting (www.gefweb.org)	

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17-25	Third World Conservation Congress. World Conservation Union (www.iucn.org)	Bangkok
22-26	16th Meeting of the Parties to the Montreal Protocol (www.unep.org/ozone)	Prague
29-30	Group on Earth Observations - 5th Meeting (www.earthobservations.org)	Ottawa
	DECEMBER 2004	
1-3	Clean Development Mechanism Executive Board 17th Meeting (www.unfccc.int/cdn)	Buenos Aires
6-17	FCCC 10th Conference of Parties (www.unfccc.int)	Buenos Aires
13-17	American Geophysical Union Fall Meeting (www.agu.org)	San Francisco
	JANUARY 2005	
1	Luxembourg assumes Presidency of European Union	Brussels
9-13	American Meteorological Society Annual Meeting (www.ametsoc.org/AMS)	San Diego
10	First Review of IPCC Special Report on Carbon Dioxide Capture and Storage. Comment period ends March 7, 2005. (www.ipcc.ch)	
12-14	IPCC First Expert Meeting on Emission Scenarios (closed) (www.ipcc.ch)	Washington
18-22	World Conference on Disaster Reduction UN International Strategy for Disaster Reduction (www.unisdr.org)	Kobe, Japan
	FEBRUARY 2005	

Climate News Notes®

Monday, October 4, 2004

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N° 04-19
Sixth Year

Robert H. McFadden
Editor
703-329-0780

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14-16	Earth Observation Summit (www.earthobservations.org)	Brussels
7	Final Review of IPCC Special Report on Safeguarding the Ozone Layer and the Global Climate System. Comment period ends April 1, 2005. (www.ipcc.ch)	
	APRIL 2005	
6-8	Intergovernmental Panel on Climate Change 23rd Plenary Session (www.ipcc.ch)	Nairobi
	MAY 2005	
16-27	Subsidiary Bodies of the Framework Convention on Climate Change - 22nd Session (www.unfccc.int)	Bonn
	JUNE 2005	
29	IPCC Second Expert Meeting on Emission Scenarios (www.ipcc.ch)	Laxenburg, Austria
	JULY 2005	
1	UK Assumes EU Presidency	
22	First Review of Fourth Assessment Report - Working Group II Comments due September 16, 2005 (www.ipcc.ch)	
	AUGUST 2005	
8	Final Review of IPCC Special Report on Carbon Capture and Storage. Comments due September 5, 2005. (www.ipcc.ch)	
	SEPTEMBER 2005	

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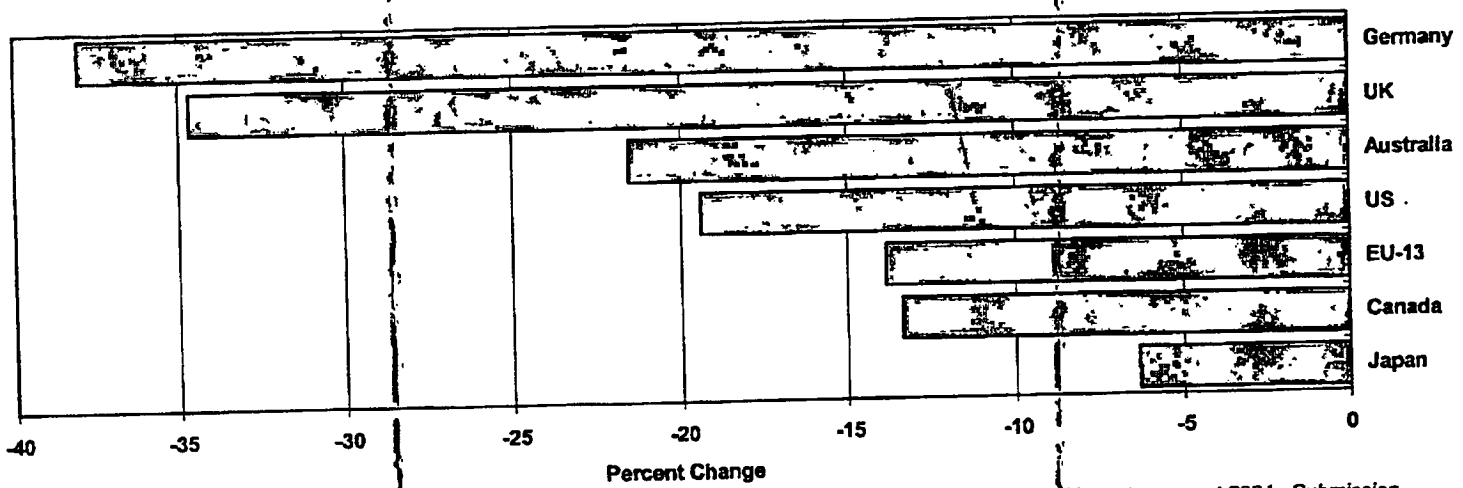
19	First Review of IPCC Fourth Assessment Report - Working Group I. Comments due November 11, 2005. (www.ipcc.ch)	
26-30	Intergovernmental Panel on Climate Change 24th Plenary (www.ipcc.int)	TBD
	NOVEMBER 2005	
7-18	11th Conference of Parties Framework Convention on Climate Change. (www.unfccc.int)	TBD

Percent Change in
GHG Emissions Per Dollar of Real GDP -- 1990 to 2002



EU-15 GHG emissions data from EEA - *Annual European Community greenhouse gas inventory 1990-2002 and inventory report 2004 - Submission to the UNFCCC Secretariat.* Other countries from inventory reports on UN-FCCC Secretariat Internet site. Excluding LUCF. Real GDP from Energy Information Administrtion, *International Energy Annual 2002.*

7Oct04

CEQ 338 PC

Kenneth Peel

From: "william o'keefe" <okeefew@att.net>
To: "ken peel" <KLPeel@msn.com>
Sent: Tuesday, October 19, 2004 4:43 PM
Subject: Fw: Andrew Revkin's How Science became a Partisan Issue

Ken
Please share this with Phil. I had a lot more to say but the NYT limits are too constraining.
Bill
----- Original Message -----
From: william o'keefe
To: letters@nytimes.com
Sent: Tuesday, October 19, 2004 4:34 PM
Subject: Andrew Revkin's How Science became a Partisan Issue

How science became a partisan issue is more about policy than science itself. On environmental issues, especially climate change, science is important but rarely definitive. Where science is not definitive, it is just one of many factors that policy makers must consider.

There is something troubling about these complaints given the deafening silence during the Clinton-Gore years. Vice President Gore repeatedly asserted that climate science was settled even though it is not. One distinguished scientist was fired for telling him that. Where was the out cry?

The Clinton EPA was the most politicized in memory. It pushed regulation that went beyond what science and economics could justify. Where were the complaints then? That silence may be more telling than today's rhetoric.

How many of the 48 Nobel Laureates actually read the report that they endorsed or simply signed the letter because a colleague asked? I know one who did exactly that.

Perhaps scientific elites are upset because their "opinions" are not given excessive deference.

William O'Keefe
President, George C Marshall Institute
1625 K St
Washington DC 20006
202-296-9655

Kenneth Peel

From: "william o'keefe" <okeefew@att.net>
To: "ken peel" <KLPeel@msn.com>
Sent: Tuesday, October 19, 2004 4:43 PM
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-EXECUTIVE OFFICE OF THE PRESIDENT-

COUNCIL ON ENVIRONMENTAL QUALITY

730 Jackson Place, NW
Washington, DC 20503

PHONE: *(202) 456-6224*
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~~FAX~~: (202) 482-6318

TO: JAMES R. MAHONEY

FROM: PHIL COONEY

DATE: 10/20/04 **PAGES:** 9 (INCLUDING COVER SHEET)

COMMENTS: Jim, Further to our conversation earlier this week, I do not know if you were aware of the attached FOIA request. We will talk soon.

My best, Phil

TO: Phil Cooney

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

August 31, 2004

OTHER - FREEDOM BRANCH FREE, 100 FREE PAGES SEP 02 2004 02

BY FACSIMILE, ELECTRONIC MAIL, AND FIRST-CLASS MAIL

Mr. Abel Lopez
Ms. Carolyn Lawson
FOIA/PA Division, HR-73
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
Fax: (202) 586-0575
Email: carolyn.lawson@hq.doe.gov

RE: FREEDOM OF INFORMATION ACT REQUEST

Dear Mr. Lopez and Ms. Lawson:

On behalf of the Natural Resources Defense Council ("NRDC") and pursuant to both the Freedom of Information Act ("FOIA"), 5 U.S.C. § 552, and Department of Energy ("DOE") regulations, 10 C.F.R. §§ 1004.1, *et seq.*, we write to request that you send a copy of every record described herein to us at the address appearing on this letterhead. We ask that you respond to this letter, in accordance with FOIA and DOE regulations, within ten working days. Please send the requested records to us as you collect and review them. In other words, please do not delay the provision of any record pending the collection and review of any other.

Because this request relates to analyses, the results of which have already been published (see below), we believe that none of the requested records are exempt from mandatory disclosure under FOIA. Should you regard any requested record or portion thereof as exempt from mandatory disclosure, we ask that you exercise your discretion to disclose it anyway. For each requested record or portion thereof that you refuse to provide, we ask that you provide (1) basic factual material, including the originator, date, and length of the withheld material, and (2) a justification for the denial, including an identification of the asserted exemption and an explanation as to how each exemption fits the withheld material.

Please provide all requested records irrespective of the status and outcome of your evaluation of the fee category assertion and fee waiver request that appear below. In order to prevent delay in DOE's provision of the requested records, we state that NRDC will, if necessary and under protest, pay fees in accordance with 10 C.F.R. § 1004.4(e).[1] Such payment shall not constitute any waiver of NRDC's right to seek administrative or judicial review of any denial of its fee waiver request and/or rejection of its fee category assertion.

[1] Please consult with us, however, before undertaking any action that would cause the fee to exceed two hundred dollars.

www.nrdc.org
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TEL 202 289-6868 FAX 202 289-1060

NEW YORK · LOS ANGELES · SAN FRANCISCO

F2004-00514

I. Definitions

"Record" refers to any writing (handwritten or typed) in the agency's possession (irrespective of how it is stored), including but not limited to any piece of correspondence, minutes of a meeting, memorandum, note, electronic message, calendar entry, agenda, notice, and telephonic facsimile generated after June 1, 2001.

II. Description of Requested Records

Please provide all records constituting, containing, describing, or mentioning the "U.S. Climate Change Technology Program Draft Strategic Plan: Vision and Framework," cited in an article by Secretary Abraham published in *Science* magazine, July 30, 2004 at pages 616-617, note 14 (as attached) item A. That article contains a figure (page 617) displaying the results of analyses carried out as part of the Climate Change Technology Program's Strategic Plan. The records we request include, but are not limited to, the analyses from which these published results are derived.

III. Request for a Fee Waiver

We request that DOE waive the fee that it would otherwise charge for search and production of the records described above. FOIA dictates that requested records be provided without charge "if disclosure of the information is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the government and is not primarily in the commercial interest of the requester." 5 U.S.C. § 552(a)(4)(A)(iii). *See also* 10 C.F.R. § 1004.9(a)(8). The requested disclosure would meet both of these requirements.

A. First Requirement

The disclosure requested here would be "likely to contribute significantly to public understanding of the operations or activities of the government." 5 U.S.C. § 552(a)(4)(A)(iii).

The requested records concern results of analyses undertaken as part of the U.S. government's Climate Change Technology Program. As such, the records requested herein concern "identifiable operations or activities of the Federal government." 10 C.F.R. § 1004.9(a)(8)(i)(A) (internal quotation marks omitted).

The requested disclosure is "likely to contribute to an understanding of government operations or activities." 10 C.F.R. § 1004.9(a)(8)(i)(B) (internal quotation marks omitted), as it will provide information explaining the derivation of the analytical results published by Secretary Abraham in the above-referenced *Science* magazine article.

Currently, the general public does not know the extent and particulars of the cooperation between DOE employees and representatives of the regulated community on the subject of New Source Review. Disclosure of the records requested above will thus "contribut[e] to an understanding by the general public of the subject likely to result from the disclosure." 10 C.F.R. § 1004.9(a)(8)(i)(C).

Finally, the disclosure of the requested documents will "contribute 'significantly' to public understanding of government operations or activities," 10 C.F.R. § 1004.9(1)(8)(i)(D), for NRDC will disseminate widely its summary and analysis of the information conveyed in the records. NRDC has a proven ability to digest and disseminate information effectively. In addition to its web site (www.nrdc.org) which is updated daily, NRDC has numerous other means to widely disseminate information to the public including numerous and varied publications, educational programs, media initiatives, and public interest litigation. For example, *Nature's Voice* is published and distributed five times a year by NRDC to its approximately 450,000 active members. NRDC also publishes a magazine, *OnEarth*, which is distributed to 140,000 subscribers and is also distributed for sale to newsstands and bookstores. *OnEarth* is available online free of charge at http://www.nrdc.org/onearth/02spr/default.asp. NRDC also regularly distributes information and alerts to its 490,000 online activists. *See, e.g.*, Action Alert on Arctic National Wildlife Refuge, April 16, 2002 (Attachment 1); Join Me in Signing the Declaration of Energy Independence, February 11, 2002 (Attachment 2).

NRDC routinely uses FOIA to obtain information from federal agencies that NRDC legal and scientific experts analyze in order to inform the public about a variety of issues including energy policy, urban air pollution, water pollution, climate change, and nuclear weapons. Some specific examples are provided below:

(1) NRDC obtained through a FOIA request a memorandum by ExxonMobil advocating the replacement of a highly respected atmospheric scientist, Dr. Robert Watson, as the head of the Intergovernmental Panel on Climate Change. NRDC used this memorandum to help inform the public about what may have been behind the decision by the Bush Administration to replace Dr. Watson. See NRDC Press Release, "Confidential

Papers Show Exxon Hand in White House Move to Oust Top Scientist from International Global Warming Panel," April 3, 2002. (Attachment 3); Elizabeth Shogren, "Charges Fly Over Science Panel Pick," *Los Angeles Times*, April 4, 2002, at A19. (Attachment 4)

(2) In the summer of 2000, NRDC obtained information through FOIA regarding the levels of arsenic in drinking water supplies across the country. NRDC made much of the information available on the NRDC web site and provided analysis describing its significance and guiding interested members of the public on how to learn more about arsenic in their own drinking water supplies. See Steve LaRue, "EPA Aims to Cut Levels of Arsenic in Well Water," *San Diego Union-Tribune*, June 5, 2000, at B1. (Attachment 5)

(3) NRDC used information obtained through FOIA requests to produce and distribute a report analyzing the impacts of manure pollution from large livestock feedlots on fish and wildlife, as well as human health. *Spills & Kills* (August 2000). (Attachment 6)

(4) NRDC used information obtained from numerous FOIA requests to publish five databooks between 1984 and 1994 describing the history of nuclear weapons programs in the United States, Soviet Union, Britain, France and China. (Attachment 7)

(5) NRDC obtained through a FOIA request a Defense Department document, the *History of the Custody and Deployment of Nuclear Weapons: July 1945 through September 1977*. The document attracted significant press attention once it was disclosed. *See, e.g.*, Walter Pincus, "Study Says U.S. Secretly Placed Bombs; Cold War Deployments Affected Mostly Allies," *Washington Post*, Oct. 20, 1999, at A3. (Attachment 8) One of NRDC's nuclear scientists, Robert Norris, published a detailed analysis of this document explaining its significance to the public. Robert S. Norris, William M. Arkin, and William Burr, "Where They Were," *Bulletin of Atomic Scientists* (Nov/Dec 1999). (Attachment 9)

(6) NRDC regularly publishes a Nuclear Notebook, often using information obtained through FOIA requests. The Nuclear Notebook provides current information about the nuclear weapons programs of the United States and other nations. It is published in each issue of the Bulletin of Atomic Scientists.

See, e.g., "U.S. Nuclear Forces, 2002," *Bulletin of Atomic Scientists*, May/June 2002 (Attachment 10).

(7) In 1996, NRDC obtained through a FOIA request test results regarding lead levels in the District of Columbia's drinking water supplies. NRDC made the test results public as well as analysis explaining the significance of the results. See, D'Vera Cohn, "Tap Water Safeguards Still Stalled; City Failed to Tell Some Residents of Excess Lead Contamination." *Washington Post*, April 18, 1996, at J1. (Attachment 11)

(8) In 1989, NRDC obtained through a FOIA request testimony by federal experts who opposed oil drilling off the coasts of California and Florida. The Bush Administration had previously suppressed the testimony. See Larry Liebert, "Oil Testimony Reportedly Quashed; Environmentalists Say Federal Experts Pressured by Bush," *San Francisco Chronicle*, Oct. 5, 1989, at A6. (Attachment 12)

(9) In 1988, NRDC obtained through a FOIA request a report by the U.S. Fish and Wildlife service that declared that the government's review of offshore oil drilling in Northern California was incomplete and overly optimistic. Reagan Administration officials had tried to keep the report secret and then repudiated it upon its release. See Eric Lichtblau, "Federal Report Blasts Offshore Oil Studies," *Los Angeles Times*, June 4, 1988, at A32. (Attachment 13)

(10) In 1982, NRDC obtained through a FOIA request a memorandum by the U.S. Environmental Protection Agency stating that most air pollution monitors have repeatedly underestimated levels of toxic lead in the air. NRDC used the memorandum to inform the public about the consequences of EPA's proposal to relax restrictions on lead in gasoline. See, Sundra Sugawara, "Lead in Air is Undermeasured, EPA Section Chief's Memo Says," *Washington Post*, July 11, 1982, at A6. (Attachment 14)

In sum, once DOE provides the requested records to NRDC, the organization will employ its proven methods and expertise to educate the general public on the analyses conducted for the results presented in the article by Secretary Abraham. Thus, NRDC's use of the requested records will significantly enhance the general public's understanding of the activities and operations of the federal government. 10 C.F.R. § 1004.9(1)(8)(i)(D).

emissions in 2012, with more than 300 MMTCe in cumulative savings over the decade (3).

To this end, the administration has developed an array of policy measures, including financial incentives and voluntary programs. For example, our Climate VISION (4)

ity, are needed to predict future climate change with greater confidence.

Last summer, the Climate Change Science Program (CCSP) released a new strategic plan that addresses these gaps (10). The plan is organized around five goals: (1) improving our knowledge of all

that, like climate sensitivity, are uncertain. The complex relations among population growth; economic development; energy demand, mix, and intensity; resource availability; technology; and other variables make it impossible to accurately predict fu-

B. Second Requirement

Disclosure in this case would also satisfy the second prerequisite of a fee waiver request in that it is "not primarily in the commercial interest of the requester." 10 C.F.R. § 1004.9(1)(8). NRDC is a not-for-profit organization and, as such, has no commercial interest. *See id.* § 1004.9(1)(8)(ii)(A).

IV. Conclusion

I thank you in advance for providing the requested records in a timely fashion. If you have any questions, please do not hesitate to contact me by telephone at (202) 289-6868.

Sincerely,

David G. Hawkins
Director
NRDC Climate Center

Cc (w/out attachments): David Conover

Attachment "A"

POLICY FORUM

CLIMATE

The Bush Administration's Approach to Climate Change

Spencer Abraham

As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), the United States shares with many countries its ultimate objective: stabilization of greenhouse gas concentrations in the atmosphere at a level that prevents dangerous interference with the climate system. Meeting this UNFCCC objective will require a long-term commitment and international collaboration.

President Bush's policy on climate change harnesses the power of markets and technological innovation, maintains economic growth, and encourages global participation. Although climate change is a complex and long-term challenge, the Bush administration recognizes that there are cost-effective steps we can take now.

Near-Term Policies and Measures

In 2002, President Bush set a national goal to reduce the greenhouse gas intensity (*1*) of the U.S. economy by 18% by 2012. This goal sets America on a path to slow the growth in greenhouse gas emissions and—as the science justifies and the technology allows—to stop and reverse that growth as needed to meet the UNFCCC goal (*2*). Our approach focuses on reducing emissions while sustaining the economic growth needed to finance investment in new, clean energy technologies. The administration estimates that this commitment will achieve about 100 million metric tons of carbon equivalent (MMTCe) of reduced emissions in 2012, with more than 500 MMTCe in cumulative savings over the decade (*3*).

To this end, the administration has developed an array of policy measures, including financial incentives and voluntary programs. For example, our Climate VISION (*4*), Climate Leaders (*5*), and SmartWay Transport Partnership (*6*) programs work with industry for voluntary reduction of emissions. The Department of Agriculture is using its conservation programs to provide an incentive for actions that increase carbon sequestration (*7*). We also are pursuing many energy supply technologies with comparatively low or zero CO_2 emissions profiles, such as solar, wind, geothermal, bioenergy, and combined heat and power. The president has proposed more than $4 billion in tax credits as incentives for these and other energy-efficient technologies over the next 5 years (*3*). Last year, the Bush administration increased fuel economy standards for new light trucks and sport utility vehicles by 1.5 miles per gallon over the next three model years, leading to the estimated avoidance of 9.4 MMTCe of emissions (*8*).

While acting to slow the pace of greenhouse gas emissions in the near term, the United States is laying a strong scientific and technological foundation to reduce uncertainties, to clarify risks and benefits, and to develop realistic mitigation options to meet the UNFCCC objective.

Advancing Climate Change Science

In 2001, President Bush commissioned the National Research Council (NRC) to examine the state of our knowledge and understanding of climate change science. The NRC's report (*9*) makes clear that there are still important gaps in our ability to measure the impacts of greenhouse gases on the climate system. Major advances in understanding and modeling of the factors that influence atmospheric concentrations of greenhouse gases and aerosols, as well as the feedbacks that govern climate sensitivity, are needed to predict future climate change with greater confidence.

Last summer, the Climate Change Science Program (CCSP) released a new strategic plan that addresses these gaps (*10*). The plan is organized around five goals: (i) improving our knowledge of climate history and variability; (ii) improving our ability to quantify factors that affect climate; (iii) reducing uncertainty in climate projections; (iv) improving our understanding of the sensitivity and adaptability of ecosystems and human systems to climate change; and (v) exploring options to manage risks. Annually, almost $2 billion is spent on climate change science by the federal government.

A review of the CCSP plan by NRC shows the administration is on the right track. While concern was expressed about future funding to execute the plan, the NRC concluded that it "articulates a guiding vision, is appropriately ambitious, and is broad in scope" (*11*).

NRC's report also identified the real need for a broad global observation system to support measurements of climate variables. Last June, the United States hosted more than 30 nations at the Inaugural Earth Observation Summit, out of which came a commitment to establish an intergovernmental, comprehensive, coordinated, and sustained Earth observation system. The data collected by this system will be used to create better climate models, to improve our knowledge of the behavior of CO_2 and aerosols in the atmosphere, and to develop strategies for carbon sequestration.

Accelerating Climate Change Technology Development

The Bush administration also is moving ahead on advanced technology options that have the potential to substantially reduce, avoid, or sequester future greenhouse gas emissions. About 80% of current greenhouse gas emissions are energy related, and, although projections vary considerably, a tripling of energy demand by 2100 is not unimaginable (*12*). Therefore, to provide the energy necessary for continued economic growth while we reduce greenhouse gas emissions, we may have to develop and deploy cost-effective technologies that alter the way we produce and use energy.

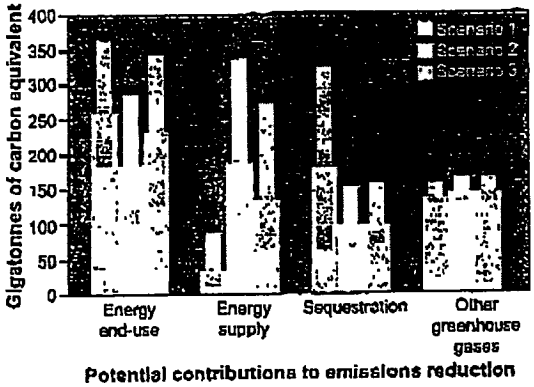
By 2100, more than half of the world's energy may have to come from low- or zero-emission technologies to attain the UNFCCC goal (*13*). The pace and scope of needed change will be driven partially by future trends in greenhouse gas emissions that, like climate sensitivity, are uncertain. The complex relations among population growth; economic development; energy demand, mix, and intensity; resource availability; technology; and other variables make it impossible to accurately predict future greenhouse gas emissions on a 100-year time scale.

The Climate Change Technology Program (CCTP) was created to coordinate and prioritize the federal government's nearly $3 billion annual investment in climate-related technology research, development, demonstration, and deployment (RDD&D). Using various analytical tools, CCTP is assessing different technology options and their potential contributions to

The author is the U.S. Secretary of Energy, 1000 Independence Avenue, SW, Washington, DC 20585, USA.

reducing greenhouse gas emissions. Given the tremendous capital investment in existing energy systems, the desired transformation of our global energy system may take decades or more to implement fully. A robust RDD&D effort can make advanced technologies available sooner rather than later and can accelerate modernization of capital stock at lower cost and with greater flexibility.

CCTP's strategic vision has six complementary goals: (i) reducing emissions from energy use and infrastructure; (ii) reducing emissions from energy supply; (iii) capturing and sequestering CO_2; (iv) reducing emissions of other greenhouse gases; (v) measuring and monitoring emissions; and (vi) bolstering the contributions of basic science (*14*).



Potential ranges of greenhouse gas emissions reductions to 2100 by category of activity for three technology scenarios characterized by viable carbon sequestration (scenario 1); dramatically expanded nuclear and renewable energy (scenario 2); and novel and advanced technologies (scenario 3) (*14*).

Ten federal agencies support a portfolio of activities within this framework. Annually, more than $700 million is being spent to advance energy efficiency technologies (plus $500 million for accelerated deployment), and more than $200 million supports renewable energy. Many activities build on existing work, but the Bush administration also has expanded and realigned some activities and launched new initiatives in key technology areas to support the CCTP's goals.

In his 2003 State of the Union address, President Bush made a commitment to the development of a hydrogen economy, pledging $1.7 billion over 5 years for his Hydrogen Fuel Initiative and FreedomCAR Partnership to develop hydrogen fuel cell–powered vehicles. The transition to hydrogen as a major energy carrier over the next few decades could transform the nation's energy system and create opportunities to increase energy security by making better use of diverse domestic energy sources for hydrogen production and to reduce emissions of air pollutants and CO_2 (*15*). Where hydrogen is produced from fossil fuels, we must also address carbon capture and sequestration.

To help coordinate and leverage ongoing work overseas, the United States led the effort to form the International Partnership for the Hydrogen Economy (IPHE). IPHE will address the technological, financial, and institutional barriers to hydrogen and will develop internationally recognized standards to speed market penetration of the new technologies.

The administration also is pursuing next-generation nuclear energy as a zero-emissions energy supply choice. The Generation IV International Forum, with nine other nations as partners, is working on reactor designs that are safe, economical, secure, and able to produce new products, such as hydrogen. Six promising technologies have been selected as candidates for future designs and could be ready as early as 2015. In 2003, President Bush announced that the United States would join the ITER project to develop fusion as an energy source. Although the technical hurdles are substantial, the promise of fusion is simply too great to ignore.

Carbon capture and sequestration is a central element of CCTP's strategy because for the foreseeable future, fossil fuels will continue to be the world's most reliable and lowest-cost form of energy. It is unrealistic to expect countries—particularly developing countries—with large fossil reserves to forgo their use. A realistic approach is to find ways to capture and store the CO_2 produced when these fuels are used.

The Department of Energy is currently working on 65 carbon sequestration projects around the country. In the last 2 years, we have increased the budget for these activities 23% to $49 million. The multilateral Carbon Sequestration Leadership Forum, a presidential initiative inaugurated in June 2003 with 16 partners, will set a framework for international collaboration on sequestration technologies.

The forum's partners are eligible to participate in FutureGen, a 10-year, $1 billion government-industry effort to design, build, and operate the world's first emissions-free coal-fired power plant. This project, which cuts across many CCTP strategic goals, will employ the latest technologies to generate electricity, produce hydrogen, and sequester CO_2 from coal. Through this research, clean coal can remain part of a diverse, secure energy portfolio well into the future.

These initiatives and other technologies in the CCTP portfolio (*16*) could revolutionize energy systems and put us on a path to ensuring access to clean, affordable energy supplies while dramatically reducing greenhouse gas emissions. The figure, left, offers a glimpse of the range of emissions reductions new technologies might make possible in energy end use, energy supply, carbon sequestration, and other greenhouse gases on a 100-year scale and across a range of uncertainties.

The Bush administration has developed a comprehensive strategy on climate change that is informed by science, emphasizes innovation and technological solutions, and promotes international collaboration to support the UNFCCC objective. Although the scientific and technology challenges are considerable, the president remains committed to leading the way on climate change at home and around the world.

References and Notes

1. Measured as the ratio of greenhouse gases (carbon equivalent) emitted per real gross domestic product.
2. See www.whitehouse.gov/news/releases/2002/02/addendum.pdf.
3. *Global Climate Change Policy Book: A New Approach* (The White House, Washington, DC, 14 February 2002); available at www.whitehouse.gov/news/releases/2002/02/climatechange.html.
4. See www.climatevision.gov.
5. See www.epa.gov/climateleaders.
6. See www.epa.gov/smartway.
7. See www.usda.gov/news/releases/2003/06/fs-0194.htm.
8. National Highway Traffic Safety Administration, *Final Environmental Assessment: National Highway Traffic Safety Administration Corporate Average Fuel Economy (CAFE) Standards* (NHTSA, Washington, DC, 2003); available at: www.nhtsa.dot.gov/cars/rules/cafe/docs/239533_web.pdf.
9. National Research Council, *Climate Change Science: An Analysis of Some Key Questions*, Committee on the Science of Climate Change (National Academy Press, Washington, DC, 2001), pp. 20–21.
10. CCSP, *Strategic Plan for the U.S. Climate Change Science Program* (CCSP, Washington, DC, July 2003); available at www.climatescience.gov.
11. National Research Council, *Implementing Climate and Global Change Research: A Review of the Final U.S. Climate Change Science Program Strategic Plan* (National Academies Press, Washington, DC, 2004), p. 1.
12. Intergovernmental Panel on Climate Change, "An overview of the scenario literature," *Emissions Scenarios* (Cambridge Univ. Press, Cambridge, 2000).
13. See, for example, K. Caldeira, A. K. Jain, M. I. Hoffert, *Science* 299, 2052 (2003).
14. CCTP, *U.S. Climate Change Technology Program Draft Strategic Plan: Vision and Framework* (CCTP, Washington, DC, in preparation); see www.climatetechnology.gov.
15. National Research Council, *The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs* (National Academies, Washington, DC, 2004).
16. CCTP, *Research and Current Activities* (CCTP, Washington, DC, 2003); available at www.climatetechnology.gov.

PEW CENTER ON Global CLIMATE CHANGE

For Immediate Release
October 2004

Contact: Katie Mandes
703-516-4146

CLIMATE POLICY AND TECHNOLOGICAL CHANGE

New report examines how climate policies affect the cost of greenhouse gas mitigation

WASHINGTON, DC — With Russian ratification of the Kyoto Protocol now likely, the development and deployment of technologies to reduce global emissions is more critical than ever. While technological change occurs naturally as companies compete in the marketplace, climate policies can spur additional or "induced" technological change (ITC).

Induced Technological Change and Climate Policy, by Larry Goulder of Stanford University, explores the use of ITC in climate policy, using state-of-the-art economic modeling and analysis. Goulder finds that models that include ITC produce lower cost estimates for GHG reductions, and that costs are lowest when climate policies are announced in advance. Furthermore, he finds that to reduce greenhouse gas emissions most cost-effectively, both policies that boost technological innovation, such as R&D funding, and policies that limit emissions, such as a GHG cap-and-trade program, are required.

"This research shows us that the costs of meeting a long-term CO_2 emissions target using both R&D subsidies and a carbon tax (or cap-and-trade) is roughly 10 times less than with R&D subsidies alone," said Eileen Claussen, President of the Pew Center on Global Climate Change.

A crucial point is that although studies show different implications of ITC on the overall timing of climate policy, all find that some abatement must begin now in order to jumpstart the critical process of technological change. "Timing is crucial for dealing with this issue in a cost-effective manner; the longer we wait, the more expensive it will be," said the Pew Center's Claussen.

The full text of this and other Pew Center reports is available at http://www.pewclimate.org.

Advancing the debate through credible analysis and cooperative approaches.

2101 Wilson Blvd.
Suite 550
Arlington, VA 22201
ph (703) 516-4146
fax (703) 841-1422
www.pewclimate.org

About the Author

LAWRENCE H. GOULDER

Lawrence Goulder is the Shuzo Nishihara Professor in Environmental and Resource Economics at Stanford University. He is also a Senior Fellow at Stanford's Institute for International Studies and its Institute for Economic Policy Research; a Research Associate at the National Bureau of Economic Research; and a University Fellow of Resources for the Future, a non-profit environmental and natural resource research firm located in Washington, DC.

Goulder graduated from Harvard College with an A.B. in philosophy in 1973. He obtained a master's degree in musical composition from the Ecole Normale de Musique de Paris in 1975 and earned a Ph.D. in economics from Stanford in 1982. He was a faculty member in the Department of Economics at Harvard before returning to Stanford's economics department in 1989.

Goulder's research examines the environmental and economic impacts of U.S. and international environmental policies. He has focused considerably on policies to reduce emissions of "greenhouse gases" that contribute to climate change, and on "green tax reform" - revamping the tax system to introduce taxes on pollution and reduce taxes on labor effort or investment. In other work he has examined connections between environmental policies and technological innovation. His work often employs a general equilibrium analytical framework that integrates the economy and the environment and links the activities of government, industry, and households. The research considers both the aggregate benefits and costs of various policies as well as the distribution of policy impacts across industries, income groups, and generations. Some of his work is interdisciplinary, involving collaborations with climatologists and biologists. He has conducted analyses for several government agencies and environmental organizations.

The Pew Center was established in May 1998 by The Pew Charitable Trusts, one of the United States' largest philanthropies and an influential voice in efforts to improve the quality of the environment. The Pew Center is an independent, nonprofit, and non-partisan organization dedicated to providing credible information, straight answers, and innovative solutions in the effort to address global climate change. The Pew Center is led by Eileen Claussen, former U.S. Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs.

Reducing Risks from Climate Change

To address climate change without disrupting the nation's economy. the Commission recommends:

- ***Implementing in 2010 a mandatory, economy-wide tradable permit system designed to curb future growth in the nation's emissions of greenhouse gases while capping initial costs to the U.S. economy at $7 per metric ton of carbon dioxide-equivalent.***
- ***Linking subsequent action to reduce U.S. emissions with efforts by other developed and developing nations to achieve measurable and effective emissions reductions via a review of program efficacy and international progress in 2015.***

The Commission believes the United States must take responsibility for addressing its contribution to the risks of global climate change, but must do so in a manner that recognizes the global nature of this challenge and does not harm the competitive position of U.S. businesses internationally.

The Commission proposes a flexible, market-based strategy is designed to slow projected growth in domestic greenhouse gas emissions as a first step toward later stabilizing and ultimately reversing current emissions trends if comparable actions by other countries are forthcoming and as scientific understanding warrants.

Under the Commission's proposal, the U.S. government in 2010 would begin issuing permits for greenhouse gas emissions based on an annual emissions target that reflects a 2.4 percent per year reduction in the average greenhouse gas emissions intensity of the economy (where intensity is measured in tons of emissions per dollar of GDP).

Most permits would be issued at no cost to existing emitters, but a small pool, 5 percent at the outset, would be auctioned to accommodate new entrants, stimulate the market in emission permits, and fund research and development of new technologies. Starting in 2013, the amount of permits auctioned would increase by one-half of one percent each year (i.e., to 5.5 percent in 2013; 6 percent in 2014, and so on).

The Commission's proposal also includes a safety valve mechanism that allows additional permits to be purchased from the government at an initial price of $7 per metric ton of carbon dioxide (CO_2)-equivalent. The safety valve price would increase by 5 percent per year in nominal terms to generate a gradually stronger market signal for reducing emissions without prematurely displacing existing energy infrastructure.

In 2015, and every five years thereafter, Congress would review the tradable permits program and evaluate whether emissions control progress by major trading partners and competitors (including developing countries such as China and India) supports its continuation. If not, the United States would suspend further escalation of program requirements. Conversely, international progress, together with relevant environmental and technological considerations, could lead Congress to strengthen U.S. efforts.

Absent policy action, annual U.S. greenhouse gas emissions are expected to grow from 7.8 billion metric tons of CO_2-equivalent in 2010 to 9.1 billion metric tons by 2020 — a roughly 1.3 billion metric ton per year increase. Modeling analyses suggest that the Commission's proposal would reduce emissions in 2020 by approximately 560 million metric tons. If technology innovations in combination with efficiency initiatives proposed elsewhere in this report produce lower abatement costs than current models assume, then fewer permits will be purchased under the safety valve mechanism and actual reductions could roughly double to as much as 1.1 billion metric tons in 2020.

The impact of the Commission's proposed climate program on future energy prices would be modest. Modeling indicates that relative to business-as-usual projections for 2020, average costs for electricity production would be expected to rise by 5–8 percent (or half a cent per kilowatt-hour); natural gas prices would rise by about 7 percent (or $0.40 per mmBtu); and gasoline prices would increase 4 percent (or 6 cents per gallon). Coal use would decline by 9 percent below current forecasts, yet would still increase in absolute terms 20 percent relative to today's levels, while renewable energy production would grow more substantially; natural gas use and overall energy consumption, meanwhile, would change only minimally (1.5 percent or less) relative to business-as-usual projections.

Overall, the Commission's climate recommendations are estimated to cost the typical U.S. household the equivalent (in 2004 dollars) of $33 per year in 2020 and to result in a slight (0.2 percentage point) reduction in expected GDP growth.

Improving Energy Efficiency

To improve the energy efficiency of the U.S. economy, the Commission — in addition to an increase in vehicle fuel economy standards — recommends:

- ***Updating and expanding efficiency standards for appliances and equipment.***
- ***Updating building codes to capture additional cost-effective efficiency opportunities in new residential and commercial construction.***
- ***Pursuing cost-effective efficiency improvements in the industrial sector.***

In addition, efforts should be made to address efficiency opportunities in the heavy-duty truck fleet, which is responsible for roughly 20 percent of transportation energy consumption, but is not subject to fuel economy regulation, and in the existing vehicle fleet where a substantial opportunity exists to improve efficiency by, for example, mandating that replacement tires have rolling-resistance characteristics equivalent to the original equipment tires used on new vehicles.

In updating and implementing efficiency standards, policy makers should seek wherever possible to exploit potentially productive synergies with targeted technology incentives, research and development initiatives, information programs (such as the federal Energy Star label), and efficiency programs sponsored by both electricity and natural gas utilities.

Fw CommWG Re Next CIWG Meeting Nov. 17-Info to read-Action Items!
From: Cooney, Phil
Sent: Wednesday, November 10, 2004 7:22 PM
To: Hannegan, Bryan J.
Subject: Fw: [CommWG] Re: Next CIWG Meeting Nov. 17-Info to read-Action Items!

-----Original Message-----
From: Holbrook, William F. <William_F._Holbrook@ceq.eop.gov>
To: Cooney, Phil <Phil_Cooney@ceq.eop.gov>
Sent: Wed Nov 10 19:07:37 2004
Subject: Fw: [CommWG] Re: Next CIWG Meeting Nov. 17-Info to read-Action Items!

.

-----Original Message-----
From: outreach-bounces@usgcrp.gov <outreach-bounces@usgcrp.gov>
To: outreach@usgcrp.gov <outreach@usgcrp.gov>; cbell@usgs.gov <cbell@usgs.gov>; patricia.klintberg@usda.gov <patricia.klintberg@usda.gov>; daytond@onr.navy.mil <daytond@onr.navy.mil>; povenmiresl@state.gov <povenmiresl@state.gov>; craig.montesano@noaa.gov <craig.montesano@noaa.gov>; parker.kathryn@epa.gov <parker.kathryn@epa.gov>; kent.laborde@noaa.gov <kent.laborde@noaa.gov>; ahsha.tribble@noaa.gov <ahsha.tribble@noaa.gov>
CC: rmoss@usgcrp.gov <rmoss@usgcrp.gov>; james.r.mahoney@noaa.gov <james.r.mahoney@noaa.gov>
Sent: Wed Nov 10 19:04:35 2004
Subject: [CommWG] Re: Next CIWG Meeting Nov. 17-Info to read-Action Items!

Dear CIWG Members,

As you are all aware, our next CIWG meeting will be held next Wednesday, Nov. 17 from 2:30-4:00 PM at the CCSP Office. This is an important meeting. Dr. Mahoney will be joining us and there are several action items and decisions to be made. The following information is attached for your review prior to Wed.'s meeting:

1. Sept. 22 Draft Meeting minutes
2. Draft Meeting Agenda
3. Draft Terms of Reference (reviewed and approved by Dr. Mahoney) 4. Draft Implementation Plan* (reviewed and approved by Dr. Mahoney)

* note that this includes two spreadsheets: the deliverables timeline and the agencies inventory

We will be approving the documents #2 and 3 and sending them to the Principals for final approval.

ACTION ITEMS-PLEASE COMPLETE PRIOR TO WEDNESDAY'S MEETING

A. Review of above documents
B. Complete agency inventory for your agency, focusing on November and December activities, but also noting any activities for a "featured topic" (as outlined in our implementation plan).
C. We will need input for FY2006 Our Changing Planet. More to come on this.

Please attend in person. If you must call in, the number is:

1-800-516-9896 and the participant code (enter at prompt) is 418816, followed by #.

If you are unable to make it, please make sure an alternate representative from your agency is present. We need everyone's participation as we will be making several

Fw CommWG Re Next CIWG Meeting Nov. 17-Info to read-Action Items! important decisions.

Thank you and we look forward to seeing everyone next Wednesday,

Kathryn (and Keya)

From: ccsp-bounces@usgcrp.gov on behalf of Peter Schultz [pschultz@usgcrp.gov]
Sent: Thursday, November 11, 2004 2:41 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov; ipo@usgcrp.gov
Subject: [ccsp] Meeting of the CCSP Principals
CCSP Principals,

Dr. Mahoney would like to convene the next meeting of the CCSP Principals on Tuesday, November 30 from 3 to 5 PM at the CCSPO at 1717 Pennsylvania Ave., NW, Suite 250. **Please notify Sandy MacCracken (smaccrac@usgcrp.gov, 202-419-3483) whether you or a designee will attend this meeting.** The agenda and briefing materials will be forthcoming.

Dr. Mahoney would like to begin to convene the CCSP Principals at a regular date & time each month. We are considering Tuesday, Wednesday, or Thursday of the 3rd week in each month from 3 to 5 PM. **Please let Sandy know which of these you prefer. If none of these work for you, please let her know dates/times that would be suitable.**

Cheers,
Peter Schultz

Peter A. Schultz, Ph.D.
Associate Director for Science Integration
Climate Change Science Program Office
(Incorporating the U.S. Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: pschultz@usgcrp.gov
Telephone: 202.419.3479
Fax: 202.223.3065

Hannegan, Bryan J.

From: Cooney, Phil
Sent: Tuesday, November 23, 2004 4:04 PM
To: Perino, Dana M.; Olsen, Kathie L.; Hannegan, Bryan J.
Subject: FW: Latest Reuters and CBC Stories on Arctic Council and Climate Change

-----Original Message-----
From: Watson, Harlan L (OES) [mailto:WatsonHL@state.gov]
Sent: Tuesday, November 23, 2004 3:41 PM
To: Peel, Kenneth L.; Cooney, Phil
Subject: Latest Reuters and CBC Stories on Arctic Council and Climate Change

> CBC.North.CA, Tuesday, November 23, 2004, 1:15 PM CST Marathon session
> ends with climate change consensus
>
> REYKJAVIK, Iceland - The Arctic Council's eight member nations have
> averted a political crisis by reaching a deal on policy
> recommendations on climate change.
>
> <<...OLE_Obj...>>
> 'We have expected more but at least we have a policy document' - Geir
> Tommy Pedersen
> After 18 hours of talks and numerous calls to Washington and other
> capitals, negotiators and their climate experts from all eight
> countries reached a consensus at the Reykjavik conference.
>
> The details of the recommendations, to accompany the Arctic Climate
> Impact Assessment released recently in Iceland, will be released
> Wednesday.
>
> For months, the United States has been at odds with the other seven
> nations over the content of the policy recommendations and how they
> should be presented.
>
> The recommendations address greenhouse gas emissions and mitigation,
> the need for additional research in some areas and public education.
>
> U.S. State Department spokesperson Sally Brandel defended the American
> position to date, saying the U.S. could only support policy
> recommendations it agreed with.
> <<...OLE_Obj...>>
> 'It's an important step for the Arctic Council to have worked through a
> controversial issue' - Sally Brandel
>
> Brandel says it was a give-and-take situation for all the countries
> involved.
>
> "It's an important step for the Arctic Council to have worked through
> a controversial issue, political issue, and to have in a sense grown
> stronger for having survived, maybe our first, quite controversial
> issue," she says.
>
> Representatives of indigenous groups at the Arctic Council are
> welcoming the agreement on a policy document.
>
> They say it's not as strong as they wanted but it's a beginning.
>
> "We feel good about this because we have been promoting this
> document all the time from ICC," says Puju Christen Olsen of the Inuit
> Circumpolar Conference.

> "This is a step forward and of course, we have expected more but at
> least we have a policy document so there's something to work further
> on," added Geir Tommy Pedersen, president of the Saami Council for
> Norway, Sweden, Finland and Russia.
>
> The policy recommendations still have to be approved by ministers from
> all eight nations.
>
> They'll gather in Iceland for the meeting of the Arctic Council
> Wednesday.
>
> Details of the policy document will be released at that time.
>
> Reuters, Tuesday, November 23, 2004, 17:15:31 GMT
> Arctic nations to make scant promises to slow thaw
> By Alister Doyle
>
> REYKJAVIK, Nov 23 (Reuters) - Eight Arctic countries will make scant
> promises to slow a rapid thaw of the region linked to global warming
> at a meeting in Iceland on Wednesday after U.S. opposition to firmer
> action, delegates said.
>
> A draft policy document to be adopted by foreign ministers at the
> Arctic Council makes no common call, for instance, to cut emissions of
> greenhouse gases widely blamed for warming the Arctic twice as fast as
> the rest of the globe.
>
> "The Arctic Council is not a forum for negotiating or making
> commitments" linked to global warming, Gunnar Palsson, the Icelandic
> chair of preparatory talks among senior officials, told Reuters on
> Tuesday.
>
> Delegates said the United States, the only Arctic nation outside the
> U.N.'s Kyoto protocol on curbing heat-trapping emissions from fossil
> fuels, had opposed stronger recommendations favoured by some nations
> and indigenous groups.
>
> Environmentalists said the meeting was a lost opportunity to slow
> damaging climate change by nations with territory stretching into the
> Arctic - the United States, Russia, Canada, Sweden, Norway, Denmark,
> Finland and Iceland.
>
> Palsson said ministers would set no new binding commitments or dates
> for action in a document that has taken months of negotiations for the
> Arctic Council, set up after the Cold War.
>
> "They will address the need for the countries and the communities of
> the north to adapt to climate change, to mitigate the consequences of
> climate change, to engage in further research and monitoring and
> education," he said.
>
> The Arctic Climate Impact Assessment (ACIA), by 250 scientists and
> issued two weeks ago, says warming could melt the polar ice in summer
> by 2100, ruin the livelihoods of indigenous peoples and drive species
> like polar bears to extinction.
>
> The Arctic is thawing fast partly because dark oceans and ground, once
> exposed, soak up more heat than ice and snow.
>
> LOST CHANCE - WWF
>
> "The report gives such a strong warning of the changes to come that it
> deserves a very strong response," said Samantha Smith, director of the
> WWF environmental group's Arctic Programme.
>
> "If there are no new commitments then they will miss a chance to show

> leadership," she said. Nations around the Arctic account for almost 40
> percent of world greenhouse gas emissions, mainly from cars, factories
> and power plants.
>
> The United States is the top global polluter. Washington will be
> represented by Paula Dobriansky, Under Secretary, World Affairs, while
> other nations send government ministers.
>
> Some delegates said agreement on common policy recommendations was a
> victory of sorts after months of wrangling. Indigenous groups had
> wanted more but had won a far wider global understanding of their
> plight.
>
> Norwegian Foreign Minister Jan Petersen said the ACIA report could
> help a drive to persuade Washington to rejoin U.N. efforts on climate
> change.
>
> "This study shows fairly dramatic consequences and will influence the
> debate," he told Reuters. "We should never give up hope that the
> United States will sign up for the Kyoto process for a more effective
> climate policy."
>
> U.S. President George W. Bush pulled out of Kyoto in 2001, arguing
> that it was too expensive and wrongly excluded developing nations from
> a first round of cuts in emissions.
>
>
>
>

CEQ
336 PC

Industrial Minerals Association - North America

November 23, 2004

Philip Cooney, Esq.
Chief of Staff
Council on Environmental Quality
722 Jackson Place, NW
Washington, DC 20503

Dear Mr. Cooney:

On behalf of the Industrial Minerals Association – North America (IMA-NA), thank you, and Larisa Dobriansky, for taking time last week to meet with Richard Hodgson (Solvay), Steve Harvey (FMC), Jerry Hurley and me (IMA-NA).

As we discussed at our meeting, IMA-NA is pleased to respond to President Bush's challenge to help reduce intensity of greenhouse gas emissions over the next decade on behalf of its member companies in the soda ash, borates and sodium silicates industries[1]. We look forward to partnering with the Council on Environmental Quality (CEQ) and the Department of Energy (DOE) in the President's Climate VISION program to address the global climate issue through voluntary measures. We support this approach to achieve the environmental protection our nation requires without unacceptable damage to our national economy.

To that end, we look forward to receiving feedback from you and your staff on the IMA-NA Voluntary Greenhouse Gas Emission Reduction Program we shared with you during our meeting.

If IMA-NA can be of assistance to you in these efforts, please do not hesitate to let me know. In the meantime, we are preparing our Letter of Intent with a view to submitting it to DOE in the next few weeks and formalizing our partnership.

Sincerely,

Mark G. Ellis
President

[1] FMC Corporation, General Chemical Industrial Products, Inc. (including its Amherstburg, Ontario plant), PQ Corporation, Searles Valley Minerals, Solvay Chemicals, U.S. Borax.

4061 Powder Mill Road, Suite 450, Calverton, MD 20705 | 301-595-5550 | fax 301-595-3303 | www.ima-na.org

cc: Ms. Larisa Dobriansky
Richard Hodgson
Steve Harvey
Jerry Hurley

Industrial Minerals Association - North America

November 23, 2004

Ms. Larisa Dobriansky
Deputy Assistant Secretary for
National Energy Policy
U.S. Department of Energy
Policy and International Affairs (PI-60)
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary Dobriansky:

On behalf of the Industrial Minerals Association – North America (IMA-NA), thank you, and Philip Cooney, for taking time last week to meet with Richard Hodgson (Solvay), Steve Harvey (FMC), Jerry Hurley and me (IMA-NA).

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cc: Philip Cooney, Esq.
Richard Hodgson
Steve Harvey
Jerry Hurley

IMA-NA

Industrial Minerals Association – North America

November 23, 2004

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Deputy Assistant Secretary for
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U.S. Department of Energy
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1000 Independence Avenue, SW
Washington, DC 20585

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Sincerely,

Mark G. Ellis
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4061 Powder Mill Road, Suite 450, Calverton, MD 20705 | 301-595-5550 | fax 301-595-3303 | www.ima-na.org

cc: Philip Cooney, Esq.
Richard Hodgson
Steve Harvey
Jerry Hurley

CEQ 622PC

CCSP PRINCIPALS MEETING

Summary of Decisions/Actions and Discussic

December 1, 2004
10:00 a.m. - 12:00 noon
Climate Change Science Program Office
1717 Pennsylvania Avenue, NW, Suite 250

Attendance

James Mahoney, NOAA, Chair
Ghassem Asrar, NASA
Mitchell Baer, DOE
Ronald Birk, NASA
Karrigan Bork, DOT
William Breed, USAID
Margaret Cavanaugh, NSF
Mary Cleave, NASA
Margarita Conkright, NOAA
David Dokken, CCSPO
Jerry Elwood, DOE
William Farneth, DOS
Mary Glackin, NOAA
David Goodrich, NOAA
Bryan Hannegan, CEQ
William Hohenstein, USDA
Jack Kaye, NASA
Richard Moss, CCSPO
Patrick Neale, SI
Kathryn Parker, EPA
Rick Petty, DOE
Rick Piltz, CCSPO
Joel Scheraga, EPA
Peter Schultz, CCSPO
Michael Slimak, EPA
Nick Sundt, CCSPO
Ahsha Tribble, NOAA
Harlan Watson, DOS

CEQ 622PC

CCSP PRINCIPALS MEETING

Summary of Decisions/Actions and Discussic

December 1, 2004
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Margarita Conkright, NOAA
David Dokken, CCSPO
Jerry Elwood, DOE
William Farneth, DOS
Mary Glackin, NOAA
David Goodrich, NOAA
Bryan Hannegan, CEQ
William Hohenstein, USDA
Jack Kaye, NASA
Richard Moss, CCSPO
Patrick Neale, SI
Kathryn Parker, EPA
Rick Petty, DOE
Rick Piltz, CCSPO
Joel Scheraga, EPA
Peter Schultz, CCSPO
Michael Slimak, EPA
Nick Sundt, CCSPO
Ahsha Tribble, NOAA
Harlan Watson, DOS

From: ccsp-bounces@usgcrp.gov on behalf of James R. Mahoney [James.R.Mahoney@noaa.gov]
Sent: Monday, December 06, 2004 4:28 PM
To: ccsp@usgcrp.gov
Cc: Peter Schultz; Ahsha Tribble; Eric Locklear; Allandra Washington; Margarita Gregg
Subject: [ccsp] Update of CCSP Agency Budgets for OCP (FOR ACTION)
To CCSP Principals:

Please see the attached word document memo requesting agency inventory and budget information to be used in preparation of the FY 2006 version of *Our Changing Planet*. Also, please see the attached excel document containing spread sheet formats for providing the requested information.

In order to keep the production of Our Changing Planet on schedule, we are requesting that you submit this information no later than **COB on Tuesday, January 4, 2005**. Thank you for your prompt attention to this request.

Information copies of this request are also being sent to the Interagency Working Group on Climate Change science and Technology (the deputy secretaries).

With best regards,

Jim Mahoney

Attachments (2)

FW Nat. Media Report - Financial Times climate change science
From: Holbrook, William F.
Sent: Tuesday, December 07, 2004 3:12 PM
To: Hannegan, Bryan J.; Cooney, Phil
Subject: FW: Nat. Media Report - Financial Times, climate change science

-----Original Message-----
From: Scott Smullen [mailto:Scott.Smullen@noaa.gov]
Sent: Tuesday, December 07, 2004 2:47 PM
To: Povenmire Susan L (OES); Hopkins, Robert; Holbrook, William F.
Cc: james.r.mahoney@noaa.gov
Subject: Nat. Media Report - Financial Times, climate change science

National Media Report

Dr. Mahoney's off-the-record interview with Fiona Harvey of the Financial Times of London

December 3, 2004 - via telephone

Background:
Fiona is the new Financial Times reporter to cover environmental issues. Referred to NOAA via State Dept. PA, Fiona was sent to Washington, DC by her editors to gain interviews with the various enviro. agencies and top managers. She will be covering climate change and the COP10 proceedings in Buenos Aires. This interview should help frame her coverage of US views on climate change science.

Line of Questioning:
Q. NOAA is one of the main agencies looking at this issue. What is the main thinking about climate change in NOAA?

Mahoney explained his title and role at Commerce/NOAA and role with CCSP. He said the President designated this 13 agency 'super group' of federal offices to study climate change - CCSP. Cabinet level representation, it involves work and reporting of these agencies. The budget for CC is large - $2 billion in FY04 and 05. President said we won't sign Kyoto, but said we will do all we can to accelerate the science and make sure we get as much information we can at the earliest possible time for whatever action appears to be appropriate. The policy of the Administration is to 1) on science - advance and get as much science out as possible, as quickly as possible. and 2) to invest very heavily in technology and the anticipated market penetration of low or virtually zero green house gas emitting technology. 3) development and implementation of a series of voluntary emission reduction programs from virtually all the major industrial sectors of the country. 4) extensive international collaboration.
Administration is spending more than $4 billion on the steps I just outlined = $2B science, $2B on tech, and $800M on incentives for consumers and manufacturing.

Current thinking. I speak for all of the science agencies, not just NOAA. IPCC third assessment was out when current Administration came on. Next report out in 2007. President asked NAS to review, give views in 2001. Assessment = likely some of our observed CC phenomena is related to human activity, but there is likelihood that conclusions may be poorly drawn too. Likely significant human contribution, but the sense of significant uncertainty cannot be completely dismissed.
This is important because the resolution that may be required someday, in terms of mitigation effects, has the potential to be a costly impacts on the entire world. There is a humble realism to carefully examine, but also not jump ahead poorly formed views.

Science. We've increased the amount of attention paid to observation and climate parameters in the US and throughout the world. We're going to have to be able to very carefully measure parameters in the world and deduce trends and what they mean, now and in the future. We've been working on a big investment in ocean buoys,

accelerated satellite programs, and most of all a 10-year program of cooperating nations that was launched in ministerial level summit in the US a year and a half ago - GEOSS - that is more aggressive system to be fully deployed in 10 years. We've learned a lot more about the roles of aerosols and the heat balance in the ocean. Now we're dealing with lower atmosphere aerosols and carbon particles. We're beginning to get a better understanding of the role of the oceans and how it interacts with the atmosphere in terms of energy balance that in turn effects the temperature profiles and carbon balance. In the last year or two we're getting a better idea about the rates in which there is a transfer of heat or energy or temperature between the atmosphere and the oceans, and that other chemicals such as carbon or a combination of substances. As often with research, the things that we're learning raise as many questions as we're resolving. The best estimate is the oceans are accommodating something on the order of half of the net carbon flux. It is a much more intense focus on observation so that we can identify where we are and what the trends are. The role of aerosols and the coupling of oceans and atmosphere. And exploration of effectiveness of climate modeling. With CCSP - we've identified 21 synthesis and assessment reports, and are well in the process of dealing with these science questions, extensive reports to come. Idea is to incorporate wide range of views and agree on where we think we are.

Q. With all the science... when will there be a big enough body of enough when we can draw some conclusions?
There is no bright line where we can say one month or one year. From the US perspective, the commitment of more than $5 billion a year on science, tech, incentives and collaborative programs represents a decision that this is serious enough that a lot of action should be taken. That is response to those who say the US isn't doing anything.
The US is doing a lot. We take the science seriously. As the President has said.... as the science determines, other steps will be taken. The series of documents CCSP is producing will all be out in three years from now. The rights steps are being taken now. Certainly in the upcoming years we should know substantially more. We're trying to make sure the science is carefully reported in its own right. And that we don't use the science or the interpretation of the science to specifically make policy suggestions.

Q. What are you expecting this year. When Kyoto comes into force, will this have an effect on US?
I'd rather not comment on that. As the science lead, I don't want my comments to establish a bias. But let me say that the US continues to be a significant participant in the IPCC with a large number of scientists involved. And President Bush confirms the US commitment signed in Rio in '92 to prevent dangerous impacts from human influences on the climate. The policy of the US is there... there is dispute about the details. We're doing our science work, the US is making these major investments, the President confirms that, and the US is contributing to virtually every international effort other than Kyoto, and President confirms the obligation to Rio.

Q. The science... what's happening with earth observation.
A great deal. Last week a substantial working group session in Ottawa. (Mahoney gave background on Admiral Lautenbacher's vision and leadership in GEOSS and milestone expected in Brussels in February.
Smullen offered to send her background and updates from Ottawa).

End of interview.

POC: Scott Smullen, NOAA OPCIA, 202-482-1097

ccsp Summary of Decisions and Actions12-01-04 CCSP Principals Mtg
From: ccsp-bounces@usgcrp.gov on behalf of Peter Schultz [pschultz@usgcrp.gov]
Sent: Wednesday, December 08, 2004 4:32 PM
To: ccsp@usgcrp.gov; ccsp_info@usgcrp.gov
Cc: david.goodrich@noaa.gov; ipo@usgcrp.gov
Subject: [ccsp] Summary of Decisions and Actions,12-01-04 CCSP Principals Mtg

Dear CCSP Principals,

Attached is a summary of the decisions and actions from the December 1, 2004 CCSP Principals meeting. Please review the summary and send me any comments by December 15.

The summary lists three items for action by the CCSP Principals:

Action 2.iv. Agencies should review the list of S&A lead and supporting personnel and send any corrections to Peter Schultz by December 17, 2004. [Note: The list is attached to this email.]

Action 3.i. CCSP Principals should review the revised OCP production schedule and send comments to Peter Schultz by December 17, 2004. [Note: The revised schedule is attached to this email.]

Action 7. CCSP Principals should review the Communication IWG's Terms of Reference and Implementation Plan and send comments to Peter Schultz by December 22, 2004. The Terms of Reference, Implementation Plan, and nominations for CIWG Co-Chairs will be acted on at the January Principals meeting. [Note: The TOR and Implementation Plan are attached to this email.]

Please indicate the document name, page number, and line number associated with each of your comments.

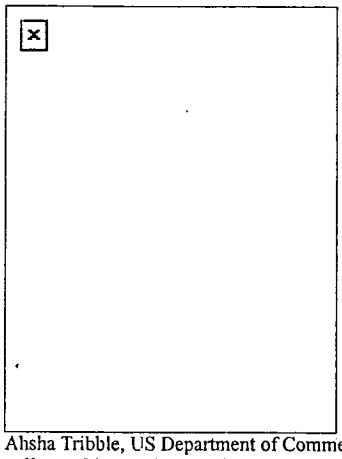
Cheers,
Peter

Peter A. Schultz, Ph.D.
Associate Director for Science Integration Climate Change Science Program Office
(Incorporating the U.S. Global Change Research Program and the Climate Change Research Initiative)
1717 Pennsylvania Avenue NW, Suite 250
Washington, DC 20006
Email: pschultz@usgcrp.gov
Telephone: 202.419.3479
Fax: 202.223.3065

From: Hannegan, Bryan J.
Sent: Thursday, December 09, 2004 1:30 PM
To: Connaughton, James; Cooney, Phil; turekianvc@state.gov
Subject: US Event at COP-10 Summary

A description of the US "side event" yesterday at COP-10. Note the discussion at the end and the points raised by various attendees....

US actions to address climate change
Presented by the US



Ahsha Tribble, US Department of Commerce, said science should inform rather than dictate policy making, and stressed that her Department's scientific programmes are open and transparent.

Ahsha Tribble, US Department of Commerce, introduced the Strategic Plan of the US Climate Change Science Programme, emphasizing that the aim of the programme is to reduce scientific uncertainty relating to climate change.

David Conover, US Department of Energy, noted the ambitious research and development agenda of his department's Climate Change Technology Programme. He stressed that the programme aims to ensure that a diverse portfolio of candidate technologies compete in the market place. He noted that energy efficiency represents the largest investment area, and said tax incentives are used to promote energy efficiency.

Noting that the agricultural sector both contributes to GHG emissions and is vulnerable to climate change, Bruce Knight, US Department of Agriculture, stressed the need to mitigate the impact of climate change on farmers and identify their role in reducing emissions. Knight indicated that, while the costs of reducing GHG emissions fall on the agricultural sector, the benefi ts are public. He stressed that farmers should be able to recover these costs, and identifi ed the need to value and market emerging benefits.

Larisa Dobriansky, US Department of Energy, introduced Climate Vision, a voluntary programme including 13 partner associations that represent 90% of US industrial emissions. She noted that the programme aims to examine climate technology needs, evaluate possible funding mechanisms, and promote research and development (R&D) and technology diffusion.

Susan Wickwire, US Environmental Protection Agency (EPA), described the EPA's voluntary climate change programmes, noting that they seek to address inefficiencies in the market and provide information, technical assistance, and recognition for environmental leadership.

Discussion:

Noting the high cost of the Climate Change Science Programme, a participant questioned whether the US might not rather have relied on science emerging from the IPCC and better spent the money directly on mitigation efforts. Harlan Watson, US Department of State, indicated that the IPCC's outputs do not represent the final word.

A participant highlighted the fact that, even if the US Presidential Climate Change Strategy's target to reduce GHG intensity by 18% by 2012 is met, overall US GHG emissions will increase by 14% from 2002-2012, to reach GHG emission levels of 32% above the 1990 baseline.

A participant highlighted uncertainty among US corporations concerning the status of early action credits and baselines for action as a hurdle to their involvement in voluntary agreements.

Harlan says the magic words (in red)
Sent: Thursday, December 09, 2004 5:39 PM
To: Marburger, John H.; Cooney, Phil; Olsen, Kathie L.
Subject: Harlan says the magic words (in red)

UN Framework Convention on Climate Change Conf.
Thursday, 9 December 2004, 2:07 pm
Press Release: US State Department

UN Framework Convention on Climate Change Conf.
Tenth Conference of the Parties to the UN Framework Convention on Climate Change

Dr. Harlan L. Watson, Senior Climate Negotiator and Special Representative and Alternate Head of the U. S. Delegation
Buenos Aires, Argentina
December 7, 2004

Dr. Watson: We welcome and congratulate the government of Argentina on hosting the meeting here and for the excellent arrangements they have made. We are certainly committed to working constructively and to having positive outcomes of this Conference of the Parties..

The United States does remain committed to the Framework Convention and to achieving its ultimate objective. However, we are taking a different path than Kyoto, which many of the parties here are taking. With regard to the actions the United States is taking, they are many, and I would challenge many of the Kyoto Protocol Parties to match us in the activities we are taking both domestically and internationally.

First of all, we have three prongs in our climate policy which President Bush announced in February 2002. The first is to reduce our greenhouse gas intensity at home, thereby slowing the growth of our greenhouse gas emissions. Second, we are making substantial investments in science and technology and institutions designed to address both climate change in the near term and in the long term. And, third, we are engaging actively in international cooperation -- both on a bilateral basis and on a multilateral basis.

With regard to our domestic program, we are committed to reducing our greenhouse gas intensity by 18% over the ten-year period 2002-2012. This is a domestic commitment the President made. We are doing this through a number of programs through both incentives and voluntary programs, and through some mandatory programs such as improving the fuel economy of our automobiles, improving the efficiency of our appliances and so on.

With regard to science, the United States is spending some $2 billion annually on the science of climate change, to address the uncertainties and help reduce these uncertainties. We spent some $23 billion dollars since 1990 when the U.S. Global Change Research Program was first initiated.

On the technology side, we spend approximately $3 billion dollars annually on a variety of technologies, the implementation of which would allow us to reduce our greenhouse gases over the long term. This includes both near-term options such as solar, and other renewable energy technologies, energy efficiency technologies, advanced fossil technologies -- and some longer-term technologies, such as advanced nuclear, both in fission and fusion, as well as strong investments in hydrogen and in carbon capture and storage.

Internationally -- we are engaged both, as I mentioned before, on a bilateral basis as well as multilaterally. Bilaterally, we have established partnerships with 14 countries and regional organizations -- many of which are Kyoto parties and some of which are not. We have well over 200 projects with our partners addressing climate change science, clean energy technologies, earth observations and so forth. We have also initiated, as I mentioned yesterday, some five multilateral initiatives

Harlan says the magic words (in red)
-- science and technology initiatives:

The Group on Earth Observations -- which is involving over 50 nations and 30 international organizations, as well as the European Commission, I might add, on helping to design and implement, over the next ten years, a comprehensive earth observation system which will provide data not only on climate change but also on other environmental issues.

We have a very strong partnership among 10 countries and the EURATOM on the Generation IV International Forum which is working to develop a new generation of nuclear reactors, which will be safer and more economic and secure, from a proliferation standpoint.

The Carbon Sequestration Leadership Forum, with some 16 countries and the European Commission, is working on technologies that will allow the capture and storage, in a safe and environmental manner, of emissions from fossil fuel burning plants.

The International Partnership for the Hydrogen Economy -- where again we have 16 countries and the European Commission -- is working to advance the global transition to a hydrogen economy.

And most recently, the Methane-to-Markets Partnership where 13 countries joined the United States this summer to launch an innovative program that will be targeted on reducing methane emissions, which is the second most important greenhouse gas. With regard to this latter partnership, the U.S. committed some $53 million to the Partnership over the next five years.

I want to close my opening remarks by referring to President Bush's commitment he made in June 2001 to develop with friends and allies and nations throughout the world an effective and science-based response to address climate change. The United States supports the development of an integrated approach to partnerships among governments, the private sector and NGOs that promotes economic growth, improves economic efficiency and productivity, enhances energy security, increases the availability of cleaner, more efficient energy resources and, of course, reduces pollution all in ways that have the effect of reducing nations' greenhouse gas intensity.

We believe that economic development is absolutely key to addressing this issue, because without economic development and economic growth around the world we are not going to be able to afford the new technologies that we need to address the problem in the long term.

And with that, I will be happy to stop and take any questions that you might have. Thank you.

Cooney, Phil

From: Hannegan, Bryan J.
Sent: Tuesday, December 14, 2004 2:14 PM
To: Cooney, Phil; 'Conover, David'
Cc: Perino, Dana M.; Holbrook, William F.
Subject: PointCarbon.com: US power companies set voluntary GHG reduction targets

US power companies set voluntary GHG reduction targets

A group comprised of seven US power organisations and companies have signed a voluntary agreement with the Department of Energy to reduce their greenhouse gas emissions in a move towards meeting President Bush' emissions intensity objective.

The US Department of Energy and Power Partners is made up by the American Public Power Association, Edison Electric Institute, Electric Power Supply Association, Large Public Power Council, National Rural Electric Cooperative Association, Nuclear Energy Institute, and Tennessee Valley Authority. It is these actors who have now signed a Memorandum of Understanding (MoU) to cut their emissions.

They have pledged to reduce collectively the power sector's greenhouse gas emissions intensity by an equivalent of 3 to 5 per cent (measured as emissions per unit of electricity produced) below 2000-2002 baseline levels, as measured over the 2010-2012 period.

The MoU signed today establishes goals for the public-private partnership, sets out general principles, and proposes actions to further the partnership's objectives, the Department of Energy announced.

Edison Electric Institute President Thomas Kuhn said in a comment that all the Power Partners "believe this is a critical step in reducing greenhouse gas intensity in the United States."

"The seven power groups will collectively work toward achieving the goal for the sector, setting the stage for significant progress in addressing greenhouse gases," he said.

The Power Partners is one of 13 trade associations or business groups taking part in the Climate VISION (Voluntary Innovative Sector Initiatives: Opportunities Now) program, a US voluntary program set up to meet the Bush administration's target of reducing the greenhouse gas emissions intensity of the United States' economy (measured as carbon-equivalent emissions per unit of economic output) by 18 per cent between 2002 and 2012.

From: Ahsha Tribble [Ahsha.Tribble@noaa.gov]
Sent: Monday, December 20, 2004 3:45 PM
To: Hannegan, Bryan J.
Subject: [Fwd: CCSP Guidelines Announcement]
Sorry Bryan. I made a typo in your email address.

Ahsha

-------- Original Message --------
Subject:CCSP Guidelines Announcement
Date: Fri, 17 Dec 2004 12:20:19 -0500
From: Ahsha Tribble <Ahsha.Tribble@noaa.gov>
Organization:NOAA
To:phil.cooney@ceq.eop.gov, "Gabriel, Clifford J." <Clifford_J._Gabriel@ostp.eop.gov>, kathie.olsen@ostp.eop.gov, bryan.hannegan@cep.eop.gov, "Wuchte, Erin" <Erin_Wuchte@omb.eop.gov>, Margo.Schwab@omb.eop.gov

CCSP EOP Principals,

The NOAA Office of Legislative Affairs would like to have a communications document to give to the Hill and other constituents regarding the release of the Guidelines for Producing CCSP Synthesis and Assessment Reports. The draft is attached for your review. We invite your comments, if any, by next week prior to sending this document out.

Thank you,
Ahsha

--
****
Ahsha N. Tribble, Ph.D.
Technical Chief of Staff
Office of Assistant Secretary of Commerce
For Oceans and Atmosphere
HCHB/Room 5804
14th & Constitution Ave, NW
Washington, DC 20230
202-482-5920 (DOC)
202-482-6318 (Fax)
****

From: ccsp_info-bounces@usgcrp.gov on behalf of Margarita Gregg [margarita.gregg@noaa.gov]
Sent: Tuesday, December 21, 2004 11:23 AM
To: CCSP_INFO@usgcrp.gov
Subject: [ccsp_info] [Fwd: Update of CCSP Agency Budgets for OCP (FORACTION)]
F.Y.I. - it has come to my attention that some of you are unaware of this request for an update of your agency budgets for OCP FY06. As stated in the attached memo, once I receive a point of contact for this request, I will send you the materials your agency has submitted throughout the year so all you would need to do is update it.

Thanks and Happy Holidays
Margarita

-------- Original Message --------
Subject: Update of CCSP Agency Budgets for OCP (FOR ACTION)
Date: Mon, 06 Dec 2004 16:27:58 -0500
From: James R. Mahoney <James.R.Mahoney@noaa.gov>
To:ccsp@usgcrp.gov
CC: Peter Schultz <pschultz@usgcrp.gov>, Ahsha Tribble <Ahsha.Tribble@noaa.gov>, Allandra Washington <Allandra.Washington@noaa.gov>, Margarita Gregg <Margarita.Gregg@noaa.gov>, Eric Locklear <Eric.Locklear@noaa.gov>

To CCSP Principals:

Please see the attached word document memo requesting agency inventory and budget information to be used in preparation of the FY 2006 version of *Our Changing Planet*. Also, please see the attached excel document containing spread sheet formats for providing the requested information.

In order to keep the production of Our Changing Planet on schedule, we are requesting that you submit this information no later than **COB on Tuesday, January 4, 2005**. Thank you for your prompt attention to this request.

Information copies of this request are also being sent to the Interagency Working Group on Climate Change science and Technology (the deputy secretaries).

With best regards,

Jim Mahoney

Attachments (2)

--
M.E. Conkright Gregg, Ph.D.
PPI/NOAA Climate Office
1100 Wayne Avenue, Suite 1225
Silver Spring, MD 20910
Phone: (301) 427-2089 ext 109
Fax: (301) 427-2082
Email: Margarita.Gregg@noaa.gov

CEQ 6161

Cooney, Phil

From: James R. Mahoney [James.R.Mahoney@noaa.gov]
Sent: Thursday, December 23, 2004 4:52 PM
To: Olsen, Kathie L.; Gabriel, Clifford J.; Halpern, David; Hannegan, Bryan J.; Cooney, Phil
Cc: Richard Moss; Peter Schultz; Ahsha Tribble; Allandra Washington; James R Mahoney
Subject: Items we discussed in our December 14 meeting
Attachments: Workshop 2005 description 12-23-04.doc; CIWG TOR 12-23-04.doc; CIWG Imp Plan 12-04.doc

To all

This email and its attachments respond to issues raised during our CCSP review meeting on Dece 14. Three items are covered:

(b)(5)

As I write this, it is coming up to 5:00 PM on December 23. I wish you all and your families the best for the holidays.

Jim Mahoney

004338

DISCUSSION SUMMARY

1. Decisions/Actions from December 1, 2004 CCSP Meeting (Mahoney) (Approval)
[Materials: 1. Decisions & Actions, 12-01-04.pdf]

Decision 1: The December 1, 2004 Decisions and Actions Summary was approved.

2. Synthesis and Assessment Products (Mahoney, Moss) (Information)

Report on Dec 20 meeting of S&A leads

Mahoney and Moss reviewed the discussion and outcomes from a December 20 meeting of approximately 30 agency personnel responsible for the 21 Synthesis and Assessment