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United States Senate

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510-6150

October 3, 1997

JLY
cc: JAF
RMB
RL
AM
JA

Mr. Dirk Forrister
Chair
White House Climate Change Task Force
The White House
Washington, DC 20500

Dear Mr. Forrister:

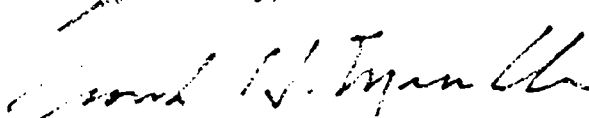
Because the administration declined to provide a witness for our September 30 hearing on climate change, members of our Committee were unable to ask questions on a variety of issues relevant to the climate change negotiations.

In an effort to allow the Senate—and the public at large—to appreciate the diplomatic, economic and technical issues we face as a consequence of the climate change issue, I respectfully request that the enclosed written questions for the record be answered in a time frame prior to or concurrent with the upcoming negotiations in Bonn.

Should you, your staff, or officials in agencies generating responses to these questions require clarification of additional information, David Garman of the Senate Energy Committee staff may be reached at (202) 224-7933.

Thank you for your attention to this request. I will look forward to the administration's responses.

Sincerely,



Frank H. Murkowski
Chairman

cc: The Honorable Federico Peña
The Honorable Janet Yellen
The Honorable Timothy Wirth
The Honorable Chuck Hagel
The Honorable Robert C. Byrd

Chaker Qs

Questions from Chairman Murkowski

1. When will the Administration unveil its proposed "targets and timetables" for carbon emission reductions?
 2. When will the Administration release to the public the economic analysis that it used in reaching these targets and timetables?
 3. Will the economic analysis used to arrive at these targets and timetables be peer reviewed?
 - a. If not, why not?
 - b. If so, will the peer reviewers comments be made public?
 4. The Administration has indicated that it seeks to have an international emissions trading scheme in the new treaty.
 - a. Roughly how many of the 165 parties to the existing climate treaty have agreed to this approach?
 5. The Administration has indicated that it wanted to have "joint implementation" with developing countries as a means to reduce the costs of treaty compliance.
 - a. Roughly how many of the 129 developing country parties have agreed to this approach?
 6. The Administration has indicated that it will "advance existing commitments" for developing countries and has even proposed a means under which developing nations would "graduate" into binding commitments.
 - a. Roughly how many of the 129 developing country parties have agreed to the "graduation" approach?
 - b. Roughly how many of the 36 industrialized country parties have agreed to the "graduation" approach?
 7. Some of the key strategies for our negotiations—including developing country participation, joint implementation, and emissions trading—are not faring well in the negotiations.
 - a. If we don't get all of these elements in a Kyoto Protocol, will we walk away from the deal?
- Slack
- VEJ

8. Last week the DOE released a report (the so-called "five labs" study) indicating that we might reduce carbon emissions to 1990 levels with a \$50/ton carbon tax and an aggressive energy R&D program. In response to this report, the Secretary of Energy was quoted in a press release as saying that the analysis "...showed that what was good for the environment would be good for the economy."
- Is it the Administration's position that a \$50/ton carbon tax would be good for the economy?
 - Does the DOE study analyze impacts on business and manufacturing?
 - Is the DOE study an economic study or an attempt to make predictions?
9. The economic modelling effort that was abandoned by the Administration earlier this year assumed that the mere announcement of an agreement to reduce carbon dioxide would immediately result in a 25% increase in the rate of improvement in energy efficiency.
- Was this a valid and realistic assumption?
 - Did the peer reviewers feel it was a realistic assumption?
10. The administration economic modelling effort also assumed a decrease in long term interest rates to almost 2%.
- Was this a valid and realistic assumption?
 - Don't new taxes and higher costs tend to increase inflation and interest rates?
11. The administration modelling effort did not consider the costs associated with the development, implementation and monitoring of a trading program.
- Was this a valid and realistic omission?
12. Did the administration modelling effort take into account the adverse effects on U.S. competitiveness and the potential shifting of producers in the United States?
13. It was reported earlier this month that the Administration is considering an executive order that would require federal agencies to reduce emissions by 20%. It was also reported that the Department of Defense will oppose any Administration proposal on climate change that threatens military readiness.

- a. What studies have been done to assess the impact of such an executive order on the U.S. military?
 - b. Have any such analyses been conducted by the Department of Defense to your knowledge?
 - c. Is consideration being given to granting waivers to federal agencies that cannot comply with emission reduction mandates without compromising their legal obligations and vital functions?
 - d. Is the Administration considering granting a waiver to the Department of Defense? To any other departments or agencies?
14. The DOE "five labs" study concludes that a carbon emission reduction of 390 million metric tons per year is required to stabilize emissions at 1990 levels in 2010 and is based on implementation of the program by the year 2000. The study finds that by increasing energy efficiency through a variety of federal and state programs with industry participation as well as imposing a \$50 per metric ton of carbon permit price that "2010 emissions could be cut by about 390 [million metric tons] per year."
- a. Does this mean that we can reach 1990 levels by the year 2010 or that in the year 2010, using new technology in combination with regulatory and other measures, we will begin to reduce emissions at a rate high enough to stabilize emissions at 1990 levels at some point in the future?
 - b. In 2010, how many million metric tons will China or Brazil be emitting per year? More than 390?
15. The DOE study concludes that "in all [three] cases, carbon reductions require the nation to embark on an aggressive set of policies and programs."
- a. Assuming everything works as has been hypothesized in the Efficiency Case (Case One), we will not achieve stabilization of carbon emissions at 1990 levels by 2010, correct?
16. According to the report, the Case 2 and 3 scenarios require "better technology, 'readier' markets, and a price of carbon that results in a significantly increased willingness to manufacture, purchase, and use low-carbon technologies. It represents a vigorous national commitment that goes far beyond current efforts."
- a. If we were to agree to implement a program similar to Case Two, including "a vigorous national program of research, development demonstration, and diffusion, and a trading regime for carbon" at

a price of \$25/ton, we still will not stabilize emissions at 1990 levels by 2010, correct?

- b. According to the DOE study, only if we were to do all of the above and impose a \$50/ton carbon charge would we be able to achieve stabilization at 1990 levels by 2010, correct?
- c. To your knowledge, has any nation involved in the international climate negotiations proposed the adoption of an international mandate for developed countries to stabilize emissions at 1990 levels by the year 2010?
- d. If not, then this study fails to tell us what would be necessary to achieve the significantly higher emission reductions that would be necessary to comply with any of the climate proposals that are on the table, correct?
- e. If that is the case, then this study also fails to demonstrate that the U.S. can comply with the kind of legally binding emission reduction mandates currently under consideration in the international negotiations through use of existing technology at no cost to the nation, correct?
- f. If \$50/ton charges are required to stabilize emissions at 1990 levels by 2010, how much would the per ton charge need to be to reduce emissions to 10% or 15% below 1990 levels? Would it double? Triple?

17. Recent studies conducted by DRI/McGraw-Hill conclude that a \$180-190/ton carbon charge would be necessary to stabilize emissions at 1990 levels by 2010. (Pg. 4 of July 1997 study, "The Impacts of Carbon Mitigation Strategies . . .")

- a. Can you explain why there is such disparity between DRI's and DOE's estimates of the per ton charge necessary to reach 1990 levels by 2010?
- b. Has any attempt been made to reconcile these significant differences?
- c. Is it possible that the necessary carbon charge would be higher than \$50/ton to simply stabilize emissions at 1990 levels by 2010?

18. One of the primary conclusions stated in the DOE study is that each of the three scenarios under consideration "can produce energy savings that are roughly equal to or exceed costs" . . . "if feasible ways are found to implement the carbon reductions...." The report states, however, that the study did not analyze specific policies to achieve the reductions described in the cases or the political feasibility of policies.

- a. If we don't know what the policies or means for reductions are, and have not determined whether or not they are feasible, how can we rely on this report's conclusion that the reductions can be achieved without a cost to the nation?
 - b. What are some of the means that might be used to achieve the reductions? Would it involve new taxes? Note: Possible programs mentioned include "energy efficiency codes and standards" and "incentives through the tax system directed at investments in energy- efficient technology in industry." (Page 1.13)
19. In numerous places in the report, information is provided on what costs were taken into account or were excluded from consideration in making the cost-benefit assessments. "... we count as benefits only the energy savings to the nation.... Costs include the increased technology cost plus an approximate estimate of the costs of program and policy implementation." (Exec. Summary, footnote 2)
- a. If no effort has been made to analyze specific policies to achieve the described reductions, how did you determine costs of programs and policy implementation?
 - b. What is an example of a "program" that was included in your analysis. What is the cost of that program? What cost did you assign to the "policy implementation" associated with that program?
20. On page 1.12 of the report the following statement appears: We have presented the direct and most easily quantified of the costs and benefits, but have not attempted a full benefit-cost analysis. We do not account for indirect effects of policies (e.g., the reallocation of investment dollars to efficiency investments). We do not account for the increased cost of some R&D programs that are needed to achieve the scenario results nor do we count the benefit of reduced carbon and other pollutant emissions. Also, we have not analyzed any possible redistribution of wealth that could arise from a carbon trading system or other policy to increase the price of carbon-based fuel."
- a. Aren't these pretty significant holes in DOE's analysis?
 - b. If a "full benefit-cost analysis" has not been conducted, then how can you legitimately conclude that emission reductions can be achieved through energy efficiency without cost?
21. On page 1.15, the report states that the \$50/ton carbon charge is not a "direct cost."
- a. Why isn't the carbon charge considered a "direct cost?"

- b. Isn't it a direct cost to someone? Who has to pay it?
 - c. Is the cost of the carbon permit fees included in the analysis in any way?
- 22. The report characterizes the carbon charge as "a potentially large transfer payment" and makes the following statement: "The magnitude of the transfer payment, as well as the losers and winners from the transfers, depends on the nature of policy and its implementation as a cap and trade system or some alternative. The amount of money that could be in play is very large: \$50/ton times 1.3 billion tons per year equals \$65 billion per year." (Page 1.15)
 - a. Is it correct then that the study concludes that emissions reductions could be made at low or no cost yet fails to take into account some \$65 billion in "transfer payments?"
 - b. Who are these "losers" the DOE report refers to?
- 23. In describing the results of DOE's analysis, the statement is made that the DOE report "makes a strong case for the value of energy technology research, development, demonstration, and diffusion as a public response to global climate change." As the report points out on page 1.3, DOE's expenditure of \$8 million on energy-efficiency research between 1978 and 1996 has resulted in net benefits of \$28 billion through 1996 including significant environmental, health, productivity and economic competitiveness benefits. As you know, numerous economists agree that research and development and technology deployment is the most cost-efficient way to address climate concerns. Indeed, it is precisely because of the kinds of cost-effective opportunities DOE has identified that these economists have concluded in a number of independent studies that the wisest course of action, is to delay the adoption of any kind of mandates or legally binding targets and timetable for a modest period of years to permit research and development to occur and to generally avoid replacement of equipment and machinery prior to the end of its useful life cycle. The Administration has previously testified that if we "do it dumb," compliance with the proposed international target and timetable mandates could be very costly to the U.S.
 - a. Doesn't the DOE report provide further support and justification for not rushing into legally binding emission reduction mandates in December in Kyoto but delaying - even for a few years - to reap the benefits of the kinds of R& D the DOE report is promoting?
 - b. Can you quantify the "cost" of delaying for 10 or 20 years?

- c. Can you demonstrate that the cost of delay exceeds the cost of adopting international mandates three months from now?
24. According to the DOE report, 95 million of the 135 million tons of carbon reductions necessary in the utility sector to achieve stabilization at 1990 levels by 2010, "comes from retirement of coal power plants and carbon-ordered dispatching of the utility system ... and from repowering coal plants with natural gas." (Page 1.6)
- a. How much does it cost to "repower" an average coal plant with natural gas?
 - b. Who would bear these costs?
25. The DOE report says that the measures used to reduce emissions in the utility sector are "cost-effective with a \$50/ton carbon charge." (Page 1.6)
- a. When you say that retiring a coal plant is "cost-effective" with a \$50/ton carbon charge, aren't you really saying is that if we impose a fee of \$50 per ton of carbon, a given number of coal plants will be forced to shut down?
 - b. How many existing coal plants would be "retired?"
 - c. Where are these plants located?
 - d. Has any consideration been given in DOE's analysis to the costs associated with the shutdowns, layoffs, displacements that would occur as a result of "retiring" existing plants?
 - e. When you say that energy savings or reductions can be achieved at little or no cost "to the nation," does that include the citizens, communities and businesses in this country?
26. The DOE report also states that the remaining reductions in the utility sector would be achieved from renewables such as wind, biofuels, expansion of hydropower, and extension of nuclear power plant life. (Page 1.6)
- a. Explain what is meant by "nuclear power plant life extensions."
 - b. Does this study contemplate new nuclear power plants or a greater dependence on nuclear power?
27. Turning to the transportation and industry sectors, the DOE report contemplates a reduction of 50 million tons of carbon per year through (a) advanced combustion turbine cogenerators in industry; (b) biomass and black liquor gasification and low-carbon industrial

processes; and (c) cellulosic ethanol/gasoline blends for automobiles.
(Page 1.6)

- a. What kinds of industrial processes utilize advance combustion turbine cogenerators?
 - b. What percentage of industrial plants currently use these turbine cogenerators?
 - c. How much would it cost a given plant to re-outfit with a turbine cogenerator?
 - d. Are cellulosic ethanol/gasoline blends currently available to American consumers? What automobiles can use this fuel? What kind of conversion would be necessary for other cars to use this fuel? What would it cost?
28. The Acid Rain trading program exists solely within the United States and operates primarily through the annual allocation of sulphur dioxide permits to a known group of electric power generators, correct?
- a. Why are the permits generally allocated only to electric power generators?
 - b. What mechanism is used to determine whether these entities' emissions are within their permit allowances?
 - c. What happens if a company's emissions exceed its permits?
 - d. What legal process exists to allow the regulated community to appeal decisions with which it disagrees in connection with the trading and emission program?
 - e. What costs are associated with the operation and administration of the trading program? How are these costs minimized to maintain market incentives?
29. I understand that the establishment of a trading regime similar to the sulphur dioxide program for carbon emissions has been proposed.
- a. Would the carbon trading program operate domestically or internationally?
 - b. What role is envisioned for the Chicago Board of Trade?
 - c. Could a U.S. company such as an automobile manufacturer in Detroit purchase carbon permits through the Board of Trade from another developed country such as Germany? From a

developing country such as Guatemala or Botswana?

- d. If carbon permits may be purchased from a developing country, how would it be determined how many permits each developing country would be allocated?
 - e. Would any UN agencies or bodies be involved in the implementation of the emission trading program? How would they be funded?
 - f. What kind of transaction costs would you expect to be associated with an international emissions trading program?
 - g. Would state or local governments be required to purchase carbon units for emissions? Federal agencies?
 - h. What kind of allocation process would be set up to establish the caps that would be required to provide incentives to trade?
 - i. In the Acid Rain program, compliance with permits is ensured through sophisticated continuous emissions monitoring equipment. How would compliance with permit limitations be ensured under this program?
 - j. Would developing countries have to reduce their own emissions by one ton of carbon for each carbon unit they sell? How would compliance be ensured for developing countries? Will developed countries only be able to sell a carbon unit if they can demonstrate they have already achieved the relevant reductions?
 - k. What penalties would apply if a developing country failed to reduce its emissions at an amount commensurate with the carbon units it had sold?
 - l. Who will monitor countries or companies for enforcement purposes?
30. What is the administration's calculation or estimate of the greenhouse gas emission reduction equivalent of the Clean Coal Technology Program, which was a 7 billion dollar program, at least half of which came from private industry?
31. What exactly is the Administration itself doing to develop new technologies to reduce greenhouse gas emissions? I'm not talking about what the government is doing with industry in a partnership, or what industry is doing alone—what is the federal government doing itself?

September 25, 1997

MEMORANDUM FOR TODD STERN, GENE SPERLING, KATIE MCGINTY, & DAN
TARULLO

FROM: DIRK FORRISTER

SUBJECT: FRIDAY'S ROOSEVELT ROOM MEETINGS ON CLIMATE CHANGE

JLY
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Following the meeting held last week with representatives from electric utilities, two additional meetings with industry representatives have been scheduled for Friday, September 26th. A meeting at 9 am includes a group of industries representing manufacturing firms with generally moderate views on climate change. A second meeting at 3 pm will include chemical companies and representatives from other energy-intensive manufacturing industries. Both meetings will take place in the Roosevelt Room. This memo provides background information on the companies attending these meetings and the issues they are likely to raise.

I. AGENDA

The meetings will cover two major topics, plus any other topics you or the participants want to explore in the time available.

- * International Framework: what do they view as the critical elements for the Protocol that would garner their support? What do they view as "deal breakers" in terms of their ability to support? What type of target/timetable could they support (or at least not oppose)?

-- These firms represent a wide range of positions. Some support only voluntary actions and nothing else. Many support key elements of our current negotiating framework (e.g., emissions trading, joint implementation, multi-year budget period, and greater actions by developing countries.) This group is very concerned that we will compromise or walk away from these issues in order to get a deal in Kyoto.

-- There is some support for a binding target in this group, but only if all the other parts of the framework are achieved. Others that could be convinced to support a reasonable target have been disappointed in the lack of any Administration economic analysis underlying the selection of a target. Most would prefer a longer period for a target to facilitate capital stock turnover.

* Early Action Incentives: is there some way to advance an early action program as part of the president's policy announcement? Is there some way to reconcile industry's interest in undertaking early action with the uncertainty about domestic policy design? Most of these companies have participated in actions aimed at reducing emissions under the President's Climate Change Action Plan. Many believe that more can be achieved, but they fear that, in the absence of a clear domestic program, further reductions achieved might only make it more difficult to comply with future required targets. These companies also fear that they will be singled out to carry more than their fair share of emissions reductions. Because they are already heavily regulated industries, they view themselves as easy targets for greenhouse gas reductions, particularly if reductions from the auto sector are not achieved for political or other reasons.

2. Participants

1. Friday, 9 - 10 am

MOTOROLA CORP.

Richard Guimond, Corporate Director: leading manufacturer of electronic goods. They generally have a strong environmental, are participating in a voluntary program to reduce greenhouse gases from the chip manufacturing process, and refused to sign the BRT advertisement. They generally favor cost-effective, market-based solutions and have concerns about international competitiveness. They are sensitive to the concerns of their major customers, but want to see a responsible response to deal with the threat of climate change. Rich is a former DOE and EPA official in the hazardous waste field.

BALLARD POWER SYSTEMS

Scott Weiner, President: leading developer of proton exchange membrane fuel cells. It has formed a strategic alliance with Daimler Benz to commercialize fuel cells for the transport sector and has been participating in PNGV program. It is also working with GPU International to develop fuel cells for stationary electric power applications, with a field trial of a 250 kilowatt power plant scheduled for 1999 and commercial production during 2001. Scott is a former New Jersey environment commissioner and former executive with General Public Utilities.

UNITED TECHNOLOGIES

Judith Bayer, Director, Environmental Government Affairs: with annual revenues of \$23.5 billion. UTC provides a broad range of high-technology products to the aerospace, buildings and automotive industries. Major business lines include: Pratt and Whitney engines, Carrier heating and air conditioning systems, Otis elevators, Sikorsky helicopters and International Fuel Cells. They are members of the International Climate Change Partnership. Because Carrier's products rely heavily on HFCs, they feel strongly that any climate treaty should include all gases in a single

basket and not contain specific policies and measures. They are also interested in any federal policies that could spur sales of fuel cells.

AMERICAN STANDARD COMPANIES

Jim Wolf, Vice President, Government Affairs: the world's largest producer of bathroom and kitchen fixtures, one of the world's largest manufacturers of heating and air conditioning systems, and a major supplier of vehicle braking and control systems. Worldwide sales in 1996 were \$9.6 billion. They are a member of both the International Climate Change Partnership and the Business Council for Sustainable Energy. As a manufacturer of energy efficient equipment, they have been a leading supporter of taking near-term actions to reduce emissions of greenhouse gases. They also support emissions trading and joint implementation, budget periods, and treating all gases within a single basket. They strongly oppose harmonized policies and measures.

HONEYWELL CORP.

Glen Skovholt, Vice President: Mike Bonsignore attended the CEO meeting with the President and is a supporter of action to address climate change. With sales of \$7.3 billion, the company is a world leader in energy efficiency technology. They have been an active participant in Green Lights and Energy Star voluntary programs. While it has a lot to gain from any actions that spur growth in energy efficiency technologies, it is careful in the political debate to avoid offending its major customers in the automobile, oil and utility industries. Honeywell is a member of the Business Council for Sustainable Energy.

AT & T

Alice Borrelli, Director: While they have not been active on the issue of climate change, AT&T believes that the scientific case for action is strong. They did not sign the Business Roundtable ad calling for more research before taking action. They believe that the electronics and communications sectors could benefit from actions to reduce greenhouse gas emissions. They support efforts to bring the larger developing countries into the process.

GENERAL ELECTRIC

Larry Boggs, Legislative Counsel: has many business units that would be affected by climate change. GE is a major manufacturer of energy consuming appliances, is the parent company of Employers Reinsurance, and is a major supplier to the automobile and aerospace industries. GE is a member of the International Climate Change Partnership.

ALLIED SIGNAL

Joseph McQuire, Director, Environmental and Legislative Affairs: is a chemical producer and manufacturer for the automotive, aerospace and utility sectors. Allied has sought to play a

moderating influence on this issue among major manufacturing firms. They believe that climate change must be addressed but support a moderate approach to any agreement including reliance on market mechanisms such as emissions trading. They have been involved in several "green programs" under the Climate Change Action plan where they have technologies capable of reducing greenhouse gas emissions. They are a member of the International Climate Change Partnership.

INTEL CORPORATION

Tim Mohin, Manager, Government Affairs: the world's largest chipmaker and a leading manufacturer of PC, networking and communication products. Intel has been actively involved in a number of voluntary programs to reduce greenhouse gas emissions, but has not taken an active role on climate policy issues. They manufacture computers under the "Energy Star" label that "sleep" when inactive, substantially reducing energy consumption. They are also participating in an industry research program aimed at reducing or eliminating PFC emissions (a potent greenhouse gas) from the chip manufacturing process. They would like any international agreement to include flexible measures that allow for cost-effective reductions and that require actions by developing countries.

BRITISH PETROLEUM

Bruce McCrodden, Vice President, External Affairs: The President of BP America and the CEO of BP (John Browne) have been outspoken advocates of actions to reduce greenhouse gas emissions. In a speech this week, John Browne spoke out in support of taxes to reduce greenhouse gas emissions. BP is also expanding its own emissions trading and joint implementation activities. BP chairs the International Climate Change Partnership.

INTERNATIONAL CLIMATE CHANGE PARTNERSHIP

Kevin Fay, Executive Director: comprised of approximately 35 companies and associations, this group represents a relatively moderate position on climate change. Members include chemical companies, air conditioning and refrigeration manufacturers, aerospace companies, and one oil company (BP). They seek to balance recognition that the science compels some action with the need to take sensible, cost-effective steps that will not prove burdensome to their companies. They generally have been supportive of the proposed U.S. framework, but remain concerned that we will not achieve key elements of our proposal, but will sign an agreement in Kyoto anyway. They are seeking assurances that we not back down from our proposals. They are interested in the possibility of an expanded voluntary program to achieve nearer-term reductions, but are concerned that any program must insure that investments in reductions are counted toward any future obligations incurred by their firms.

BUSINESS COUNCIL FOR SUSTAINABLE ENERGY

Michael Marvin, Executive Director: Members include companies that manufacture energy efficiency equipment and alternative sources of power. They represent those firms that stand to gain markets from any actions that restrict greenhouse gas emissions. As such, they have been active in promoting early action and have strongly supported the U.S. position on emissions trading and joint implementation and realistic binding targets. They have urged actions by 2005 and are very concerned that any target that extends significantly beyond that will not be taken seriously by industry or consumers and will undermine efforts to reduce emissions and advance technology in the near term.

II. FRIDAY 3 pm MEETING -- PARTICIPANTS and COMPANY PROFILES

Alcoa

Marcia Dalrymple, Manager, Government Affairs

Headquartered in Pittsburgh, Alcoa is one of the world's leading producer of aluminum and alumina and has sales of \$13.1 billion. Whether it will be easy to scale-up trading to deal with carbon emissions remains an open question in their view. Alcoa has been an active participant in two of EPA's voluntary programs: Green Lights (energy efficient lighting) and the Voluntary Aluminum Partnership (reducing chemical emissions from the smelting process). Alcoa has experience in the acid rain emissions trading program; they opted in as a large industry generator.

Paul O'Neill, Alcoa's CEO, joined the President and Vice President for the August 4 CEO meeting. He is concerned that policy-making should not get ahead of sound science and he is advocating a focused research effort aimed at resolving uncertainties. They are concerned about competitiveness impacts related to developing country obligations, but don't have a view yet on the details of those obligations. Alcoa wants to work with us to help shape policy on climate change.

FMC Corp.

Harold S. Russell, VP, Government Affairs

Based in Chicago, FMC is a diversified supplier of chemical products, agricultural chemicals, precious metals, defense systems, automobile components, food machinery, petroleum equipment and specialized machinery. With annual sales topping the \$3 billion mark, FMC ranks as a Fortune 150 company. International sales to more than 100 countries account for more than one-third of their total annual revenues.

Robert Burt, CEO of FMC, chairs the Business Roundtable's Environment Committee and climate change initiative. The Business Roundtable has said that we need a much more extensive policy dialogue before we make final decisions regarding targets and timetables. Burt is unconvinced that we need targets and timetables at all. Burt has taken moderate approaches on other environmental issues

like Superfund and TRI and has been willing to take reasonable positions that draw fire from narrow-minded colleagues. He has taken interest in the potential for voluntary action to play a role in our final domestic policy.

Bethlehem Steel

Maurice (Mo) Ernest Carino Jr., VP, Federal Government Affairs

Bethlehem Steel is headquartered in Bethlehem, PA, with major plants in MD, IN, PA, upstate NY, and MS, and a coal mine in West Virginia. In 1996, they achieved sales of almost \$4.7 billion. They are the nation's largest producer of plate steel, most of it in the higher value grades required for the more demanding industrial uses. They are also a leading supplier of railroad rails to the rail transportation market and large diameter pipe to the energy market. One of their main economic issues are tremendous health care and pension liabilities. Since 1978 they have reduced their energy use by 40% and have recently restructured. Bethlehem has also endorsed the CERES Principles.

Bethlehem's CEO is the Chair this year of the American Iron and Steel Institute (AISI). His number one climate issue is developing countries because of their steel production. Flexibility is important as well. Regarding targets and timetables, they are concerned about the impact on growth of a carbon cap. In addition, at the meeting with the President, he emphasized the importance of voluntary programs. Credits for early reduction is very important because they have achieved reductions since 1990. At a meeting yesterday, AISI told us that they could achieve a 10% reduction from 1990 levels by 2010 through voluntary programs.

DUPONT CORPORATION

Tom Jacob, Environmental Manager

A major chemical producer (including HFCs) and the parent company to Consolidated Coal, — Dupont is a major contributor to greenhouse gas emissions. DuPont was a leader in recognizing the scientific case demanded action to phase-out CFCs. In the case of climate change, they believe that John Browne of BP got it right when he said that significant uncertainties remain, but that prudence supports taking some actions now. They are very concerned that this issue is getting highly politicized on both sides and look to the Administration to provide bipartisan science-based leadership. They are also concerned that if actions are taken that all industries should be required to contribute in an equitable manner and fear that the chemical industry may be an easier target than some other sectors (e.g., autos or buildings). They are currently exploring possible ways to structure voluntary programs to achieve meaningful actions while safeguarding investments.

ENRON CORP

John Palmisano, Director, Regulatory Affairs:

Ken Lay attended the CEO meeting with the President and was supportive of action to address climate change. With annual revenues of \$13 billion, Enron is a diversified energy company with one of the world's largest natural gas pipelines, an active wholesale electricity brokerage business, major investments in solar and wind technologies, and the recent purchaser of Portland General Electric Utility. Enron has also been an active trader in sulfur dioxide allowance market and strongly supports joint implementation and emissions trading. They believe action in the nearer-term is critical to sending the proper signals to the market place. Enron is a member of the Business Council for Sustainable Energy. John left EPA after helping design the earliest EPA emissions trading programs and established his own trading company which ultimately was purchased by Enron.

Georgia-Pacific

James E. Bostic, Jr., VP

Georgia-Pacific, headquartered in Atlanta with \$13 billion in annual revenues, ranks first nationally in the production of structural and other wood panels and second nationally in lumber, owning six million acres of timberland. They own the world's largest building products distribution system. 1996 was a very challenging year for Georgia-Pacific, because of the most dramatic price collapse ever in commodity pulp and paper markets.

On climate change, Georgia-Pacific is positioned with some unique opportunities: forest sequestration and producing energy from biomass waste or crops. They are concerned about potential international competitiveness impacts, if energy prices rise dramatically with climate policy, but are interested in working constructively on a reasonable outcome.

Weyerhaeuser

Gary D. Risner, Federal Environmental Regulatory Affairs Manager

Weyerhaeuser is one of the largest forest products companies in the world. Weyerhaeuser operates more than 130 manufacturing facilities and employs 39,700 people in North America. They also have sales offices in Asia and Europe. Their headquarters are in Federal Way, WA. Their main business units are Timberlands (producing wood and wood fiber); Wood Products (producing softwood lumber, plywood and veneer; oriented strand board, composite panels, hardwood lumber and doors, and wholesale building materials); Pulp, Paper, Packaging and Recycling (market pulp, newsprint, bleached paperboard, printing and writing papers, container board and corrugated packaging, and collection and marketing of recyclables, chemicals); Weyerhaeuser Real Estate, and Weyerhaeuser Mortgage.

Regarding climate change, Weyerhaeuser supports the American Forest and Paper Association's Global Climate Change Position statement, which says that:

--Any new treaty must involve all countries including the developing nations.

- Biomass fuels combustion must continue to be considered a net-zero greenhouse gas contribution
- Any treaty must recognize the positive effects of active forest management
- Carbon storage in forests and wood products must be better recognized
- Climate science must be subjected to periodic review by peers and all stakeholders
- Treaty participants must assure consistent reporting and enforcement in all countries

Weyerhouser also believes that flexible, incentive based approaches can be appropriately utilized to encourage world-wide participation in reducing greenhouse gas emissions. Pushing for mandatory emissions reductions in the short term may not be required and could be potentially damaging to the US economy. A better approach is to continue global scientific studies with ongoing climate change verification while stimulating incentive based technology development to meet long term emissions reduction requirements and time schedules.

Holnam Inc.

David Rinas, Sr. Vice President

Holnam is the largest cement manufacturer in North America. Headquartered in Michigan, Holnam has manufacturing facilities, distribution centers and marketing offices spread throughout the United States. Holnam is a private company, wholly owned by Holderbank Financiere Glaris, which is the world's largest producer of cement and related construction material. Holderbank is headquartered in Switzerland and is publicly traded on stock exchanges in Zurich and London.

Holnam has been very proactive on climate change. They claim that we could reduce CO2 emissions from cement production cheaply and easily by increasing the use of cement substitutes. The U.S. is behind the rest of the world in the utilization of substitutes. Holnam wants the federal government to encourage the use of substitutes and overcome the market barriers -- we are reviewing these proposals at present.

Trigen

Thomas R. Casten, President and CEO

Trigen is recognized internationally as a leader in district energy systems. (District energy applies economies of scale to heating and cooling buildings. A central plant produces chilled water, hot water or steam and pipes it to a number of buildings, thus eliminating the need for individual boilers and chillers.) The company has developed and operates 11 district energy systems in North America that provide economical and environmentally responsible heating and cooling to municipalities, commercial buildings, institutions and industry. Trigen is based in White Plains, NY.

Trigen believes that the Administration's first act on the road to Kyoto should be to seize the low-hanging fruit represented by combining production of heat and power. More than two-thirds of the energy produced by burning fossil fuels for electricity is discarded as waste heat. Trigen's

own analysis indicates that combining heat and power generation could drop the United States' output of CO2 well below 1990 levels.

Owens Corning

John D. Hopkins, Jr., VP, Legislative Affairs

Headquartered in Toledo, Ohio, Owens Corning is a \$3.8 billion, publicly held company of 19,000 people with manufacturing, sales and research facilities, including joint venture and licensee relationships, in more than 30 countries worldwide. Originally a glass company, the company now offers a diversified array of products, including complete building materials systems, advanced glass fiber used in more than 40,000 composite end-use applications from skis and golf clubs, to bridge decking and transmission towers, to automobiles, computers, and fiber optic cables, and large-diameter pipe used to build the infrastructure of developing nations.

Owens Corning joined in the insulation industry's Lisbon Declaration on CO2 reductions. It says that the greenhouse effect requires urgent action, and that there is massive potential for energy savings in space heating through the use of proven thermal insulation technology. It says that 133 million tons of CO2 could be reduced if all American homes were to be insulated to the Council of American Building Officials' 1992 Model Energy Code. On the other hand, Owens Corning signed the BRT ad. Joint implementation is especially valuable because the quality of building stock in Central and Eastern Europe is poor.

Dow Chemical

Paul Cicio, Global Issues Manager/Government Affairs

Dow is the sixth largest chemical company in the world, operating in 157 countries. Headquartered in Midland, MI, they have sales of \$20 billion a year. Dow is the largest producer of plastics in the world. Dow is also one of the largest energy consumers in the world. Dow has 323 operating facilities globally, including plants in about 20 states in the U.S. Over 90% of their energy consumption is through cogeneration. Dow is the only company (to their knowledge) who has committed to a 20% energy efficiency improvement over the next ten years (2% per year; about twice as high as the national average.) Dow has made voluntary commitments to reduce energy use in the U.S., Canada, Germany, and the Netherlands.

Regarding climate change, Dow strongly supports actions to reduce energy use. Dow believes tough decisions on the treaty should be delayed until the science and economics are better understood. Dow is supporting more meaningful dialogue with the U.S. government regarding what it is we truly need to do without losing competitiveness.

Whirlpool

Michael Thompson, Director of Government Relations

Whirlpool is the world's leading manufacturer and marketer of home appliances. Headquartered in Benton, MI., the company manufactures in 13 countries and markets products in more than 140 countries. In the last 8 years, Whirlpool has grown from a primarily U.S. manufacturer to a global company employing some 50,000 people on four continents. Whirlpool was the first company to develop and implement a CFC recovery and recycling for refrigerators. In 1994 Whirlpool began producing the refrigerator that won the Super Efficient Refrigerator Program (SERP) contest sponsored by U.S. public and private utilities. Whirlpool is also a voluntary participant in EPA's 33/50 program.

Whirlpool has not been active on the climate change issue. It is a Republican bedrock company from the midwest. They signed the Business Roundtable ad. They are a company that should be better off under climate change restrictions, because they typically make the most efficient products in the appliance industry. They may still harbor some bitterness toward the Administration because they were unhappy that DOE took so long to complete the refrigerator appliance efficiency standards that Whirlpool lost its technological head start. They use refrigerants (HFCs) that would be covered under our proposed "comprehensive" approach and strongly oppose any harmonized policies and measures. They are a member of the International Climate Change Partnership.

September 19, 1997

The Honorable Dan Schaefer
Chairman
Energy and Power Subcommittee
Committee on Commerce
Room 2125
Rayburn House Office Building
Washington, DC 20515

Dear Mr. Chairman:

I received your August 22 questions that relate to the Administration's policy making process on the issue of global climate change. I appreciate your thoughtful inquiries on this important issue.

As you know, the Administration has not yet settled on a particular set of policies to reduce greenhouse gas emissions. Instead, the President, Members of his Cabinet, and Senior White House officials have been meeting with a wide range of parties interested in the issue of global climate change. We have been consulting with business and labor representatives, scientists, economists, and environmental groups about the best, most cost-effective way to reduce greenhouse gas emissions. And, on October 6, the White House will hold a conference to discuss the scientific evidence, the economic impact and international implications of global climate change. These discussions are intended to inform the Administration's decision-making process, which will culminate in a U.S. policy position for the international negotiations in Kyoto in December of this year.

Because we are in the final stages of this policy making process, I believe that many of the questions asked in your August 22 submission would be more accurately and thoroughly answered after the Administration has announced its policy position. For that reason, I am requesting that you allow me to provide answers to these questions after the Administration has engaged in a thorough and complete policy making process and has made the key policy decisions about this important issue.

If you or your staff have any questions, please contact me or Michele Jolin, the CEA Chief of Staff at (202)395-5084. I appreciate your consideration and cooperation, and look forward to working with you further.

Sincerely,

THE WHITE HOUSE
WASHINGTON

September 15, 1997

MEMORANDUM FOR THE PRESIDENT

FROM: GENE SPERLING
KATHLEEN McGINTY
DANIEL TARULLO

SUBJECT: Climate change scenarios

I. INTRODUCTION

This memorandum is the first of several we will be submitting over the next month on climate change policy. As you know, many consider this issue to be the premier environmental challenge of the next century. As the world's largest emitter of greenhouse gases, our country's actions will be watched closely: If we act prudently, we can take steps to reduce emissions over the long term without undue adverse effects on economic growth. But the issue is particularly difficult -- both analytically and politically -- because the environmental and economic consequences are potentially momentous and yet highly uncertain.

The complexity of the issue is reflected in four different constraints:

- Environmental. Reflecting the seriousness of the issue, the environmental community is pushing for a highly aggressive stance on reducing greenhouse gas emissions -- one that involves an early and steep reduction in emissions. They will be sharply critical of policies that seem less aggressive.
- International and diplomatic. The international negotiations have focused on relatively aggressive approaches. Adopting a less aggressive approach would therefore also have adverse diplomatic implications. We would be severely criticized in international circles for putting forward proposals that do not meet international expectations.
- Economic. Economists recognize the severity of the problem, but argue that a more gradual approach can achieve similar environmental objectives at substantially lower economic cost. Critics would charge that a strict target and timetable would slow growth and cost jobs.

- Domestic. Aggressive approaches would expose us to well-financed campaigns -- by major corporations and labor unions -- that demagogue our policies as excessively costly and as a large energy tax increase. These groups will also strongly insist on strong developing country participation in any worldwide emissions reduction system. Reflecting these corporate and union pressures, the Hill is extremely opposed to an aggressive approach -- especially one that does not involve the developing countries -- and is extremely unlikely to ratify any such approach.

The first two of these constraints are roughly consistent, as are the second two. *Our basic dilemma, however, is that the first two constraints are incongruous with the third and fourth.* An aggressive approach would play well internationally and with environmental groups, but would be sharply criticized by corporations, labor unions, and the Hill. A more gradual approach, however, would garner some support from domestic interests but would be met with derision abroad and by environmental constituents.

In this context, it is worth noting that on substance grounds, your advisers strongly object to the proposals that have been floated by the European Union. In other words, not all international pressures are necessarily consistent with "good policy." In particular, your advisers believe that the EU approach is problematic in three ways:

- Its approach to developing countries, in which developing countries do not have to bear any of the burden of emissions reductions, will undermine the environmental benefits of efforts in this area;
- Its approach to reducing emissions -- cutting emissions 15 percent *below* 1990 levels by 2010 -- is dangerously front-loaded, and predicated on naive and misleading assumptions.
- The combination of these two factors leads to a credibility problem, that may actually reduce the chances of getting a solid international agreement over the medium-term.

The developing country issue highlights the vast gulf between the dialogue abroad (where previous U.S. proposals on developing country participation are almost uniformly considered too aggressive) and at home (where Senator Byrd's resolution, calling for even tougher demands on developing countries than previous U.S. proposals, passed the Senate 95-0). Your advisers favor a tougher line on developing countries than we have taken to date. This could involve a two-step approach to the international negotiations: reach agreement among the developed countries, but do not submit the agreement for domestic ratification until key (such as the biggest and richest) developing countries commit to binding targets. Developing countries are extremely unlikely to agree to binding targets in the foreseeable future, so this approach would imply that we will not be ratifying any international climate agreement for at least several years. *The danger is that even floating this approach could produce such negative reactions as to preclude agreement in Kyoto.* On the other hand, this approach may boost the domestic viability of any international agreement once it is reached. We will discuss this issue with you in more detail in the near

future.

The three illustrative scenarios presented in this memorandum are intended to frame our own decision-making process in the run-up to the Kyoto negotiations in December and beyond. One thought to keep in mind in evaluating these scenarios is how to avoid proposals that would be subject to demagoguery on taxes or on shifting jobs abroad. Other key issues that pervade these scenarios include:

- How to implement a carbon emissions reduction scheme at home;
- How much we can reasonably expect from technological advances without a significant price signal; and
- The role of developing economies in reducing global emissions.

These four issues are discussed in more detail in Section III of the memorandum.

II. THREE SCENARIOS

The climate change issue involves so many different parts (the target and timetable for our emissions, whether to use a tradeable permits system to reach that target, whether to auction the permits, etc.) that it is easy to become enmeshed in the details while losing sight of larger strategic considerations. The purpose of this section is to present scenarios that try to present some of the trade-offs on that higher strategic plane; subsequent memoranda and meetings will allow us to examine many of the component pieces in more detail.

The three scenarios we consider are:

- Scenario 1: Adopt most attractive policies currently acceptable in international sphere, fight for domestic ratification;
- Scenario 2: Devise more economically efficient domestic policy, even if not internationally acceptable; and
- Scenario 3: Try to bridge the gap

It is crucial to emphasize that the scenarios are meant to be illustrative, to provide a way of thinking about our policy proposals. Similarly, the economic figures presented along with each scenario are highly uncertain and require further vetting by some interested agencies. They reflect educated guesses based on economic models. But the issues of disagreement discussed above, along with many others, could have a substantial effect on the precise outcomes. In particular, the estimates of the effects from international trading are especially uncertain.

SCENARIO 1

ADOPT POLICIES CURRENTLY ACCEPTABLE IN INTERNATIONAL SPHERE

Overall strategy

- Reach internationally feasible full agreement in Kyoto.
- Fight to sell and ratify agreement domestically over the next few years.

Components

Target and timetable	1990 emissions levels by 2010
Domestic implementation	Tradeable permits. R&D and Federal energy efficiency programs.
Developing country participation	Agreement in principle on joint implementation. Unlikely to get international agreement -- even in principle -- on Annex B (voluntary limits for developing economies) or evolution (a mandatory graduation system for adopting quantified targets).
International trading	Agreement in principle on a trading regime within Annex I (developed economies).

Energy price effects

We present two alternative sets of estimates. The first assumes that international trading among the developed countries (Annex I) becomes operational. Under such a system of international trading, there is substantial uncertainty over the size of net international transfers of the permits. But under some scenarios, purchases of permits from other countries in 2010 could amount to \$5 to \$10 billion -- implying that international purchases of permits account for up to half our total reductions toward the 1990 goal. Some of your advisers believe that this deficit could prove to be a large political liability.

The second set of estimates assumes no international trading. Your economic advisers note that the first set of estimates involves more arbitrary assumptions than the second.

With Annex I (developed economy) trading

- Permit price. Carbon prices in 2010 up between \$50 and \$90 per ton.

- Gas prices. Gas prices in 2010 would rise by between 10 and 25 cents.
- Coal prices. Coal prices in 2010 would rise by between \$30 and \$70 per ton, relative to the current price of about \$20 per ton.
- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of between \$1 and \$2 per million BTUs in 2010. (In 1993, the Administration proposed a tax of \$0.26 per million BTUs plus a \$0.34 per million BTUs tax on oil.)
- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay \$500 to \$1,000 more in 2010. Effects would be regressive in the first instance, although this could be offset by using revenue to reduce other regressive taxes.

No Annex I trading

- Permit price. A carbon price increase of between \$80 and \$140 per ton in 2010.
- Gas prices. Prices in 2010 would rise by between 20 and 30 cents per gallon.
- Coal prices. Coal prices in 2010 would rise by between \$50 and \$100 per ton, relative to a current price of \$20 per ton.
- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of between \$1.80 and \$3.15 per million BTUs in 2010.
- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay \$900 to \$1,500 more in 2010.

International reaction

- Kyoto agreement feasible, albeit not guaranteed.
- Some criticism from Europeans and other countries.

Domestic reaction

- Hill. Kyoto agreement *extremely* unlikely to be ratified (Byrd resolution); attacked as massive energy tax hike. Even without ratification vote, Congressional anger could manifest itself in many ways.
- Corporations. Major concerns over costs imposed on the economy, as well as developing

country stance. Firms in energy-intensive industries will argue (regardless of the evidence) that their operations will flee the United States for other countries. Strong support from renewable energy and energy-efficiency firms.

- Environmental groups. Many environmental groups will support a 1990 by 2010 target, but would prefer a more aggressive path.
- Labor. Strong opposition, driven particularly by coal workers
- Elite media. Likely to support Administration for tackling critical issue
- Outside critics. Many economists who have studied climate change are likely to be extremely critical of the 1990 by 2010 target, as will be discussed under Scenario 2. They will compare the reductions necessary to achieve 1990 levels by 2010 to the oil shocks of the 1970's, regardless of whether those comparisons are warranted.

SCENARIO 2

DEVISE CHEAPEST DOMESTIC POLICY WITH POSSIBILITY OF KEEPING CARBON CONCENTRATIONS AT TWICE PRE-INDUSTRIAL LEVELS

Overall strategy

- Devise cheapest domestic policy with possibility of keeping carbon concentrations at twice pre-industrial levels.
- Allow more time for capital stock to turn over naturally, while providing signal for technological development and dissemination.
- Since this scenario will not be remotely acceptable in the international sphere, it is provided more as a benchmark than a true scenario.

Components

Target and timetable	Reduce emissions <i>growth</i> to zero in 2010. Then, determine when emissions would return to 1990 or other base year level.
Domestic implementation	Tradeable permits (auctioned), or equivalent measures (e.g., \$5 per ton initially, rising over time). R&D and Federal energy efficiency programs.
Developing country participation	U.S. would insist on mandatory, binding targets for developing economies with relatively large total emissions or relatively high per capita incomes.
International trading	U.S. would seek international trading system among all participating countries.

Energy price effects

The overall cost of this approach is approximately 1/10 to 1/3 as expensive as under Scenario 1.

- Permit price. A carbon price increase of between \$5 and \$10 per ton by 2010, scheduled to increase further over time.
- Gas prices. Gas prices in 2010 would rise by an estimated 2 to 3 cents.
- Coal prices. Coal prices in 2010 would rise by between \$5 and \$7 per ton, relative to the

current price of about \$20 per ton.

- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of about \$0.10 to \$0.25 per million BTUs.
- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay \$10 to \$100 more in 2010.

International reaction

- Kyoto agreement impossible. The U.S. will be blamed for undermining the current round of international negotiations (Rio II). Given this international reaction, agreement on international trading system unlikely.
- Developing country component of this approach is unrealistic, because developing countries will not agree.

Domestic reaction

- Hill. Less chance of intense attack.
- Corporations. Many firms could decide that the gradual approach to emissions reductions is the best they will be able to achieve.
- Environmental groups. Environmental groups sharply criticize.
- Labor. The AFL-CIO does not object.
- Elite media. Criticism from many editorial boards. More criticism likely if severe weather events raise prominence of issue.

SCENARIO 3: TRYING TO BRIDGE THE GAP

Overall strategy

The difficulties with Scenarios 1 and 2 are clear: Scenario 1 represents a strong and credible commitment to address the climate change problem, but only at a potentially significant cost to the U.S. economy. Scenario 2 substantially mitigates the economic costs, but would do would be met by immense criticism abroad and among environmental groups at home as insufficiently responsive to the scale of the climate change challenge.

The central question is whether a strategy can be found for bridging the gap between these approaches, providing a credible commitment to taking the environmental problem seriously without imposing untenable costs on the U.S. economy. We suggest three approaches that, to differing degrees, bridge the gap.

Components

Target and timetable: three alternatives	A) 1990 by 2010-2020 B) 1990 plus 15 percent by 2010, 1990 plus 7.5 percent by 2020, 1990 plus 5 percent by 2030, and 1990 by 2040 C) 2000 by 2010, 1995 by 2020, 1990 by 2040
Domestic implementation	Tradeable permits, with an "escape clause" on the permit price, or equivalent measures. R&D and Federal energy efficiency programs.
Developing country participation	U.S. would insist on mandatory, binding targets for developing economies with relatively large total emissions or relatively high per capita incomes.
International trading	U.S. would seek international trading system among all participating countries.

As indicated in the table above, all the alternatives below would be predicated on binding commitments from key developing countries. One possible way to address the developing country issue is a two-step approach: we could try to reach an agreement among the developed economies, but no such international agreement would be submitted for ratification before the key developing economies agreed to their commitments.

Also, under any of these approaches, we could build in an "escape clause" to limit the economic costs. The escape clause would involve government sales of permits at a fixed price -- that fixed price would then define the maximum price for the permits, thus limiting the potential economic costs. For example, if the government were willing to sell unlimited permits at a fixed

price of \$50 per ton, it would guarantee that gas prices did not rise by more than 15 cents per gallon in 2010. However, if the "escape clause" were triggered, the U.S. would not meet its ostensible target and timetable.

Approach A: 1990 by 2010-2020

This approach would attempt to soften the criticism of Scenario 1 by stretching out the 2010 deadline to lower the economic costs. Instead, the U.S. commitment would be that average emissions between 2010 and 2020 would be equal to the 1990 emission level.

Economic Effects

- The economic effects of this approach are very similar to those of Scenario 1. In particular, models suggest that the economic costs of the emissions reductions required under this approach are about 90 percent of the costs from Scenario 1.
- Depending on the international trade regime, the permit price in 2010 under this approach would be somewhere between \$30 and \$100. Gas prices in 2010 would rise between 10 cents and 25 cents per gallon.

Environmental and International Ramifications

- This approach would probably satisfy the concerns of environmental constituencies, but would still subject the United States to criticism for being "too weak."

Approach B: Phasing in 1990 targets

This approach delays the year at which emissions are reduced to 1990 levels, but also builds in intermediate targets that provide a glidepath to that goal. Relative to Scenario 2, this approach allows us to maintain credibility by committing to some target by 2010 -- by at dramatically lower cost than under Scenario 1.

Economic Effects

- Relative to Scenario 1, this approach would once again mitigate the economic costs of the program. But it requires a substantial lengthening of the timetable to induce substantial reductions in costs. Because of the slow turnover of the capital stock, economic costs are not dramatically reduced without lengthening the timetable to 2040 or later.
- The intermediate target of reaching 15 percent above 1990 levels by 2010 implies a permit price of about \$15 to \$30 in 2010.

Environmental and International Ramifications

- This approach would be met by some dissatisfaction from the environmental community, since we would be seen as pushing our 1990 commitment off into the distant future. It is unclear how successful the interim commitments would be in mollifying these concerns.
- The international community would similarly be worried about our long-run commitment, and it is once again unclear whether these concerns could be reduced by the intermediate commitments. Many of your advisers worry that the delays in reaching 1990 levels embodied in this approach would undermine U.S. leadership on a critical issue, and make it even more difficult for us to convince developing countries to participate.

Approach C: Shifting base year in intermediate commitments

This approach would shift the intermediate commitments in Approach B to a new basis: for example, we would commit to reaching 2000 levels by 2010, 1995 levels by 2020, and 1990 levels by 2040.

- In one sense, the target year 1990 is disadvantageous for the United States. Between 1990 and 1995, our emissions grew 6.5 percent, while those in Western Europe *fell* by 0.2 percent. Thus, the choice of 1990 instead of a later year can be seen as a transfer from the U.S. to the rest of the world, a transfer made explicit in the case of Annex I trading.
- However, viewed from a broader perspective, the 1990 baseline is highly advantageous for the United States. Since the United States is the world's largest emitter of greenhouse gases, *any* baseline based on total historical emissions offers us significant advantages relative to other countries. (Compare, for example, a baseline based on per capita shares of global greenhouse gas concentrations). The 1990 baseline has generated momentum within the international negotiations; trying to shift the base year could re-open the question of whether historical emissions are the appropriate metric, and thus risks long-term damage to U.S. interests.

Economic Effects

- The economic effects of this approach are very similar to those of the previous approach: the intermediate target of reaching 15 percent above 1990 levels by 2010 implies a permit price of about \$15 to \$30 in 2010.

Environmental and International Ramifications

- The disadvantage of this approach is that there is much negotiating history invested in the 1990 target. A move off of that target by the U.S. would be sharply criticized

internationally, since there would be relatively little gain for almost any country other than the U.S., and even some loss in countries such as Germany and Russia. There would probably be less international censure for an increase in the 1990 target, even at the same economic cost to the U.S.

- This approach would also be met with some disappointment from the environmental community -- but we would receive some credit for taking a concrete step over a relatively short horizon.

III. KEY ISSUES

As discussed above, there are three key issues that pervade these scenarios: domestic implementation, technology, and joint implementation. We will undoubtedly discuss these issues with you in more detail over the coming weeks, but wanted to flag them for you now.

A. Domestic implementation

Under the system to be negotiated in Kyoto, each participating country would be able to choose its own method for ensuring emissions reductions. The potential "domestic implementation" methods differ markedly in terms of their economic efficiency and political feasibility. We are committed to a market-based approach to reducing emissions, rather than a command-and-control regulatory approach.

The primary non-tax market-based structure for domestic enforcement is a system of tradeable permits. Under this approach, the Federal government would issue a limited supply of permits for emissions, and these permits would be tradeable. *One key issue with permits is the allocation mechanism.* There are two approaches to allocation: auctioning, or grandfathering. Your economic advisers have grave concerns about the cost -- and even the feasibility -- of a grandfathering system. Others dispute this claim, arguing that such mechanisms are both feasible and crucial for garnering corporate support.

1. An auction-based approach

The United States and many other countries have long used auctions to sell government securities, and governments have also used auctions to allocate other resources -- such as oil leases, timber, and portions of the spectrum. The auction mechanism for distributing carbon permits has two main advantages:

- First, it would raise revenue that could be used to reduce other taxes, offset the regressivity of the emissions reduction scheme, raise national saving, or fund adjustment programs. Depending on the stringency of the control regime and other factors, the auction could generate relatively small amounts of money or as much as \$150 billion per year. If those funds were used to reduce distortionary taxes, the so-called double

dividend may result: improved environmental protection *and* less distortionary overall taxation.

- Second, it would ensure that permits are placed directly into the hands of those who value them most highly.

The main disadvantages to an auction approach are that it would be characterized as a tax much more easily than an approach based on grandfathering, and that it would make it much more difficult to garner corporate support.

- Auctions would force most businesses to pay large costs simply for the right to maintain their business-as-usual operations. Despite the fact that many these firms would likely pass most of the cost through to consumers, a firestorm of opposition will arise from these businesses.
- Corporate opponents would undoubtedly attack the auctions as a tax, even if the revenues were recycled to reduce other taxes. The success of the auction approach would depend critically on building constituencies for the tax reductions made possible by the auction revenues.

2. Grandfathering

Instead of forcing emitters to pay for permits at an auction, the government could grandfather them administratively, based on a pre-determined formula. The most likely system would involve granting permits to existing emitters based on historical fuel use or emissions; permits are allocated in this manner in the SO₂ trading program.

This approach has significant political advantages over an auction:

- The prospects for support from key businesses -- such as those you met with last month -- are much higher with an allocation scheme than an auction. The theoretical benefits of auctions as a means of distributing the permits will be much less salient to the CEO of a large corporation than the necessity of having to purchase permits to continue operations.

This approach brings with it several disadvantages, however.

- An administrative system would confer a substantial amount of wealth on those to whom the permits are awarded. Such an approach would reward those who were biggest polluters in the past.
- The value of the permits would attract many claimants. Deciding which claimants deserve the permits could prove very difficult. Treasury and CEA have grave concerns that the lobbying behavior inherent in attempts to capture the permit wealth will make the

entire system grossly inefficient and perhaps unworkable.

- Administrative allocation schemes forgo the opportunity to raise revenues -- and thus to use the revenues to cut other taxes.

Significantly, it may be possible to combine an auction and an administrative allocation approach -- for example, by auctioning some percentage of the permits, and administratively allocating the rest.

B. The role of technology

Over the long-run, all your advisers concur that advances in technology are crucial to reducing greenhouse gas emissions. Since the world economy is likely to grow by several multiples during the next century, the ratio of greenhouse gas production to economic activity must be cut dramatically to reconcile continued economic growth with reduced greenhouse gas emissions. According to your science advisers, three kinds of technologies seem promising:

- Technologies that use energy and materials more efficiently -- like the PNGV car;
- Technologies that produce energy using solar cells, plants and wood waste, and other methods that do not result in net production of greenhouse gases; and
- Technologies that can sequester or permanently store greenhouse gases in deep aquifers or in other ways.

There is agreement that a package of technology options should be a component of any U.S. climate strategy. Options could include direct government expenditures, tax breaks for R&D, or regulatory standards. *But your advisers have sharp disagreements about how much we can reasonably expect of technological advances without the spur of a price increase.*

- Some of your advisers believe that the cost estimates presented above are too high because even without an increase in the price of energy, there are numerous opportunities for energy-saving technologies to be developed and applied. For example, one controversial study conducted by five of the Department of Energy's national laboratories concluded that even without an increase in the price of carbon, "cost-effective energy efficiency alone can take the nation 30 to 50% of the way to 1990 levels" by 2010.
- Your economic advisers raise a series of significant methodological objections to the study mentioned above. They also stress the importance of market incentives for technological advances, and the substantial body of evidence that markets respond to such incentives. They argue that technology will clearly be one of the conduits for meeting an emissions reduction target, but that both theoretically and historically, the most rapid technological advances come in response to significant increases in the

relative price of energy.

For instance, over the entire postwar period, the fossil-fuel efficiency of the U. S. economy has improved at slightly more than one percent per year. Between 1970 and 1986, during which time the economy suffered two oil-price shocks, fossil-fuel efficiency grew by more than 2½ percent per year. The pace of efficiency improvement has slowed down, but not stopped, since the late 1980s, as the relative price of energy has fallen.

The degree of disagreement on this crucial topic, however, can easily be exaggerated. Despite ongoing debates over the precise role of technology, therefore, *there is broad technical agreement that a significant price signal is crucial to achieving emissions reductions of the sort being considered in international fora.* In other words, it is impossible to achieve 1990 emissions levels by 2010 without a substantial increase in carbon prices.

C. Joint implementation

Another source of disagreement among your advisers is the role of joint implementation (JI). JI is a mechanism by which a private entity in the United States could invest in greenhouse gas mitigation projects in developing countries without emissions budgets. In exchange, the investor (and the U.S.) would receive credit towards its emission budget. Your administration has consistently supported joint implementation, from early in your first term. The Vice President has signed framework agreements on this subject with several Latin American countries. In addition, the business community strongly supports joint implementation and some companies -- especially in the utility sector -- have been making joint implementation a reality over the past few years. But some of your advisers are concerned that it will be difficult to change the program from its current pilot scale to a full-blown international system.

In principle, JI provides a very low cost mechanism for reducing emissions, by "trading" emissions here for emissions abroad, where the cost of reduction is much lower. In practice, however, JI requires a mechanism for guaranteeing that emission reductions that qualify for credits are "additional" to -- above and beyond -- reductions that would have happened anyway in the baseline case. How can we tell whether the low emissions power generation plant built in a developing country would have been built in the absence of JI incentives? If credit is given for investments that would have happened anyway, then the use of these credits to meet developed country obligations will result in higher global emissions. On the other hand, if the standard of "additionality" is set too high, or if projects are choked off by transaction costs associated with resolving baseline and additionality questions, then the large potential savings associated with JI will be lost.

**Department of Energy**

Washington, DC 20585

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Janet Yellen / Jeffrey Frankel

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Call Dan Reicher
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***THIS TRANSMITTAL CONSISTS OF ____ PAGE(S) INCLUDING THIS COVER SHEET**

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MEDIA CONTACTS:

Amber Jones, 202/586-5806

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FOR IMMEDIATE RELEASE

September xx, 1997

**Clean Technology Can Achieve
Significant Greenhouse Gas Reductions**

Peer-Reviewed Energy Study: What's Good for Environment is Good for Economy

National investment in energy-efficiency and clean energy technologies can reduce U.S. emissions of global warming gases and produce energy savings that roughly equal or exceed the costs to implement them, Energy Department experts predict. A study conducted by five Department of Energy laboratories and peer-reviewed by industry and academic experts demonstrates that the United States could hold down the costs of meeting climate change goals through technological solutions such as advanced natural gas turbines, biomass and biofuels, and energy-saving appliances. Many consumers and businesses could actually save money through reduced energy use and lower overall energy bills.

"This analysis provides strong evidence that progress on climate change can be achieved without increasing the nation's energy bill. What's good for the environment also can be good for the economy," said Energy Secretary Federico Peña. "President Clinton's plan to make technology a cornerstone for reducing greenhouse gas emissions can achieve these results. From the Partnership for a New Generation of Vehicles that's creating the super-efficient car of the future to expanded use of renewable energy sources, the technology solution is already creating environmental benefits and savings in energy costs."

Current projections suggest that a carbon emissions reduction of 390 million metric tons (MMT) would be required to reduce U.S. emissions in 2010 to 1990 levels. The study models a scenario that combines a vigorous national technology program with a domestic system of carbon trading to achieve the reduction. The study concludes that such an approach could reduce emissions by up to 390 MMT. A new generation of technologies and international carbon emission trading could result in further reductions over the next quarter century.

This study estimated the potential costs of the reductions at \$50 to \$90 billion per year. Costs in the study include incremental investments to deploy clean energy or energy efficient technologies by consumers and industry as well as those associated with hypothetical increases in energy prices. In addition, Energy Department experts reviewed energy cost savings resulting from the use of these technologies; these estimated savings through 2010 total \$70 to \$90 billion per year. This indicates that the clean energy investments could produce energy cost savings roughly equal to or greater than the costs of implementation, on a life-cycle basis.

The "bottoms-up" approach in the study examines 200 specific technologies in four major sectors of the economy -- buildings, industry, transportation and electric utilities -- and analyzes the possible advances in each sector. For the buildings, industry and transportation sectors, the study analyzes the impacts of end-use energy-efficiency improvements and low-carbon technologies on carbon emissions. The utility sector analysis estimates the impacts of clean energy activities, such as increased use of natural gas and renewable energy. While no one measure can address the entire problem, technologies already in development could contribute substantially to the reductions. For example:

- **Transportation:** The Partnership for a New Generation of Vehicles is developing advanced automobiles that will be three times more fuel-efficient than today's vehicles but still safe and affordable. In the biofuels area, cellulosic ethanol, a promising biofuel made from agricultural and forestry wastes, produces no net carbon emissions; the Energy Department projects cutting the cost of ethanol to under 70 cents/gallon by 2010.
- **Buildings:** The study projects promising carbon reductions from energy-efficient appliances supported by the Energy Department, including a 1 kilowatt-hour/day refrigerator and advanced lighting. Advanced fuel cells powered by natural gas will produce electricity and provide heating at 80-percent efficiency, while lowering the current cost of power.
- **Utilities:** Wind turbines are expected to produce power at less than 3 cents/kilowatt-hour by 2010. Biomass co-firing with coal at some plants could produce significant emissions reductions.
- **Industry:** Advanced turbines are expected to achieve 80 percent system efficiency, producing electricity and steam in industrial plants at less than today's costs. Advanced motor systems and clean industrial technologies can cut emissions and costs while increasing productivity.

The Department of Energy's Oak Ridge and Lawrence Berkeley National Laboratories led the comprehensive one-year analysis, with contributions by the National Renewable Energy Laboratory and Pacific Northwest and Argonne National Laboratories. The findings, which were reviewed extensively by representatives from industry and academia, are consistent with those of two previous studies. Those studies, released by the National Academy of Sciences and Office of Technology Assessment in 1991, also concluded that technology could play a prominent role in reducing U.S. greenhouse gas emissions.

To request a summary or full copy of the study, titled *Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy-Efficiency and Low-Carbon Technologies by 2010 and Beyond*, media can call the Department of Energy Press Office at 202/586-5806; others can call Public Inquiries at 202/586-5575.

- DOE -

END FAX

**White House Conference on Climate Change:
The Challenge of Global Warming
Draft Agenda**

10:00 - 10:05 Vice President Gore: *Welcome attendees; Introduces President Clinton*

10:05 - 10:20 President Clinton: *Opening Remarks: Importance of Global Warming and Climate Change for the American People.*

10:20 - 11:15 The Science of Global Warming and Climate Change

Presentation: **John Holdren**, Harvard University

Panelists: **Robert Watson**, World Bank

Tom Carl, NOAA

Diana Liverman, University of Arizona

Don Wilhite, University of Nebraska

11:30 - 11:45 Vice President Gore: *Where we've come from; Where we're going.*

11:45 - 12:45 The Role of Technology in Reducing Greenhouse Gas Emissions

Presentation: **Frederico Pena**, Secretary of Energy

Panelists: **Maxine Savitz**, Allied Signal & Presidential Commission of Advisors
on Science and Technology

Roger Sant, AES Corporation

Tom Casten, Trigen Corporation

Michael Bonsignore, Honeywell Corporation

Larry Papay, Bechtel Corporation

1:00 - 2:30 Lunch:

**Remarks by First Lady Hillary Rodham Clinton
Breakout Discussions with the Cabinet**

2:30 - 3:30 Kyoto Conference and U.S. National Interests

Presentation: **Madeleine Albright**, Secretary of State

Panelists: **William Reilly**, Fmr. EPA Administrator

[**John Sweeney**, AFL-CIO]

James Wolfesohn, World Bank

Linn Draper, AEP

Fred Krupp, Environmental Defence Fund

Jessica Tuchman Matthews, Carnegie Endowment for Peace

Daniel Yergin, Cambridge Energy Research Associates
[Gen. William Odom, (Ret.), Hudson Institute]

3:30 – 4:30 Climate Change Policy and the U.S. Economy

Presentation: Larry Summers, Deputy Secretary of the Treasury

Panelists: Richard Repetto, World Resources Institute

[William Nordhaus, Yale University]

[Alan Blinder, Princeton University]

Richard Sandor, Chicago Board of Trade

[Michael Porter, Harvard Business School]

10:00 - 10:20: Opening Remarks

10:00: The Vice President welcomes attendees; introduces the President.

10:05: The President speaks to the American people in a substantive way about global warming and climate change. His remarks foreshadow the day's events, endorse the scientific consensus behind climate change, assert the importance of this issue to the American people, outline that action will need to be taken, and embrace the broad outlines of the U.S. negotiating position going into Kyoto.

10:20 – 11:15: The Science of Global Warming and Climate Change: This panel will present and discuss evidence about global warming and climate change, and present the scientific case that they are occurring, that they have real consequences for the American people, and that action is needed to limit greenhouse gas emissions.

10:20: John Holdren, Professor of Physics, Harvard University, will concisely describe the physical science of global warming and climate change, as well as the level of certainty about its different aspects within the scientific community.

10:35: The President asks Dr. Tom Karl, Senior Scientist at NOAA, to discuss extensive data and anecdotal evidence that something serious is starting to occur.

10:45: The Vice President asks Dr. Diana Liverman, University of Arizona, and Don Wilhite, University of Nebraska, to describe possible impacts on regions of U.S. in the next twenty to thirty years.

11:00: The Vice President can ask Dr. Robert Watson, Chair of the IPCC, to discuss what is clear and what is unclear about how rapidly the climate will change and about where impacts will be most felt, as well as what the skeptics are arguing. He also could ask who participates in the IPCC, and how it came into being.

11:10: The President asks John Holdren how policymakers should act when uncertainties about different climate scenarios.

- 11:30 - 11:40: Vice President Al Gore: Where we've come from; where we're going:** Outlines history of how fossil fuels have been central to building modern societies and economies, and sketches where world population and development are going. He then outlines the new challenge: marshalling modern technology and entrepreneurial spirit to develop more efficient and innovative forms and uses of energy.
- 11:45 - 12:45: The Role of Technologies in Reducing Greenhouse Gas Emissions:** This panel will discuss policy options that allow us to reduce emissions without hurting our economy.
- 11:45: Secretary Pena presents an overview of the sectors that are the major sources of greenhouse gas emissions, and of the technologies that could play a part in reducing emissions.
- 11:55: The President asks Maxine Savitz, Allied Signal and PCAST member, to discuss the potential for building cars, homes and buildings that use less fuel.
- 12:05: The Vice President asks [Lary Papay, Bectel or Roger Sant, AES] to discuss advances in the newest generation of coal-fired electric plants, the lessons learned from previous efforts to design plants that use less fuel, and the worldwide demand for cleaner burning power.
- 12:15: The Vice President asks [DuPont/Dow/Monsanto] to discuss advances being made in introducing energy efficiency into manufacturing.
- 12:20: The President asks Tom Casten to describe what Trigen has done to develop and market systems that recapture unused energy from power plants, and rechannel it to heat other buildings. Mr. Casten should also describe the kinds of companies that have benefited from this kind of technology, as well as to speculate on the market share for these kinds of technologies.
- 12:30: The Vice President asks Steve Percy, British Petroleum USA, to describe efforts to develop and market solar and other alternative fuels. Larry Papet, Bectel, could describe how much we can expect solar, wind, and other renewables to reduce our carbon emissions. Mr Papet can also describe the most effective government programs or policies in helping develop these technologies.
- 12:40: The Vice President asks Michael Bonsignore to discuss Honeywell's experience in trying to export technologies such as more efficient lighting and heating systems, as well as nuclear and hydro-energy power plants.

1:00 - 2:15:

Lunch and Breakout discussions:

1:00: First Lady Hillary Rodham Clinton will give broad remarks, including brief mention of the health effects on children from climate change.

1:15: Breakout sections: Cabinet members in attendance will each lead discussions at their tables, with a short list of questions tailored to economic, technological, or other scientific questions.

2:30 – 3:30: International Negotiations Panel. This panel will discuss the global nature of the problem, identify key issues outstanding in the negotiations, and clearly explain the U.S. negotiating position.

2:30 - 2:35: Secretary Albright provides a brief background on the ongoing negotiations, mentioning the Rio Climate Treaty, the Berlin Mandate, and the Geneva Declaration. She describes the core elements of the U.S. position (i.e. binding targets, emissions trading, JI, developing country commitments), and summarizes the positions of key countries or country groupings (i.e., the EU, China, and the G-77).

2:35 - 2:45: Vice President Gore asks William Reilly, Fmr. EPA Administrator, why developed countries have taken the lead, and what are realistic, environmentally sound and politically equitable obligations for developing countries to adopt for current and future emissions.

[2:45 - 2:50: Vice President Gore asks John Sweeney, AFL-CIO, to discuss labor's perspective on a fair international agreement to address climate change.]

2:50 - 2:55: Secretary Albright asks James Wolfensohn, World Bank, to describe why developing countries have opposed committing to binding targets at Kyoto, and any whether we risk choking off economic development.

2:55 - 3:00: Vice President Gore asks Linn Draper, AEP, whether flexible, market oriented techniques can allow businesses such as coal burning utilities to adapt to environmental regulation in a cost-effective manner. What are the international prospects for establishing such market-oriented approaches, such as trading and joint implementation?

3:00 - 3:05: The Vice President asks Fred Krupp, EDF, to describe whether an international trading system could provide significant gains to the environment.

3:05 - 3:15: Secretary Albright asks Jessica Matthews, Carnegie Foundation, about the foreign policy considerations regarding climate change. Do we have a national interest in preventing climate change impacts in the developing world?

3:15 - 3:20: Vice President Gore asks Daniel Yergin, Cambridge Energy Research Associates, to talk about strategic energy considerations, especially how developing view their energy security, and what the prospects are for the current system.

3:20 - 3:25: Secretary Albright asks General William Odom, Ret., Hudson Institute, how these issues are likely to affect strategic balances in several key regions such as the Caspian Sea and South China Sea.

3:30 - 4:30: Climate Change Policy and the US Economy: Can we do this in a way that won't hurt the economy? Which industries are likely to face challenges? Which are likely to reap benefits?

3:30 - 3:35: Deputy Secretary Summers lays out the challenge of reducing climate emissions without hurting the economy. He would summarize the economic consequences of the technology discussion: that we either have to reduce our use of fossile fuels or develop new techniques or energy supplies that emmit less carbon.

3:35 - 3:45: Vice President Gore asks Robert Repetto, WRI, how quickly it is possible to bring existing technologies on line quickly and cost-effectively to reduce our emissions.

3:45 - 3:55: Secretary Summers asks [Professor William Nordhaus/Rich Richels] ~~Princeton~~^{Yale} University, what would be the most cost effective strategy for mitigating climate change. How important are time frames for bringing on new techologies? How can we know if we are exceeding a point of diminishing returns?

3:55 - 4:05: The Vice President asks [*Alan Blinder/Robert Solow/Paul Krugman*] how, amidst uncertainty, we should craft an "insurance" strategy, and how we might design sufficiently early reductions to make an middle-term date cost effective.

4:05 - 4:15: Larry Summers asks Richard Sandor, Chicago Board of Trade, to talk about his experience in helping establish the sulphur dioxide trading system, including how people expected it to peform, how much people thought permits would cost, and why the cost ended up being significantly lower.

4:15 - 4:25: The Vice President asks Michael Porter what makes investors move quickly into environmental technologies, and firms and countries' find it in their competitive advantage to invest early in these technologies.

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FAX TRANSMISSION

To: The Honorable Janet Yellen 395-~~927~~ 6958

From: The Honorable Dan Schaefer

Date: August 25, 1997

Number of Pages (including cover sheet): 10

Notes:

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U.S. House of Representatives
Committee on Commerce
 Room 2125, Rayburn House Office Building
 Washington, DC 20515-6115

August 22, 1997

The Honorable Janet Yellen
 Chair
 Council of Economic Advisors
 Old Executive Office Building
 Washington, D.C. 20502

Dear Mr. Yellen:

On July 15, 1997, you presented the Administration's views on the economic and environment impact of the proposed international global climate change agreement before the Energy and Power Subcommittee. On behalf of the members of the Subcommittee, I thank you for your informative testimony. The hearing was indeed enlightening.

With the conclusion of the eighth meeting of the Ad Hoc Group on the Berlin Mandate, I see significant benefit to a round of follow-up questions to clarify, for the record, some of the issues that were raised during your testimony and the question and answer session that followed.

Attached is a list of questions for you to answer on behalf of the Administration. I ask that you work with the other relevant departments and agencies in developing responses and providing the relevant documentation where requested. Your responses will be entered into the record in the same manner as your original testimony. Your responses would be appreciated on or before September 22, 1997. If you have any questions, please call Cathy Van Way at (202) 225-2927.

Thank you for your continued attention and assistance to the matter.

Sincerely,

Dan Schaefer

Chairman

Energy and Power Subcommittee

Attachment

The Honorable Janet Yellen
August 22, 1997
Page 2

cc: The Honorable Tom Bliley, Chairman
The Honorable John Dingell, Ranking Member
The Honorable Ralph Hall, Ranking Member
Subcommittee on Energy and Power

SUBCOMMITTEE ON ENERGY AND POWER
HEARING ON GLOBAL CLIMATE CHANGE
FOLLOW-UP QUESTIONS

Interagency Analytical Team Report

1. Please identify each member of the Interagency Analytical Team (IAT) from the date of its inception to the present time, any other participants inside or outside the Administration, and specify their responsibilities.
2. When was the IAT formed and what were the IAT's instructions? Please provide any documentation regarding the formation of the IAT and its mission, responsibilities, membership or assignments.
3. Please indicate the total costs of the IAT's efforts and the share paid annually by each Department or Agency that was involved and please identify the source of the funds within each Department or Agency.
4. Is the IAT still in existence? If so, what are its current responsibilities?
5. Please provide a copy of all drafts of the IAT report in addition to the May 16 and 30, 1997 drafts, both earlier and later.
6. Please explain how the peer reviewers were selected? What instructions were those peer reviewers given? Please provide copies of any correspondence or instructions that were sent to the peer reviewers.
7. If the IAT effort is in fact a "failed" project as indicated in Administration testimony at the Subcommittee hearing how will the Administration determine the appropriate level of future international climate change commitments for Kyoto and later?
8. As late as last May when Dr. Ehrlich and others in the Administration held briefings on the then draft analysis and assessment there was no hint that the Administration considered this effort a failure and the models to be unreliable. What occurred since May that caused the Administration to apparently reach a different conclusion from that of Dr. Ehrlich?
9. The IAT draft analysis referred to three scenarios which resulted in costs of future climate commitments of approximately \$200, \$100 or \$50 per ton carbon tax equivalent. Has the Administration concluded that a \$200 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$100 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$50 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness. Please provide the basis for any of the above conclusions. If the Administration does not support any of the above costs, what analysis or other information does the Administration intend to rely on to support a different amount?

10. Is the paper prepared by the IAT both an analysis and assessment? How does it relate to the "analysis and assessment" referred to in Paragraph 4 of the Berlin Mandate? Has the Ad Hoc Group on the Berlin Mandate provided an analysis and assessment as required by the Berlin Mandate?
11. The IAT draft states that the central policy modeled for the analysis "is aimed at reducing carbon and other greenhouse gas emissions by stabilizing them at 1990 levels" and that policy would be "announced in 2000 and its restrictions are phased in over a ten year period, so that the policy would take full effect in 2010." Reports in the media after the Denver Summit that President Clinton attended also referenced this date of 2010. In light of EIA's projection of emissions 22% above 1990 levels by 2010, is the Administration considering a target and timetable that calls for stabilization at 1990 levels by 2010?
12. The Administration frequently cites the 2000 economists who say they support controlling greenhouse gases. Their statement supports as the mechanism either carbon taxes or emission permits. In the past, the Administration has said it opposes the use of taxes. Is that still the Administration's position?
13. The IAT draft explains that these emission reductions to achieve stabilization would be through "issuing tradable permits at the earliest point of energy production or when imported into the U.S." and that the permits "are initially auctioned in a way that is revenue neutral: i.e., all revenues generated would be recycled through the economy." Would these revenues be deposited in the treasury as miscellaneous receipts under the Economy Acts? Would they then have to be recycled through changes in the tax laws or by appropriation? How would they be recycled?
14. Does the Administration believe that permit auctions are the equivalent of a new tax? If not, please explain.
15. The IAT draft states that "among fuels, demand for coal bears the brunt of greenhouse gas stabilization." What is the impact on the U.S. economy as a whole and on the relevant coal regions of this policy towards coal? What will be the job impact? Is the Administration adopting an anti-coal policy? How is this policy consistent with President's Clinton 1998 reply to Mr. Dingell that the U.S. will not agree to any protocol that harms our economy and jobs or our competitiveness?

Kyoto Agreement

16. How long after December 1997 does the Administration think it will take to obtain Senate advice and consent of any Kyoto agreement, to ratify that agreement, and to enact implementing legislation?
17. Which Agency or Department would be responsible for implementing the provisions of any agreement reached in Kyoto, including provision relating to joint implementation, emissions trading, and advancing Article 4.1?

*in many cases
underlying address
analysis
accepted or rejected*

18. What consideration has been given or plans made regarding passage of legislation necessary to implement any agreement reached in Kyoto?

U.S. Draft Protocol

19. Article 17.4 of the Framework Convention on Climate Change (FCCC) specifies that only "Parties to the Convention may be Parties to a protocol." However, there is no assurance that all or even a majority of the 167 Parties to the FCCC will deposit instruments of ratification, acceptance, approval or accession to any protocol adopted by the Parties by consensus or otherwise in Kyoto. What assurances does the U.S. now have that most, if not all, developing country Parties to the FCCC will become Parties to a Kyoto protocol? Why is it in the U.S. interest to agree, without such assurances, to a protocol that proposes to set legally binding post-2000 targets and timetables for Annex I Parties only and also imposes on the U.S. new and legally binding commitments to advance implementation of Article 4.1 of the FCCC, such as those prescribed in paragraph 1, 2, 3, and 4 of Article 5 of the U.S. draft protocol?
20. In a July 18, 1994 letter to the then House Committee on Energy and Commerce, [the State Department] said:
- We agree that there are substantial commitments beyond 2000 for all parties to the Framework Convention under Article 4. Article 4.1 (applicable to both developed and developing countries) contains commitments that are not limited by any specific timetable.
- a) Is there any evidence to date that the U.S. is not abiding by these Article 4.1 commitments? If there is none, why should the U.S. voluntarily agree to reaffirm, as required by Article 5.1 of the June draft, to what the U.S. already agreed to when it ratified the FCCC in 1992?
- b) Is the U.S. asserting that other Annex I Parties are not abiding by such commitments? If so, please identify those Parties.
21. Paragraph 2 of Article 5 of the U.S. draft Protocol mandates each Party to "strengthen its legal and institutional framework to advance implementation" of Article 4.1 commitments. What "framework" does the Administration have in mind? Does this suggest a new Federal or international agency or program? Would this be done through new legislation? If not, how would it be achieved in the U.S.?
22. Article 5.3 requires that each Party take "measures to facilitate investment in climate-friendly technologies." What "measures" does the Administration contemplate? How would they be implemented in the U.S.? What are their regulatory and budgetary implementations?
23. Article 16 of the draft provides that the Parties "shall adopt, by [2005], binding provisions so that all Parties have quantitative greenhouse gas emissions obligations and so that there

is a mechanism for automatic application of progressive greenhouse gas emissions obligations to Parties, based upon agreed criteria."

- a) Does this mean that there could be a second protocol or another legal instrument by [2005] which is only 7 years after the December meeting in Kyoto?
 - b) Do the words "all Parties" in this Article mean that only the "Parties" to the U.S. draft protocol would be required to "adopt" by 2005 such an instrument? Unless developing country Parties to the FCCC, such as China, India and Brazil, become Parties to the Kyoto instrument (as proposed by the U.S.) prior to [2005], how does this Article address the issue of greenhouse gas emission growth by all non-Annex I Parties?
 - c) Could such a new instrument adopted by [2005] impose new and additional obligations on the U.S. beyond those proposed to be adopted in Kyoto? Why is that possibility a good result for the U.S. economy, trade, and competitiveness?
 - d) What "mechanism for automatic application of progressive greenhouse gas emissions obligations" does the Administration contemplate by this proposal? What are its implications for the U.S., including its sovereignty?
24. Article 16.1 of the Convention provides that "annexes shall be restricted to lists, forms, and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character." The U.S. draft protocol states, that it may not be "appropriate" to adopt the Article 16.1 Convention example. Please explain why. Does the U.S. support annexes that would be substantive and mandatory?
25. Article 9 of the U.S. draft provides that Parties "shall cooperate" in establishing a "long-term goal" regarding concentrations of gases. Article 10 calls for meetings at "regular intervals" to, among other things, "periodically review the adequacy" of the Protocol and Article 8 calls for periodic review of the Protocol and guidelines "in light of evolving scientific knowledge related to climate change." Article 2 already suggests a minimum of two budget periods. Article 16 tells the Parties to adopt "binding provisions" by [2005] for progressive "obligations." Does the State Department contemplate over the next several decades a continuing process of meetings of both the Protocol and Convention Parties annually and a series of IPCC assessments, special reports, and technical papers, leading to a series of protocols or other legal instruments that are likely to have significant economic impacts on the Parties and their people? Why is there a need for such frequent meetings and reviews?
26. The Global Climate Coalition sent a letter to the Department of State on February 14, 1997 raising a number of questions about the January 17, 1997 version of the U.S. draft protocol, particularly in regards to trading. The Administration has not yet responded to those questions. Please respond to them as part of your reply to this inquiry.

EU Bubble

27. The EU proposal made recently in Denver was developed last March as an EU "negotiating position for the ongoing negotiations on the Berlin Mandate" and it includes burden-sharing of a 10% reduction among EU members of the "overall emission reduction objective by the Community as a whole". This appears to be a form of differentiation, a concept the U.S. is not supporting. The existing FCCC bubble applicable to the EU presumably only covers policies and measures and, when adopted, it only covered the 12 Parties that were members of the EU in 1992. Does the U.S. understand that the EU is seeking, by its submissions and discussion with the U.S. delegation, to extend a form of the FCCC bubble to a protocol and another legal instrument that may be adopted in Kyoto, to expand the bubble to cover any target and timetable or financial obligations and not just policies and measures, and to expand the bubble to include all present and future members of the EU, such as countries from Central and Eastern Europe? Why is such an expanded bubble in the economic and competitive interests of the U.S.?
28. What is the potential impact of such an expanded EU bubble on the U.S. proposal for international emissions trading? Would it ensure that the EU would get the benefit of any emissions deficit derived from such Central and Eastern European Members and deprive the U.S., Japan, Australia and Canada of that deficit? Would the U.S. then have to rely primarily on Russia's emissions deficit in order to derive any of the benefits of trading?
29. Article 22.3 of the FCCC requires that regional economic integration organizations must declare the "extent of their competence" with regard to obligations under the FCCC. Does the U.S. believe that the EU has the competence to carry out legally binding targets and timetables and to enforce any differentiated targets for its members if they fail to achieve them?
30. The State Department's September 9, 1996 reply to the Committee stated that the U.S. did not agree to an "EU Bubble in Berlin" and that the U.S. delegation "successfully opposed including language in the Berlin Mandate which might have suggested that any country or group of countries could "bubble" in the post-2000 period." The reply then said:

Clearly, the question of "bubbling" with respect to post-2000 commitments is complex, and one that will be closely scrutinized and carefully considered as negotiations progress. The Administration has consistently and continuously consulted with Congress, as well as with U.S. industry and U.S. NGOs, on all aspects of the negotiations concerning post-2000 commitments and will continue to do so.

The Administration has not yet held meaningful discussions with this Committee on the issue of the EU bubbling to "meet and target and timetables," its implications for the U.S., its merits, or its complexities. Given the fact that negotiations are just approaching a conclusion in Bonn and Kyoto, when do you plan to consult us on this aspect of the negotiations?

31. Since 1992, the composition of the only "regional economic integration organization," namely the EU, has grown from 12 to 15 members and several other countries want to expand it further. Under what circumstances would the U.S. agree to an EU bubble that is or could be expanded?

EU Amendment to Convention

32. The EU has proposed an amendment to the Convention to provide for a vote to adopt all future protocols by three-fourths if all efforts at consensus are exhausted. The proposed amendment would appear to have a retroactive effect for Kyoto.
- a) Under this proposal, is it possible that three-fourths of the FCCC Parties could vote to "adopt" any Protocol that imposed new obligations for Annex I and/or non-Annex I Parties and then decide not to deposit an instrument of ratification, etc.?
 - b) Does the U.S. support such an amendment to the Convention?
 - c) Has the U.S. position changed from its June 19, 1996 response to this Committee in regards to any of these matters? Would the Administration agree to a resolution of one of these matters, namely voting on a protocol, without a resolution of the financial and budget matters for both the Convention and all future protocols?

Emissions Trading

33. Does the Administration intend that any international emission trading program would apply in the same way and to the same extent to public and private entities internationally and in the U.S.? For example, would it apply to local governments and to defense or other agencies of each Party and to the emissions of such entities? What will be the impact on the U.S. Defense Department of an international, or, for the matter, a domestic, emissions trading program?
34. Greenhouse gases not covered by the Montreal Protocol are not pollutants within the meaning of the Clean Air Act and are not subject to the command and control provisions of the Act or other environmental laws. It is our understanding that although the U.S. has cited (in a September 9th reply to this Committee) authority to implement the Climate Change Action Plan with voluntary measures, the U.S. draft protocol, because it may call for mandatory measures, could not be given full effect in the U.S. without the enactment of new legislation by Congress. Do you share that understanding? Is the Administration considering a domestic emission trading legislative program patterned on the 1990 Clean Air Act?

General

35. I understand that the Administration has recently established the White House Climate Change Task Force, a Deputies Group and an Assistant Secretaries group. Please explain the role and purpose of each in regards to the development of the Administration's position and policies for the international negotiations for a protocol or another legal instrument in 1997 and for the development of implementing legislation in the U.S. Please identify the members of each group. Please provide any documents regarding the formation of these groups, their membership, mission, tasks, and/or assignments.
36. Please provide a table of all contracts, cooperative agreements, grants, and interagency agreements and any extensions thereof (hereinafter referred to as "agreements") entered into with any individual, agency, or public or private entity (foreign or domestic) by or through any federal Department or Agency, including the Departments of State, Commerce and Energy, and the Environmental Protection Agency, for the period beginning July 1, 1994 to the present that relates to, or includes, (directly or indirectly) climate change matters or issues of any kind. These should include matters relating to (a) domestic or international emission trading, including economic and other analysis of such trading, the administration and verification of such trading in the U.S. and elsewhere, (b) public outreach, general and specific public education, grass roots, community outreach, workshops, (c) transportation efficiency, alternative fuels, transportation generally, utilities, impact on pollutants like ozone and particulate matter, and (d) any legal analysis of these matters and of the Convention or of any statutes concerning climate change or trading. Each table should identify the date of the agreement, the agreement recipient, the amount of Federal funds, the term, including extensions, a brief description, the product and whether it is publicly available, and the status. Please include with each table the applicable "Statement of Work", including any revision thereof, for each such agreement.

MJ



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 15 1997

OFFICE OF
POLICY, PLANNING AND EVALUATION

Tony Kreindler
Managing Editor
Inside EPA Weekly Report
1225 Jefferson Davis Highway
Arlington, VA 22202

Re: Freedom of Information Act Request RIN-00426-97

Dear Mr. Kreindler:

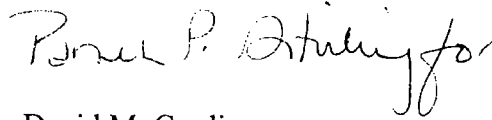
In response to your Freedom of Information Act Request for copies of "all economic analyses conducted by EPA's Office of Policy Planning and Evaluation with regard to climate change and global warming since January 1, 1996", and subsequent phone conversations with my staff on your precise area of interest, I am forwarding your request to Janet Yellen, chair of the President's Council of Economic Advisors. On July 17, 1997, Dr. Yellen, while testifying before the House Commerce Subcommittee on Energy and Power, released the May 30 staff draft of the Interagency Analytic Team (IAT) analysis and the comments received on it from expert reviewers.

As my staff indicated to you in phone conversations, the scope of your original request was too broad and could not be fulfilled. However, as you indicated in phone conversations with my staff, your main interest is in this paper.

This staff draft and the expert comments on it are the only documents we believe are responsive to your revised request and whose release will serve the public interest. We have determined that all other reports, correspondence and other documents concerning the IAT analysis of policies related to the reduction of greenhouse gas emissions are exempt from mandatory disclosure pursuant to FOIA exemption #5, 5 U.S.C. §552(b)(5). We have concluded their release is not in the public interest.

You can appeal this initial denial by sending a letter, within 30 days to: Freedom of Information Officer (A101), 401 M Street, SW, Washington, DC 20460. Your appeal should refer to the RIN number listed above, the date of this determination, and my name, title and address.

Sincerely,

A handwritten signature in black ink, appearing to read "David M. Gardiner". The signature is fluid and cursive, with a long, sweeping tail on the last letter.

David M. Gardiner
Assistant Administrator

* = sent letter to the economists

	Signed Economists letter	Affiliation	phone #	fax #
	Bill Nordhaus	Yale Univ	(203) 432-3587	(203) 432-5779
24 *	Dale Jorgenson	Harvard	(617) 495-4661	(617) 495-7730
22	William Baumol, NYU		(212) 998-8943	(212) 995-3932
5	Richard Schmalensee	MIT, Sloan School of Management	(617) 253-2957	(617) 258-6555
	Max Corden, SAIS, Johns Hopkins Univ.		(202) 663-5679	(202) 663-5656
		School of Advanced Intl Studies		
12	Gerard Debreu, UC Berkeley		(510) 642-7284	(415) 642-1966
8	Frank Fisher, MIT		(617) 253-3373	(617) 253-4096
24	Claudia Goldin, Harvard		(617) 495-3934	(617) 868-2742
17	Ned Gramlich, U.Mich/ FRB nom.		(313) 764-9483	(313) 763-9181
14	Lawrence Klein, U.Penn *		(215) 898-7713	(215) 898-4477
20	Anne Krueger, Stanford		(415) 723-0188	(415) 725-5702
24	Larry Katz, Harvard		(617) 495-5148	(617) 868-2742
4	Robert Litan, Brookings/Former OMB official		(202) 872-6828	(202) 797-6004
5	Van Ooms, CED Committee for Economic Development		(202) 296-5860	(202) 223-0776
24	Jeff Sachs Harvard Institute for International Development		(617) 495-4112	(617) 495-8685
29	James Tobin *	Yale Univ.	(203) 432-3720	(203) 432-6167
12	John Harsanyi *	Univ. Calif. Berkeley, Haas School	(510) 642-5588	(510) 642-4700

Name	Title/Affiliation	Background	Phone #	Fax #	Status
New England (CT, ME, MA, NH, RI, VT)					
Bill Moomaw PRT	Fletcher School of Law and Diplomacy, Tufts U	Economist; Former WRI policy director; article published on economics, chemist(?) policy area, role of industry, dealing with North/South issues	617/628-5000 x2732 (MA)	617/627-3712	YES (JG)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					
Ev Ehrlich PRT	President, ESC Company; directed Administration's economic analysis	Economist; Ex-Undersecretary of Commerce	202/347-3200 (DC)	202/ 347-4334	YES (JG)
Irving Mintzer PRT	Ex-WRI and Center for Global Change; Washington D.C.	Economist list; generalist	301/587-8714 (MD)		YES (JG)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Generalists (nation-wide)					
Robert Watson PRTS	Senior Advisor, World Bank, Chair -- IPCC Third Assessment	Former Associate Director for Environment, OSTP; climate science, impacts, and mitigation	202/473-1755 (DC)	202/ 473-0565	YES (RB)
Daniel Lashoff PRTS (also in Environmental Groups)	Senior Scientist, NRDC Washington D.C.	Climate specialist, co-authored NGO study, Energy Innovations	202/289-2399 (DC)	202/ 289-1060	YES (SS)
Jerry Melillo PRTS	Woods Hole, Marine Biological Lab	Impacts -- forest modelling and climate science	MA		YES (RB)
James McCarthy PRTS	Professor of biological oceanography; chairman, Environmental Science and Public Policy concentration; director, Museum of Comparative Zoology, Harvard U	Impacts -- general; ocean, chemical cycles, CO2 and ocean processes.	617/495-2330 (MA)	617/495-0506	YES (TP)
Physical Climate System Scientists (nation-wide)					
Michael McElroy PS	Professor of environmental studies; chairman, University Committee on the Environment; chairman, Earth and Planetary Science Department, Harvard U	Basic climate science; physical science	617/495-2351 (MA)	617/495-8839	YES (EL)
Impacts Scientists (nation-wide)					
Don Wilhite P	Director, International Drought Information Center, U. Of Nebraska	Impacts on natural resources; drought; national and international focus	402/472-4270 (NE)	402/ 472-6614	YES (TP)
Jane Lubchenco PS	Professor of marine biology, zoology, Oregon State; former president AAAS; organizer of Scientists' Statement; Board of Trustees, Environmental Defense Fund	DOI; Impacts on natural resources; impacts on ecosystems, biodiversity, forests; participated in President's briefing	541/737-5337 (OR)	541/737/3360	YES (TP)
Steven Hamburg P	Brown University	Impacts on natural resources; forestry and wildlife	401/863-3449 (RI)	401/863-3503	YES (TP)
Herman Shugart P	W.W. Corcoran Professor of Environmental Sciences and Chairman, Dept. Of Environmental Sciences, U. Of Virginia	Impacts on natural resources; forests	804/924-7642 (VA)	804/ 982-2137	YES (TP)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Walter Oechel P	Dept. Of Biology, San Diego St. University	Impacts on natural resources; Arctic ecosystems; water use; forest fires; ecological feedback mechanisms; sources and sinks	619/594-4818 (CA)	619/ 594-7831	YES (TP)
George Woodwell P	Director, Woods Hole Research Center; Vice Chair, Board of Trustees, Natural Resource Defense Council; Honorary/Founding Trustee, Environmental Defense Fund	Impacts on natural resources	508/540-9900 (MA) Ass't=Rama Krisha (?)	508/ 540-9700	YES (TP)
New England (CT, ME, MA, NH, RI, VT)					
Eric Chivian	Harvard Medical School	Human health impacts; spread of infectious disease	617/ 738-9443 or 617/ 432-0493 or 617/ 253-9872 (MA)	617/ 734-8822 or 617/ 432-2595	YES (EL)
Paul Epstein	Harvard Medical School	Human health impacts; spread of infectious disease; impacts of coastal algae on fish and pests on agriculture	617/432-0493 (MA)	617/ 432-2595	YES (EL)
Steven Hamburg P (also in nation-wide)	Brown University	Impacts on natural resources; forestry and wildlife	401/863-3449 (RI)	401/863-3503	YES (TP)
James McCarthy PRTS (also in nation-wide)	Professor of biological oceanography; chairman, Environmental Science and Public Policy concentration; director, Museum of Comparative Zoology, Harvard U	Impacts -- general; ocean, chemical cycles, CO2 and ocean processes.	617/495-2330 (MA)	617/495-0506	YES (TP)
Michael McElroy PS (also in nation-wide)	Professor of environmental studies; chairman, University Committee on the Environment; chairman, Earth and Planetary Science Department, Harvard U	Basic climate science; physical science	617/495-2351 (MA)	617/495-8839	YES (EL)
Jerry Melillo PRTS (also in nation-wide)	Woods Hole, Marine Biological Lab	Impacts -- forest modelling and climate science	MA		YES (RB)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
George Woodwell P (also in nation-wide)	Director, Woods Hole Research Center; Vice Chair, Board of Trustees, Natural Resource Defense Council; Honorary/Founding Trustee, Environmental Defense Fund	Impacts on natural resources	508/540-9900 (MA)	508/ 540-9700	YES (TP)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					
Rita Colwell	U. Of Maryland	Human health impacts; infectious disease	301/403-0501 (MA)	301/ 454-8123	YES (TP)
Bill Easterling	Penn State University	Impacts on natural resources; U.S. agriculture, water resources, Great Plains	814/865-3433 (PA)	814/863-7943	YES (TP)
Lawrence Kalkstein	U. Of Delaware	Human health impacts; impacts of heat stress on mortality	302/831-8269 (DE)	302/ 831-6654	YES (TP)
Daniel Lashoff PRTS (also in nation-wide and Environmental Groups)	Senior Scientist, NRDC Washington D.C.	Climate specialist, co-authored NGO study, Energy Innovations	202/289-2399 (DC)	202/ 289-1060	YES (SS)
Adam Markham	World Wildlife Fund	Impacts on natural resources; National Parks, wildlife	202/293-4800x382 (DC)	202/293-9211	YES (TP)
Jonathan Patz	Johns Hopkins U.	Human health impacts; spread of infectious disease	410/955-4130 (MD)	410/ 955-1811	YES (TP)
Herman Shugart P (also in nation-wide)	W.W. Corcoran Professor of Environmental Sciences and Chairman, Dept. Of Environmental Sciences, U. Of Virginia	Impacts on natural resources; forests	804/924-7642 (VA)	804/ 982-2137	YES (TP)
Robert Watson PRTS (also in nation-wide)	Senior Advisor, World Bank, Chair -- IPCC Third Assessment	Former Associate Director for Environment, OSTP; climate science, impacts, and mitigation	202/473-1755 (DC)	202/ 473-0565	YES (RB)
Southeast (AL, FL, GA, KY, MS, NC, SC, TN)					
Norm Christianson	Dean, Nicholas School of Environment (Duke U)	DOI; impacts on natural resources	919/613-8000 (NC)	919/ 684-8741	YES (TP)
Industrial Midwest (IL, IN, MI, MN, OH, WI)					
Stan Changnon	Illinois Water Survey Chief - Emeritus	Impacts on natural resources; agriculture and water resources	217/586-5691 (IL)	217/ 586-5691	YES (TP)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
South Central (AR, LA, NM, OK, TX)					
Ken Bowman	Texas A & M	Impacts on natural resources; meteorology; ozone	409/862-4060 (TX)		YES (TP)
Tom Crowley	Texas A & M	Impacts on natural resources; paleoclimatology	409/845-0795 (TX)	409/847-8879	YES (TP)
Gerald North	Head of the Department of Meteorology, Texas A & M	Climate impacts on Texas; author of "The Impacts of Global Warming in Texas"	409/845-7671 (TX)	409/ 862-4466 (or 4132)	YES (TP)
Robert Shope P	U. Of Texas	Human health impacts; impacts of infectious disease; participated in President's briefing	409/772-6546 Tom Curtis, U. Relations Dept. 409/772-2618 (TX)		YES (TP)
Agricultural Midwest (IA, KS, MO, NE)					
Don Wilhite P (also in nation-wide)	Director, International Drought Information Center, U. Of Nebraska	Impacts on natural resources; drought; national and international focus	402/472-4270 (NE)	402/ 472-6614	YES (TP)
Southwest (AZ, CA, HI, NV, AS, GU)					
Bruce Eldridge	Professor of medical entymology, U of California, Davis	Human health impacts; weather effects on mosquito-borne diseases; modeling and early warning systems	916/752-6983 (CA)	916/752-1537	YES (TP)
Walter Oechel P (also in nation-wide)	Dept. Of Biology, San Diego St. University	Impacts on natural resources; Arctic ecosystems; water use; forest fires; ecological feedback mechanisms; sources and sinks	619/594-4818 (CA)	619/ 594-7831	YES (TP)
William Reeves	UC Berkeley; Dean, School of Public Health	Human health impacts; will do ed boards and background	510/642-3938 (CA)		YES (TP)
Northwest (AK, ID, OR, WA)					
Jerry Franklin	College of Forest Resources U. Of Washington	Impacts on natural resources; forests	206/543-2138 (WA)	206/ 685-0790	YES (TP)
Jane Lubchenco PS (also in nation-wide)	Professor of marine biology, zoology, Oregon State; former president AAAS; organizer of Scientists' Statement; Board of Trustees, Environmental Defense Fund	DOI; Impacts on natural resources; impacts on ecosystems, biodiversity, forests; participated in President's briefing	541/737-5337 (OR)	541/737-3360	YES (TP)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Ron Neilson	Oregon State U; USDA/USFS	Impacts on natural resources; forestry and water resources			YES (TP)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Kenneth Arrow P *McGinty should call	Stanford University; Nobel Laureate	Economists' Statement	415/723-9165 (CA)		YES (JG)
Alan Blinder *McGinty should call	Princeton University; Ex-member CEA		609/258-3358 (NJ)	609/258-5398	YES (JG)
Stephen DeCanio PR	UC Santa Barbara	Organized Economists' Statement; staff at CEA during Reagan Admin.; enthusiastic about technology	805/893-3130 (CA)	805/ 893-8830	YES (JG)
Dan Dudek PRT	Environmental Defense Fund	Emissions trading proponent	203/938-3392 (CT)	203/ 938-4172	YES (JG)
Ev Ehrlich PRT (also General)	President, ESC Company; directed Administration's economic analysis	Ex-Undersecretary of Commerce	202/347-3200 (DC)	202/ 347-4334	YES (JG)
Paul Faeth	World Resources Institute	Economists' Statement	202/662-3499 (DC)	202/638-0036	YES (SS)
Paul Krugman PRT *Wirth should call	MIT (NOTE: easiest to reach by e-mail: krugman@mit.edu. For speaking engagements, contact his agent Leigh at Lecture Bureau: 908-253-8600)	One of the crafters of the Economists' Statement; won prize for best economist in U.S. under 40	617/253-1551 (MA) Ass't=Theresa Benevento 617-253-8883	617/ 253-4096	YES (JG)
Alicia Munnell	Boston	Former CEA member	617/227-8522 (home) (MA)		YES (JG)
Richard B. Norgaard	UC Berkeley	Economists' Statement; ecological economics; co-founder of Redefining Progress	510/642-3465 (CA)	510/548-4815	YES (SS)
Robert Repetto PRT	Senior Economist, World Resource Institute	Economists' Statement; produced report explaining economic models related to climate (WRI's "The Cost of Climate Protection")	202/638-6300 (DC)	202/ 638-0036	YES (JG)
Richard Sandor PRT	President, Centre Financial; Vice chair, Chicago Board of Trade	Emissions trading of sulfur and carbon dioxide	(IL)		YES (JG, DF)
Joseph Stiglitz PRT	Chief Economist, World Bank	Ex-chair of CEA; involved in economics section of IPCC; emissions trading, JI	202/473-3774 (DC)	202/522-0906	YES (SS)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Kenneth Lay PRT	CEO, Enron	Met with President, technology renewables, gas, market mechs, international	(TX)		YES (DF)
Steven Percy PRT	CEO, British Petroleum America	Proactive on climate change			YES (DF)
Bruce McCrodden PRT	Vice President, British Petroleum, Ohio	Proactive on climate change	212/207-6703 Tom Koch -6709 (OH/NY)	212/ 207-6755	YES (JG)
Lynn Sutcliffe PRT	President and CEO, Sycom Enterprises (energy efficiency service company)	Former counsel to Senate Commerce Committee; founding partner of VanNess, Feldman, Sutcliffe, and Curtis	908/412-7810 (NJ)	908/755-7215	YES (JG)
Roger Dower PRT	Sycom Enterprises (energy efficiency service company)	Energy economist; Ex-WRI and CBO economist	202/625-4118 (DC)	202/ 625-1067	YES (JG)
New York/New Jersey					
Bruce McCrodden PRT (also in nation-wide)	Vice President, British Petroleum, Ohio	Proactive on climate change	212/207-6703 Tom Koch -6709 (OH/NY)	212/ 207-6755	YES (JG)
Lynn Sutcliffe PRT (also in nation-wide)	President and CEO, Sycom Enterprises (energy efficiency service company)	Former counsel to Senate Commerce Committee; founding partner of VanNess, Feldman, Sutcliffe, and Curtis	908/412-7810 (NJ)	908/755-7215	YES (JG)
Jim Wolfe P	Vice President, American Standard/Trane, New York-based company	Potential for energy efficiency technologies	703/525-4016 (NY/VA)	703/525-0327	YES (JG)
Mt. Atlantic (DE, DC, MD, PA, VA, WV)					
Jared Blum PR	Polyisocyanurate Insulation Manufacturers Association (PIMA)	Big picture; contact for other business people	202/624-2709 (DC)	202/628-3856	YES (JG)
Roger Dower PRT (also in nation-wide)	Sycom Enterprises (energy efficiency service company); Washington, D.C.	Energy economist; Ex-WRI and CBO economist	202/625-4118 (DC)	202/ 625-1067	YES (JG)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Harvey Forest	President/CEO, Solarex, Frederick, MD	PV manufacturer; can talk about technology, but not policy because partly owned by AMOCO	301/698-4200 (MD)	301/ 698-4201	YES (JG)
Michael Marvin PRT	Executive Director, Business Council for Sustainable Energy; Washington D.C.	Trade association of industries marketing efficient technologies; help line up industry; contact for other business people	202/785-0507 (DC)	202/ 785-0514	YES (JG)
David Nemtsov PRT	Executive Director, Alliance to Save Energy; Washington D.C.	Potential for energy efficiency; contact for other business people	202/857-0666 (DC)	202/ 331-9588	YES (JG)
Scott Sklar PR	Solar Energy Industries Association, Washington, D.C.	Long-term renewables industry leader; contact for other business people	202/383-2611 (DC)	202/ 383-2670	YES (JG)
Southeast (AL, FL, GA, KY, MS, NC, SC, TN)					
Bud Cherry PR	Oxbow Corp., FL	Geothermal, biomass, coal, and power; Active worldwide	561/697-4300 (FL)	561/ 640-8847	YES (DF)
Industrial Midwest (IL, IN, MI, MN, OH, WI)					
Robert Stempel PRT	Chairman of the Board, Energy Conversion Devices, MI	Ex-CEO, GM	810/280-1900 (MI) (contact: Nancy Bacon)	248/280-1456	YES (JG)
Nancy Bacon PR	Senior Vice President, Energy Conversion Devices	Manufacturer of PV cells and batteries; active in developing countries	810/280-1900 (MI)	248/280-1456	YES (JG)
Mark Spurr P	District Heating Industry Association		612/227-8452 (MN)	612/ 292-0014	YES (JG)
South Central (AR, LA, NM, OK, TX)					
Tom Dreissen PRT (no op-eds)	Energy Performance Services	Energy service companies overseas (travels a lot, contact through assistant)	610/278-6633x246 (PA) assistant=Vera Lane	610/278-7255	YES (JG)
Kenneth Lay PRT (also in nation-wide)	CEO, Enron	Met with President, technology renewables, gas, market mechs, international	(TX)		YES (DF)
Terry Thorne PR	Senior Vice President, Enron Corp., Houston, TX.	International energy markets, alternatives	713/853-3071 (TX)	713/ 646-4831	YES (DF)
Uncertain					

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Steven Percy PRT (also in nation-wide)	CEO, BP America	Proactive on climate change			YES (DF)
Associations					
Jared Blum PR	Polyisocyanurate Insulation Manufacturers Association (PIMA)	Big picture; contact for other business people	202/624-2709 (DC)	202/628-3856	YES (JG)
Michael Marvin PRT	Executive Director, Business Council for Sustainable Energy; Washington D.C.	Trade association of industries marketing efficient technologies; help line up industry; contact for other business people	202/785-0507 (DC)	202/ 785-0514	YES (JG)
David Nemtzow PRT	Executive Director, Alliance to Save Energy; Washington D.C.	Potential for energy efficiency; contact for other business people	202/857-0666 (DC)	202/ 331-9588	YES (JG)
Scott Sklar PR	Solar Energy Industries Association, Washington, D.C.	Long-term renewables industry leader; contact for other business people	202/383-2611 (DC)	202/ 383-2670	YES (JG)
Mark Spurr P	District Heating Industry Association		612/227-8452 (MN)	612/ 292-0014	YES (JG)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Hazel O'Leary PRT	Chair, Keystone Energy Board	Former Secretary of Energy	301/961-4049 (DC)	301/654-1089	YES (DF)
Tony Earl PRT	Chairman of the Board, Center for Clean Air Policy	Former Governor of Wisconsin	608/283-2476 (WI)	608/251-9166	YES (JG)
New York/New Jersey					
James Florio PRT	Florio and Perrucci	Former Gov of New Jersey	732/562-9100 (NJ)		YES (DF)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					
Eileen Claussen PRT	Alcalde and Fay, Washington, D.C.	Former State Dept., NSC, and EPA	703/841-0626 (VA)	703/ 243-2874	YES (JG)
Hazel O'Leary PRT (also in nation-wide)	Chair, Keystone Energy Board	Former Secretary of Energy	301/961-4049 (DC)	301/654-1089	YES (DF)
Industrial Midwest (IL, IN, MI, MN, OH, WI)					
Tony Earl PRT (also in nation-wide)	Chairman of the Board, Center for Clean Air Policy	Former Governor of Wisconsin	608/283-2476 (WI)	608/251-9166	YES (JG)
South Central (AR, LA, NM, OK, TX)					
Karl Rabago	National Energy Program Manager, Environmental Defense Fund, Texas	Former DOE official in Renewable Energy; Former Texas Energy Comm. (Talk on RE)	512/478-5161 (TX)	512/478-8140	YES (LM)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Ralph Cavanagh PRT	Natural Resources Defense Council, N. California	Energy efficiency expert	415/777-0220 (CA)	415/495-5996	YES (SS)
Howard Geller PR	American Council for an Energy Efficient Economy	Energy efficiency	202/429-8873 (DC)	202/ 429-2248	YES (JG)
David Goldstein PR	Natural Resources Defense Council, California	Energy efficiency	(CA)		YES (SS)
Daniel Lashoff PRT (also in Scientists)	Senior Scientist, NRDC Washington D.C.	Climate specialist, co-authored NGO study, Energy Innovations	202/289-2399 (DC)	202/ 289-1060	YES (SS)
Amory Lovins PRT	Director, Rocky Mountain Institute	Energy efficiency/business opportunities	970/927-3851 (CO)	970/ 927-4178	YES (JG)
Alden Meyer PR	Union of Concerned Scientists		(DC)		YES (SS)
Bill Moomaw PRT (also General)	Fletcher School of Law and Diplomacy, Tufts U	Former WRI policy director; article published on economics, chemist(?) policy area, role of industry, dealing with North/South issues	617/628-5000 x2732 (MA)	617/627-3712	YES (JG)
New England (CT, ME, MA, NH, RI, VT)					
Cheryl Harrington	Regulatory Assistance Project	State utility regulations	207/582-1135 (ME)	207/ 582-1176	YES (SS)
Bill Moomaw PRT (also in General & nation-wide)	Fletcher School of Law and Diplomacy, Tufts U	Former WRI policy director; article published on economics, chemist(?) policy area, role of industry, dealing with North/South issues	617/628-5000 x2732 (MA)	617/627-3712	YES (JG)
Alan Noguee	Union of Concerned Scientists		617/547-5552 (MA)	617/ 864-9405	YES (SS)
New York/New Jersey					
Dan Rosenblum	Environmental Law and Policy Center (Chicago-based)	Lawyer; former IL commerce commissioner, advocate	212/367-9299 (NY/IL)	212/647-1403	YES (JG)
Ed Smeloff	Pace University Law School; Center for Environmental Studies		914/ 422-4141 (NY)	914/ 422-4180	YES (SS)
David Wooley	Pace University		914/422-4386 (NY)	914/ 422-4180	YES (SS)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Howard Geller PR (also in nation-wide)	American Council for an Energy Efficient Economy	Energy efficiency	202/429-8873 (DC)	202/ 429-2248	YES (JG)
Ned Helme	Center for Clean Air Policy	Public interest/governors, JI and trading	202/408-9260 Ass't=Christine Dennell	202/408-8896	YES (SS)
Daniel Lashoff PRT (also in Scientists, also in nation-wide)	Senior Scientist, NRDC Washington D.C.	Climate specialist, co-authored NGO study, Energy Innovations	202/289-2399 (DC)	202/ 289-1060	YES (SS)
Alden Meyer PR (also in nation-wide)	Union of Concerned Scientists		(DC)		YES (SS)
Russell Sturm P	Pres, International Institute for Energy Conservation; Chair, Export Council for Energy Efficiency	Works with U.S. business to export EE	202/842-3388 x519 Ass't=Lee Ebersole (DC)	202/842-1565	YES (SS)
Industrial Midwest (IL, IN, MI, MN, OH, WI)					
Howard Learner	Environmental Law and Policy Center	Midwest regional air quality, transportation and energy	312/759-3400 (IL)	312/ 332-1580	YES (SS)
Kurt Waltzer	Energy Program Manager, Ohio Environmental Council	coal emissions	614/487-7506 (OH)	614/487-7510	YES (SS)
South Central (AR, LA, NM, OK, TX)					
Gary L. Groesch	Alliance for Affordable Energy; vice chair of LA legis. study group on climate change	Holding town meeting in New Orleans in Oct. with EIC	504/525-0778 (LA)	504/ 525-0779	YES (SS)
Mountain and Upper Midwest (CO, MT, ND, SD, UT, WY)					
Amory Lovins PRT	Director, Rocky Mountain Institute	Energy efficiency/business opportunities	970/927-3851 (CO)	970/ 927-4178	YES (JG)
Southwest (AZ, CA, HI, NV, AS, GU)					
Ralph Cavanagh PRT (also in nation-wide)	Natural Resources Defense Council, N. California	Energy efficiency expert	415/777-0220 (CA)	415/495-5996	YES (SS)
David Goldstein PR (also in nation-wide)	Natural Resources Defense Council, California	Energy efficiency	(CA)		YES (SS)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Dan Albritton PRTS	Director, Aeronomy Lab, NOAA/Commerce, Boulder Co. (Gov't)	Generalist; Basic climate science	303/497-5785 (CO)	303/ 497-5340	NOT IN SEPT (RB)
Michael H. Glantz P	Program Director, Environmental and Societal Impacts Group, National Center for Atmospheric Research, Boulder, CO (Gov't)	Impacts on natural resources; societal impacts; El Nino; will do background checks on other experts	303/497-8119 (CO)	303/ 497-8125	YES (TP)
Thomas E. Lovejoy PRT	Counselor to Secretary of Interior; counselor for Biodiversity and Environmental Affairs, Smithsonian; Board of Directors, World Resources Institute	DOI; Wrote book on effects of climate change on biodiversity	202/786-2263 (DC)	202/786-2304	YES (DF)
Jerry Mahlman PS	Director, GFDL, NOAA/Commerce, Princeton, NJ (Gov't)	Basic climate science; climate models; physical science	609/452-6502 (NJ)	609/ 987-5070	YES (RB)
Joseph Romm PR	Acting Ass't Sec., Energy Efficiency and Renewable/DOE		202/586-9220 (DC)	202/ 586-9260	YES (DF)
Cynthia Rosenzweig PS	Goddard Institute for Space Studies/NASA, New York (Gov't)	Impacts on natural resources; agriculture	212/678-5562 (NY)		YES (TP)
New York/New Jersey					
Jerry Mahlman PS (also in nation-wide)	Director, GFDL, NOAA/Commerce, Princeton, NJ (Gov't)	Basic climate science; climate models; physical science	609/452-6502 (NJ)	609/ 987-5070	YES (RB)
Cynthia Rosenzweig PS (also in nation-wide)	Goddard Institute for Space Studies/NASA, New York (Gov't)	Impacts on natural resources; agriculture	212/678-5562 (NY)		YES (TP)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					
Thomas E. Lovejoy PRT (also in nation-wide)	Counselor to Secretary of Interior; counselor for Biodiversity and Environmental Affairs, Smithsonian; Board of Directors, World Resources Institute	DOI; Wrote book on effects of climate change on biodiversity	202/786-2263 (DC)	202/786-2304	YES (DF)
Joseph Romm PR (also in nation-wide)	Acting Ass't Sec., Energy Efficiency and Renewable/DOE		202/586-9220 (DC)	202/ 586-9260	YES (DF)
Mountain and Upper Midwest (CO, MT, ND, SD, UT, WY)					

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Dan Albritton PRTS (also in nation-wide)	Director, Aeronomy Lab, NOAA/Commerce, Boulder Co. (Gov't)	Basic climate science	303/497-5785 (CO)	303/ 497-5340	NOT IN SEPT (RB)
Michael H. Glantz P (also in nation-wide)	Program Director, Environmental and Societal Impacts Group, National Center for Atmospheric Research, Boulder, CO (Gov't)	Impacts on natural resources; societal impacts; El Nino; will do background checks on other experts	303/497-8119 (CO)	303/ 497-8125	YES (TP)
Duane Gubler	Center for Disease Control, Fort Collins (Gov't)	Human health impacts	970/221-6428 (CO)	970/221-6476	YES (TP)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
General/Nation-wide					
Kenneth Arrow P	Stanford University; Nobel Laureate	Economists' Statement	415/723-9165 (CA)		YES (JG)
Stephen DeCanio PR	UC Santa Barbara	Organized Economists' Statement; staff at CEA during Reagan Admin.	805/893-3130 (CA)	805/ 893-8830	YES (JG)
Dan Dudek PRT	Environmental Defense Fund	Emissions trading proponent	203/938-3392 (CT)	203/ 938-4172	YES (JG)
Ev Ehrlich PRT (also General)	President, ESC Company; directed Administration's economic analysis	Ex-Undersecretary of Commerce	202/347-3200 (DC)	202/ 347-4334	YES (JG)
Paul Krugman PRT	MIT	One of the crafters of the Economists' Statement	617/253-1551 (MA)	617/ 253-4096	left msg (JG)
John Palmisano PR	Enron Corp.	Emissions trading proponent			in Bonn (JG)
Paul Portney	President, Resources for the Future, Washington, D.C.	Resource economist			(TX)
Robert Repetto PRT	Senior Economist, World Resource Institute	Economists' Statement; authorized report explaining economic models related to climate	202/328-5103 (DC)	202/ 939-3460	YES (JG)
Richard Sandor PRT	President, Centre Financial; Vice chair, Chicago Board of Trade	Emissions trading of sulfur and carbon dioxide	202/638-6300 (DC)	202/ 638-0036	YES (JG)
Robert Solow PRT	MIT, Cambridge MA; Nobel Laureate	Emissions trading of sulfur and carbon dioxide	(IL)		YES (JG, DF)
Robert Solow PRT	MIT, Cambridge MA; Nobel Laureate	Economists' Statement	617/253-5268 (MA)	617/ 253-0560	YES (JG)
Joseph Stiglitz PRT	Chief Economist, World Bank	Ex-chair of CEA; involved in economics section of IPCC; emissions trading, JI			
New England (CT, ME, MA, NH, RI, VT)					
Dan Dudek PRT (also in nation-wide)	Environmental Defense Fund	Emissions trading proponent	203/938-3392 (CT)	203/ 938-4172	YES (JG)
A. Myrick Freeman III	Bowdoin College	Economists' Statement; Air pollution benefits through the CAACC	(ME)		

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Name	Title/Affiliation	Background	Phone #	Fax #	Status
Paul Krugman (also in nation-wide)	MIT	One of the crafters of Economists' Statement	617/253-1551 (MA)	617/ 253-4096	left msg (JG)
Richard Schmalensee	MIT	Economic benefits of action	617/253-2957 (MA)	617/ 258-6617	YES (JG)
Robert Solow (also in nation-wide)	MIT; Nobel Laureate	Economists' Statement	617/253-5268 (MA)	617/ 253-0560	YES (JG)
Robert Stavins	Harvard University, Kennedy School of Government	Economists' Statement; market-based approaches, likes taxes	617/495-1820 (MA)	617/ 495-1635	
Robert Evenson	Yale University	CEA, Economists' Statement	(CT)		
Paul Schultz	Yale University	CEA, Economists' Statement	(CT)		
W. Kip Viscusi	Harvard Law School	CEA, Economists' Statement; cost-benefit analyses	(MA)		
Gary Yohe	Wesleyan University	CEA, Economists' Statement; student of Nordhaus	(CT)		
New York/New Jersey					
William J. Baumol	New York University	Economists' Statement	(NY)		
Alan Blinder	Princeton University, NJ Ex-member CEA		609/258-3358 (NJ)		YES (JG)
Mid-Atlantic (DE, DC, MD, PA, VA, WV)					
Maureen Cropper	U of Maryland; Chair of Clean Air Act Compliance Analysis Council	Economists' Statement	(MD)		
Peggy Duxbury	Program Manager, Redefining Progress	Organization sponsored Economists' Statement; contact for other economists	202/588-8900 (DC)	202/ 588-9711	(JG)
Ev Ehrlich PRT (also in General & nation-wide)	President, ESC Company; directed Administration's economic analysis	Ex-Undersecretary of Commerce	202/347-3200 (DC)	202/ 347-4334	YES (JG)
Paul Faeth	World Resources Institute	Economists' Statement	(DC)		
Irving Mintzer PRT (also in General)	Ex-WRI and Center for Global Change; Washington D.C.	Generalist	301/587-8714 (MD)		YES (JG)
Paul Portney (also in nation-wide)	President, Resources for the Future, Washington, D.C.	Resource economist	202/328-5103 (DC)	202/ 939-3460	YES (JG)

Name	Title/Affiliation	Background	Phone #	Fax #	Status
Robert Repetto PRT (also in nation-wide)	Senior Economist, World Resource Institute	Economists' Statement; authorized report explaining economic models related to climate	202/638-6300 (DC)	202/ 638-0036	YES (JG)
Southeast (AL, FL, GA, KY, MS, NC, SC, TN)					
Philip J. Cook	Duke University	CEA, Economists' Statement	(NC)		
Industrial Midwest (IL, IN, MI, MN, OH, WI)					
Richard Sandor (also in nation-wide)	President, Centre Financial; Vice chair, Chicago Board of Trade	Emissions trading of sulfur and carbon dioxide	(IL)		YES (JG, DF)
Paul N. Courant	U of Michigan	CEA, Economists' Statement	(MI)		
Terry L. Roe	U of Minnesota	CEA, Economists' Statement; resources, agriculture, water	(MN)		
Vernon W. Ruttan	U of Minnesota	CEA, Economists' Statement; agriculture	(MN)		
South Central (AR, LA, NM, OK, TX)					
John Palmisano PR (also in nation-wide)	Enron Corp.	Emissions trading proponent	(TX)		in Bonn (JG)
Agricultural Midwest (IA, KS, MO, NE)					
John A. Miranowski	Iowa State University	CEA, Economists' Statement; former USDA official	(IA)		
Southwest (AZ, CA, HI, NV, AS, GU)					
Kenneth Arrow (also in nation-wide)	Stanford University; Nobel Laureate	Economists' Statement	415/723-9165 (CA)		YES (JG)
Stephen DeCanio PR (also in nation-wide)	UC Santa Barbara	Organized Economists' Statement; staff at CEA during Reagan Admin.	805/893-3130 (CA)	805/ 893-8830	YES (JG)
Richard B. Norgaard	UC Berkeley	Economists' Statement	(CA)		
Randy Ann Cameron	UCLA	CEA, Economists' Statement	(CA)		
Robert T. Deacon	UC Santa Barbara	CEA, Economists' Statement	(CA)		
Anthony Fisher	UC Berkeley	CEA, Economists' Statement	(CA)		
Jack Hirsleifer	UCLA	CEA, Economists' Statement	(CA)		
Gordon Ratts	UC Berkeley	CEA, Economists' Statement; econometrics	(CA)		
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The Brookings Institution

Peter J. Wilcoxon } Univ. of Texas at Austin and
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Alicia Munnell, Boston

* Nobel Prize

Proposed by [signature]

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* Please ADD these NAMES to VALIDATORS List

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Bill Nordhaus*	Yale University	(203) 432-3587	(203) 432-5779	
Dale Jorgenson*	Harvard University	(617) 495-4661	(617) 495-7730	
William Baumol	New York University	(212) 998-8943	(212) 995-3932	
Max Corden	School of Advanced International Studies, Johns Hopkins University	(202) 663-5679	(202) 663-5656	
Gerard Debreu	University of California, Berkeley	(510) 642-7284	(415) 642-1966	
Frank Fisher	MIT	(627) 253-3373	(617) 253-4096	
Claudia Goldin	Harvard University	(617) 495-3934	(617) 868-2742	
Ned Gramlich	University of Michigan	(313) 764-9483	(313) 763-9181	FRB Nominee
Lawrence Klein**	University of Pennsylvania	(215) 898-7713	(215) 898-4477	
Anne Krueger	Stanford University	(415) 723-0188	(415) 725-5702	
Larry Katz	Harvard University	(617) 495-5148	(617) 868-2742	
Robert Litan	Brookings Institution	(202) 872-6828	(202) 797-6004	Former OMB official
Van Ooms	Committee for Economic Development	(202) 296-5860	(202) 223-0776	
Jeff Sachs	Harvard Institute for International Development	(617) 495-4112	(612) 495-8685	
James Tobin**	Yale University	(203) 432-3720	(203) 432-6167	

John Harsanyi**	University of California, Berkeley Haas School	(510) 642-5588	(510) 642-4700	
Wassily Leontief**	New York University	(212) 998-7484	(212) 995-4165	
Franco Modigliani**	MIT, Sloan School of Management	(617) 253-7153	(617) 258-6855	
Stephen DeCanio	University of California, Santa Barbara Department of Economics	(805) 893-3130	(805) 893-8830	
Robert Repetto	World Resources Institute	(202) 662-2597	(202) 638-0036	Produced WRI's "The Cost Climate Protection"

Others

Richard Schmalensee	MIT, Sloan School of Management	(617) 253-2957	(617) 258-6855	Former CEA Member
Larry Goulder	Stanford University	(415) 723-3706	(415) 725-5702	Panelist at RFF Conference On Climate Change
Thomas Rutherford	University of Colorado, Boulder	(303) 492-6394	(303) 492-8960	
Warwick J. McKibbin	The Australian National University And Brookings Institution	011-61-6-273-5575 or 011-61-6-249-0301	Same 011-61-6-249-3700	 Proposed alternative to international tradeable permit system
Peter J. Wilcoxen	University of Texas at Austin And Brookings Institution	(512) 471-3211	(512) 471-3510	
Richard Richels	Electric Power Research Institute	(415) 855-2602	(415) 855-2002	

<u>NAME</u>	<u>AFFILIATION</u>	<u>PHONE</u>	<u>FAX</u>	<u>COMMENT</u>
Bill Nordhaus*	Yale University	(203) 432-3587	(203) 432-5779	
Dale Jorgenson*	Harvard University	(617) 495-4661	(617) 495-7730	
William Baumol	New York University	(212) 998-8943	(212) 995-3932	
Max Corden	School of Advanced International Studies, Johns Hopkins University	(202) 663-5679	(202) 663-5656	
Gerard Debreu	University of California, Berkeley	(510) 642-7284	(415) 642-1966	
Frank Fisher	MIT	(627) 253-3373	(617) 253-4096	
Claudia Goldin	Harvard University	(617) 495-3934	(617) 868-2742	
Ned Gramlich	University of Michigan	(313) 764-9483	(313) 763-9181	FRB Nominee
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Anne Krueger	Stanford University	(415) 723-0188	(415) 725-5702	
Larry Katz	Harvard University	(617) 495-5148	(617) 868-2742	
Robert Litan	Brookings Institution	(202) 872-6828	(202) 797-6004	Former OMB official
Van Ooms	Committee for Economic Development	(202) 296-5860	(202) 223-0776	
Jeff Sachs	Harvard Institute for International Development	(617) 495-4112	(612) 495-8685	
James Tobin**	Yale University	(203) 432-3720	(203) 432-6167	

John Harsanyi**	University of California, Berkeley Haas School	(510) 642-5588	(510) 642-4700	
Wassily Leontief**	New York University	(212) 998-7484	(212) 995-4165	
Franco Modigliani**	MIT, Sloan School of Management	(617) 253-7153	(617) 258-6855	
Stephen DeCanio	University of California, Santa Barbara Department of Economics	(805) 893-3130	(805) 893-8830	
Robert Repetto	World Resources Institute	(202) 662-2597	(202) 638-0036	Produced WRI's "The Cost Climate Protection"

Others

Richard Schmalensee	MIT, Sloan School of Management	(617) 253-2957	(617) 258-6855	Former CEA Member
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Warwick J. McKibbin	The Australian National University And Brookings Institution	011-61-6-273-5575 or 011-61-6-249-0301	Same 011-61-6-249-3700	Proposed alternative to international tradeable permit system
Peter J. Wilcoxon	University of Texas at Austin And Brookings Institution	(512) 471-3211	(512) 471-3510	
Richard Richels	Electric Power Research Institute	(415) 855-2602	(415) 855-2002	

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Alicia Munnell

Boston

* = Sent letter to the economists

** = Nobel Prize

CLOSE HOLD/PRELIMINARY AND INCOMPLETE/NOT FOR CIRCULATION

August 25, 1997

MEMORANDUM FOR: CLIMATE CHANGE OVERSIGHT GROUP

FROM:

SUBJECT: Targets and timetables

In his June 26, 1997, speech before the U.N. General Assembly, the President pledged, "We will work with our people and we will bring to the Kyoto conference a strong American commitment to realistic and binding limits that will significantly reduce our emissions of greenhouse gases." Of all the tasks we face in the run-up to the December meeting in Kyoto, choosing the precise U.S. position on those realistic and binding limits -- the so-called targets and timetables for reducing emissions of greenhouse gases (GHG) -- may be the most difficult both analytically and politically.

A key element to assessing various targets and timetables is the tradeoff between costs and benefits. A policy of early and aggressive reductions from the business as usual path (BAU) is likely to produce larger environmental benefits -- in terms of averted GHG emissions and associated disruption to the climate -- than a more gradual emissions reduction path. But a sharper emissions reduction path is also likely to involve more economic dislocation than a more gradual path.

In addition to facing these underlying economic and environmental realities, we must also recognize that our choice of a target and timetable has important political and diplomatic ramifications. Even if our initial proposals are not what is ultimately embodied in an international agreement or domestic legislation, they will nonetheless set the tone for the domestic and international debate. The purpose of this memorandum is therefore to specify more precisely the economic, environmental, diplomatic, and political tradeoffs involved in our decision on targets and timetables.

The memorandum has six sections:

- I. An examination of the tradeoff between climate benefits and economic costs
- II. Analogy with the oil shocks of the 1970s
- III. The role of technology
- IV. Quantitative estimates of climate benefits and economic costs
- V. Economic and climate trade-offs among the paths currently under discussion
- VI. Possible reactions internationally and domestically to proposals

I. Exploring the tradeoffs: The role of turnover of the capital stock

One initial reaction to the apparent tradeoff between the environmental benefits and economic costs of sharper emissions reductions may be to question the veracity of the tradeoff itself. The first part of the tradeoff follows directly from the now-established relationship between carbon emissions and climate change: Even if the precise empirical magnitudes remain the subject of intense debate, the existence of environmental benefits from earlier reductions in emissions seems clear. Such benefits include:

- Lower levels of carbon concentration at any given point in the future, with expected benefits in terms of reduced climate change relative to the BAU; and
- Insurance against negative surprises in the relationship between carbon concentrations and climate changes, or between climate changes and human activities.

But why the economic cost? Why do economists consistently find that the cost of major reductions in emissions is much higher if they are implemented by 2010 than if they are stretched out for another decade or more? A more gradual emissions reduction path involves relatively lower economic costs because it allows more time to:

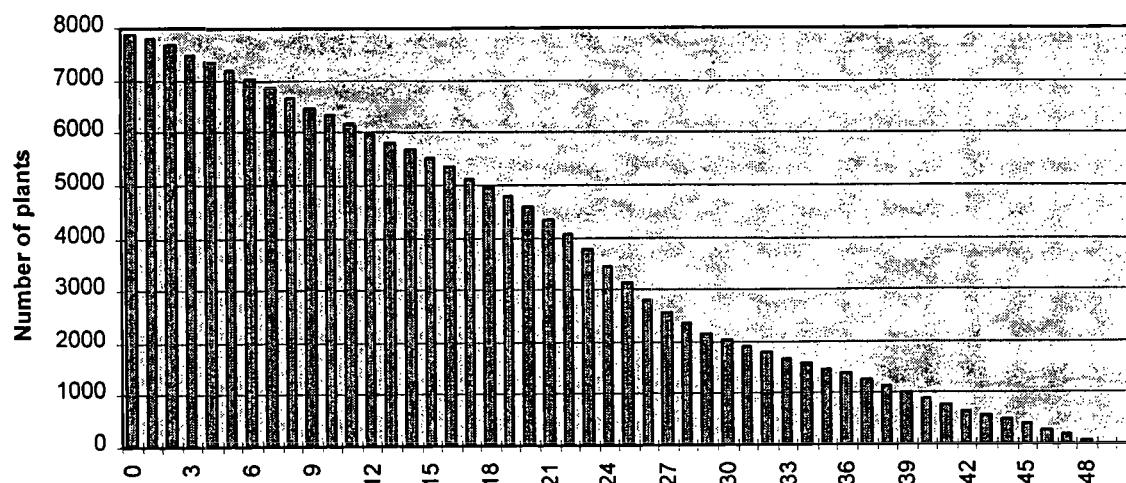
- Develop and implement new technologies;
- Resolve uncertainty over the economic implications; and
- Replace the capital stock.

Of these, the final point may be the most important. It is very expensive to scrap the nation's entire capital stock while it is still in the prime of its useful life, and replace it with new plant and equipment that is more energy-efficient. But over the course of twenty to forty years, much of our existing plant and equipment will be ready for replacement anyway -- allowing for relatively lower-cost environmental upgrading at that point. *Making efficiency improvements when the plants would have been replaced in any case means reduces the costs of such improvements -- because there are no additional costs to scrapping otherwise productive plant.* These capital turnover effects are built into some -- but not all -- of the models used to analyze climate change policies.

An illustrative example of the importance of capital turn-over

It may be useful to look at a simple illustration of the point. Figure 1 shows the effects of an accelerated replacement schedule for all of the 7,900 electric power plants built during the last 50 years. To take an extreme case, imagine that all power plants had to be shut down within ten years (by 2007), and replaced with less-polluting technology. Such a policy would imply replacing 6,330 plants (80 percent of the total) before the end of their normal lifespan. If instead

Figure 1: Accelerated Replacement of Electric Power Plants



Bar height shows number of plants to replace (beyond normal replacement schedule) if complete change-over occurs within number of years shown on axis

all power plants had to be replaced with less-polluting technology in 20 years, only 4,600 plants (58 per cent of the total) would have to be replaced before the end of their normal lifespan. And if the policy were implemented over 30 years, the complete replacement would mean an accelerated replacement of only 2,000 plants, 26 per cent of the total.¹

A similar exercise can be done for the set of power plants that are coal-fired -- the class of generators that produce the most carbon and that would thus have to be replaced even under a moderate plan to address climate change. If a complete change-over of coal plants were to be accomplished in 10 years, 799 of the 1,122 coal-fired plants (71 per cent) would have to be replaced before the end of their expected lifespan. If replacement occurs over 20 years, 488 plants would be affected, or 43 percent of the total. If one could wait 30 years, 227 plants would be closed prematurely, or 20 per cent of the total. And since newer plants tend to have larger capacity, the effects of a rapid replacement schedule are magnified. Closing all plants within 10 years implies that 289 million KW of capacity would be prematurely shut down, or 90 per cent of

¹ Under the stylized assumption of a 50-year plant life, there would be no additional cost to upgrading over a 50-year period. We have truncated the distribution at 50 years, the average lifespan of existing electric power plants. There are other plants that are still in use 60, 70, or even 90 years after they were built. But their numbers are small, and by the end of 50 years the cost of shutting them down would in any case be much-reduced.

the total. If one could wait 20 years, 235 million KW of capacity would be affected, or 73 per cent. For 30 years, the capacity that would have to be replaced falls to 116 million KW, or 36 per cent of the total.

These exercises are not intended to be an estimate of the costs of different time-tables, even within this one sector. Rather, the point has been to illustrate concretely the importance of allowing time for the capital stock to turn over, and to illustrate it in a transparent framework that is independent of modeling assumptions over which analysts might differ.

II. Analogy with the oil shocks of the 1970s

Another potentially insightful exercise is to examine the oil shocks of the 1970s. The energy price increase necessary to reach 1990 emissions levels by 2010 -- an estimated 88 percent -- is on the same order of magnitude as the 1973-74 and 1979-80 oil price increases combined.² One potentially crucial difference between the 1970 oil shocks and a carbon emissions reduction policy is that the oil shocks were *unanticipated* -- and did not allow firms and consumers to plan ahead and avoid serious microeconomic dislocation and macroeconomic disturbance. Still, the 1970s experience may help to give a sense of the economy's possible responses to large increases in energy prices over a period as short as a single decade.

Economists believe that the oil price increases of the 1970s led to high levels of inflation that were eventually reversed only through significant increases in interest rates and very large losses in output over time. More specifically, the oil price hikes are believed to have led directly to the recessions of 1974 and 1980. Real GDP fell by 3.7 percent between the end of 1973 and the beginning of 1975, and by 1.8 percent between the third quarter of 1978 and the third quarter of 1979 (before falling further in the subsequent 1981-2 recession).³

² The measures necessary to reduce 2010 emissions to the level of 1990 are likely to imply an increase in the price of oil of approximately \$11/barrel (52 percent), and an increase in the price of gasoline of 26 cents/gallon. The rough equivalency with the earlier oil shocks is for a weighted average of primary fuels. Fossil fuel prices net of inflation doubled between 1972 and 1975, and doubled again by 1981. Gasoline prices rose by 30 percent between 1972 and 1974 and by nearly another 50 percent from 1974 to 1981. Coal, as a substitute for oil, also experienced a price increase in the earlier episode, but by much less.

³ Some economists also believe that the oil shocks may have played a role in the abrupt slowdown in the long-term trend of productivity growth evidenced in the U.S. and other industrialized countries after 1973 -- but this point remains debatable.

III. The role of technology

Another question about the apparent trade-off between environmental benefit and economic cost is the role of technology -- specifically, won't technological advances facilitate sharp reductions in emissions without any significant dislocation to the economy? Your advisers have sharp disagreements about how much we can reasonably expect of technological advances without the spur of a price increase. Your economic advisers tend to stress the importance of market incentives for technological advances: they argue that technology will clearly be one of the conduits for meeting an emissions reduction target, but that significant energy price increases are necessary to induce the requisite technological advances.

Others believe that even without an increase in the price of energy, there are numerous opportunities for energy-saving technologies to be developed and applied. For example, a study conducted by five of the Department of Energy's national laboratories concluded that even without an increase in the price of carbon, "cost-effective energy efficiency alone can take the nation 30 to 50% of the way to 1990 levels" by 2010. The report, however, simply *assumes* the existence of government programs that would develop and disseminate pollution-reducing technologies -- without explicitly examining the costs of such programs. It is thus a concise summary of the *potential* for increased efficiency without any increase in price, but provides little insight into how costly it would be to actually achieve (e.g., through government programs to spur technological advances) those potential reductions.

The degree of disagreement, however, can easily be exaggerated. Even the study mentioned above -- which is seen as being extremely optimistic about the role of technology -- concludes that it is not possible to reach a target of 1990 emissions levels by 2010 without a \$50 per ton increase in the price of carbon. (In terms of the price of coal, a \$50 per ton increase in the price of carbon is equivalent to a tax of \$[2] per million BTU.) As discussed below, this increase in price is roughly consistent -- depending on whether international trading is allowed -- with what economists believe is necessary to achieve the same goal. Despite ongoing debates over the precise role of technology, therefore, there is broad technical agreement that *a significant price signal is crucial to achieving emissions reductions* of the sort being considered in international fora. In other words, it is impossible to achieve 1990 emissions levels by 2010 without an increase in carbon prices substantial enough for people to notice.

Another memorandum is being prepared that will present options for Federal efforts -- including cooperative efforts with industry -- to boost carbon-reducing technological advances.

IV. Quantitative estimates of climate benefits and economic costs

In order to evaluate the specific tradeoffs between climate benefits and economic costs inherent in alternative targets and timetables, more precise analytical tools are required. Unfortunately, it is difficult to put economic costs and climate benefits into the same unified analytical framework. The difficulties arise in part because the effects are so uncertain -- especially with regard to climate -- and in part because the climate effects take place on a very

long time scale. Nonetheless, so-called Integrated Assessment Models attempt to put the economic and environmental effects into one framework.

By now, many of these models exist. They all tend to give a similar result: optimally balancing costs and benefits produces a path of relatively small actions at the beginning, with the result that emissions continue to rise -- although at a reduced pace -- for at least a century. The incongruity between this "optimal" path and the targets and timetables under discussion in international fora is striking. Indeed, some of the authors have argued that the economic costs of achieving 1990 levels by 2010 are so great that, if that were the only alternative, we would be better off doing nothing at all [Jorgenson]. But these conclusions, and the methodology that produces them, have been sharply criticized on a number of grounds:

- Some (e.g., Schelling) claim that the methodology gives insufficient weight to the (small, but nonetheless alarming) probability of a discontinuously-large catastrophe, such as the melting of the Antarctic ice shelf or the alteration of the Gulf Stream.
- Some (e.g., Cline) claim that it gives insufficient weight to the welfare of future generations (that is, the discount rate is too high).
- Some (e.g., Pizer) claim that it neglects basic uncertainty about all parameters -- the economic effects, the climate effects, and the discount rate necessary to compare the two.
- Some claim that it omits a basic point about political credibility: an announcement by governments that they are committing to a serious agreement -- but that stringent policy measures will not be taken until many decades or more into the future -- will not be credible, and understandably so. Early, concrete measures are necessary to send the signal necessary to move people's patterns of research, investment, and consumption on to the new path.

Other modellers make implicit adjustments for such factors by imposing (rather than optimizing over) a target concentration level, and then study the emissions path that best reaches that concentration level while balancing costs and benefits. For example, Manne and Richels (1997) is believed to be the first paper to compute the economically-optimal path subject to the constraint of stabilizing concentrations at a level such as 550 ppmv.⁴ Their model implies that

⁴ Manne and Richels must necessarily make some assumption about international burden-sharing. For the case of 550 ppmv concentrations, they assume that non-Annex I countries can plausibly be expected to begin to limit emissions in 2030, and to complete a transition to a regime under which their per-capita emission rights are equal to those of the industrialized countries by 2050. The economic effects are not very different if the developing countries do not participate -- concerns about adverse effects on the competitiveness of energy-intensive manufactures do not show up at the aggregate level. But failing to include the

the optimal path has emissions from OECD countries, as well as from other Annex I countries, peaking in 2020. Emissions do not return to their 1990 levels until XXXX. Emissions from developing countries peak in 2050. The best single measure of aggregate economic costs is the present discounted value (i.e., the appropriate summation over time) of forgone consumption. According to Manne and Richels, their optimal path costs \$0.5 trillion in terms of lost consumption, as compared to \$3.3 trillion under the IPCC Working Group path of reaching XX below 1990 levels by 2010. Thus the saving under the optimal path is 83 percent.

V. Economic and climate trade-offs among the paths currently under discussion

As may be apparent from the discussion above, the optimal paths from the integrated models are not particularly helpful for guiding our immediate decisions because they are the subject of such intense and inconclusive academic debate, and because they are so incongruous with the paths being considered for Kyoto. It may therefore be more beneficial to analyze the specific targets and timetables being proposed -- or more precisely, to examine the *additional* costs and *additional* benefits of more versus less aggressive targets within the spectrum of "internationally feasible" targets and timetables.

The European Union has proposed that the developed nations reduce emissions 10 to 15 percent below 1990 levels by 2010, and small island nations have proposed that the developed nations reduce emissions 20 percent below 1990 levels by 2005. Other countries -- including Australia and Canada -- are likely to favor much more gradual paths. The chart on the following page compares the economic and environmental benefits of [four] different targets and timetables:

- 10 percent below 1990 emissions levels by 2010;
- 1990 emissions levels by 2010;
- 1990 emissions levels by 2020; and
- Eliminating emissions *growth* in the decade from 2010 and 2020.

The chart also lists the expected ramifications of the business-as-usual (BAU) path.

Business as usual

Under business-as-usual (BAU), concentration levels of carbon are expected to rise from approximately 360 parts per million by volume (ppmv) today to over 500 ppmv in 2050 and 730 ppmv by 2100 -- the highest in more than 50 million years. Concentrations are expected to reach twice pre-industrial levels in 2058. The increase in carbon concentrations is expected to produce an increase in mean global temperature of approximately 2.5 degrees Celsius by 2100. (These estimates are surrounded by significant uncertainty, and are usually presented as ranges rather

developing economies is costly in terms of climatological effects.

Climate and Economic Variables under Alternative Emissions Paths *

	Year	Concentration Level (ppmv)		Year at Which Concentration Reaches 2x Pre-Industrial Level **	Change in Temperature from 1990 Level (Celsius)	
		2050	2100		2050	2100
Business As Usual (BAU)		522.1	729.8	2058	1.15	2.45
<i>Deviation from BAU:</i>						
Annex I Participation Only	1990 -10% beginning in 2010	-30.3	-95.0	+15	-0.13	-0.36
	1990 beginning in 2010	-24.8	-83.4	+12	-0.10	-0.31
	peak in 2015, 1990 in 2040	-17.6	-77.6	+9	-0.06	-0.28

Carbon Permit Price (\$ per ton)				Consumption *** (billions of \$)
Domestic Trading		Annex I Trading		
<u>2010</u>	<u>2050</u>	<u>2010</u>	<u>2050</u>	
0.00		0.00		39,422

Annex I Participation Only	1990 -10% beginning in 2010	+175	+924	+91	+238	-299.2
	1990 beginning in 2010	+110	+582	+50	+149	-205.7
	peak in 2015, 1990 in 2040	+0	+560	+0	+155	-94.7

* Preliminary CEA projections. The assumptions behind these preliminary numbers are described in an appendix.

** Pre-industrial concentrations of CO₂ were approximately 275 ppmv.

*** Domestic Trading Only. Annex I or WorldWide Trading may substantially reduce these costs. Deviations are forgone consumption assuming a 3 percent real discount rate.

than central tendencies. While the table and text include only the central tendencies to make the presentation easier, it is imperative to recognize that the apparent precision of the central tendency estimates belies the underlying uncertainties surrounding the numbers.)

10 percent below 1990 levels by 2010

Environmental effects

Reducing emissions to 10 percent below 1990 levels by 2010 will postpone the date at which CO₂ concentrations reach twice pre-industrial levels by 15 years -- from 2058 to 2073. The central tendency of the estimates for global warming would be 0.36 degrees Celsius lower than under the BAU -- an increase of 2.09 degrees versus 2.45 degrees.

Economic effects

The models suggest that reducing carbon emissions to 10 percent below 1990 levels by 2010 requires an increase in the price of carbon of between \$90 and \$175 per ton (assuming the existence of domestic emissions trading, and depending on whether trading with other industrialized economies is allowed). In terms of the price of coal, that is equivalent to a BTU tax of between \$[XX] and \$[XX] per million BTUs. In 1993, the Administration proposed a tax of \$0.26 per million BTUs plus a \$0.34 per million BTUs tax on oil. The present value of forgone consumption, relative to the BAU path, is approximately \$300 billion (assuming no international trading).

[NEED TRADE FLOWS]

1990 levels by 2010

Environmental effects

As the table shows, a plan to return carbon emissions to their 1990 levels by 2010 postpones by 12 years (from 2058 to 2070) the date at which CO₂ concentrations reach twice pre-industrial levels. The central estimate for global warming would be reduced by 0.31 degrees by the year 2100 -- for an increase of 2.14 degrees versus an estimated 2.45 degrees under business as usual (BAU).

Economic effects

The economic effects of reaching 1990 levels by 2010 depend at least in part on the domestic implementation package. As noted above, there are large debates over the role of technology. The 5-Labs study, for example, suggests that increased technological development and dissemination may make it possible to achieve 1990 levels by 2010 at a carbon price of \$50 per ton. This is somewhat on the lower end of the range -- but well within the margin of error --

of the figures given by the economic models and reported below.

1. Domestic emissions trading system. Achieving 1990 emission levels by 2010 through a domestic emissions trading system is likely to imply an increase in the price of carbon of about \$110 per ton by 2010.

-- The present value of forgone consumption from achieving 1990 levels by 2010 -- relative to the BAU -- is approximately \$200 billion.

-- In terms of coal prices, the shift is equivalent to a BTU tax of about [\$4] per million BTUs. In 1993, the Administration proposed a tax of \$0.26 per million BTUs plus a \$0.34 per million BTUs tax on oil.

-- The annual value of domestic emissions permits would be [approximately \$100 billion] in 2010. If those permits were auctioned, the funds could be used to reduce other distortionary taxes, to raise national saving, and/or to provide transitional assistance to affected workers and firms.

2. Domestic permits plus trading with other OECD (Annex I) countries. In addition to trading permits domestically, it may be possible to agree in Kyoto to a regime for trading permits across participating countries -- potentially offering a somewhat more efficient approach to emissions reduction. Achieving 1990 emission levels by 2010 through a domestic emissions permit trading system coupled with an OECD-wide international trading system would imply a carbon price increase of about \$50. [BTU equivalent]

-- In terms of coal prices, that is equivalent to a tax of about [\$1.50] per million BTUs. Gas prices would rise by an estimated [10 to 15 cents].

-- Under an international trading system that includes the former Soviet Union (FSU) and Eastern Europe, U.S. imports of permits from the FSU and Eastern Europe could amount to [about \$5 billion per year] by 2010.

[NEED TRADE FLOWS]

1990 levels by 2020

Environmental effects

Economic effects

Eliminate emissions growth by 2010-2020

Environmental effects

Eliminating the *growth* in emissions between 2010 and 2020 -- so that emissions peak in 2015 and reach 1990 levels in 2040 -- would delay the year at which carbon concentrations reach twice pre-industrial from 2058 (under the BAU) to 2067. Relative to a path of reaching 1990 levels by 2010, the difference is 3 years (2067 vs. 2070) and the difference in the central tendency of the estimates for global warming is 0.03 degrees Celsius (2.17 degrees increase versus 2.14 degrees increase).

Economic effects

Reflecting the importance of capital turn-over, the economic effects of the more gradual path -- eliminating emissions growth by 2010-2020 -- are substantially more attractive than in the 1990 by 2010 case: The value of forgone consumption would be cut by more than half, to \$94.7 billion (relative to \$205.7 billion under the 1990 by 2010 case).

VI. Possible reactions to proposals [needs State memo on the topic]

The discussion above has centered on the underlying substance of different targets and timetables. But our policy discussion must also recognize that our initial choice of a target and timetable has important political and diplomatic ramifications -- even if they are not what is ultimately adopted. This section therefore explores several "scenarios" that may be helpful in thinking through the likely responses to different U.S. proposals.

SCENARIO 1: 1990 LEVELS BY 2010/POSSIBLE AGREEMENT IN KYOTO

International reaction/potential for Kyoto agreement

- Kyoto agreement may be feasible, albeit not guaranteed. The U.S. position on developing economies is already seen as beyond the acceptable range by other countries. Any strengthening of U.S. position -- such as would be required to fulfill the Byrd resolution -- would further reduce the chances of obtaining an agreement.
- Some criticism of U.S. from Europeans and other countries, for not showing bold leadership on critical issue (failing to propose a more aggressive U.S. target).

Domestic reaction

- Hill: Two major arguments -- competitiveness and taxes. The first argument is likely to be that U.S. industry will flee the country as a result of the agreement, with its weak developing economy provisions. The second is that the permits, if they are auctioned, would be the largest energy tax increase in history. (If the revenues are recycled by reducing other taxes, we may be able to argue that the program was a tax shift -- tax waste, not work -- rather than a tax hike.) The fact that the Byrd resolution had clearly warned (by a vote of 95-0) against this first scenario would stoke the fires.
- Moderate firms: Perhaps some support, but major concerns over developing economy stance may mean overall opposition. Firms in the aluminum, steel, chemicals, petroleum refining, paper and allied products, and cement industries will be strongly opposed, and argue that their operations will flee the United States for other countries. Moderate support may be likely from agricultural interests, insurance companies, natural gas interests, some appliance manufacturers, and financial firms (if auctions are traded). Strong support is likely from renewable energy and energy-efficiency firms.
- Environmental groups: Many environmental groups will support a 1990 by 2010 target, but would prefer a more aggressive path (e.g., 20 percent below 1990 by 2010). The environmental community is split on the issues of emissions trading and joint implementation: some (e.g., Environmental Defense Fund) are supportive, others (e.g., Sierra Club) oppose.

- Elite media: Likely to be support for tackling issue.

Potential next steps and ramifications

- Potentially becomes large issue against Administration supporters during 1998 elections.
- Ratification process not likely until 1998 or 1999. But Kyoto agreement *extremely* unlikely to be ratified.

-- Perhaps evolve into new round of negotiations, although U.S. will be seen as bad actor for failing to ratify.

-- Even without ratification vote, funding for U.S. negotiators could be curtailed or Congressional anger could manifest itself in other ways.

SCENARIO 2: 1990 BY 2020 or ELIMINATE GROWTH 2010-2020/NO AGREEMENT IN KYOTO

International reaction/potential for Kyoto agreement:

- Kyoto agreement seems very unlikely, given that U.S. target and timetable is significantly less aggressive than European proposals. If the U.S. also toughens developing country stance -- as may be necessary to have any chance at ratification -- no agreement will emerge from Kyoto.
- U.S. likely to be blamed for blowing up negotiations.

Domestic reaction

- Hill: Failure of agreement may make domestic implementation package less of a political issue. But there still could be false accusations that we proposed "the largest energy tax hike in history." The inclusion of China and a few other developing economies may split the Byrd bloc into those who are truly opposed to acting, and those who are truly concerned about the important developing economies. But in general, unlikely to be strong opposition, and perhaps some muted, private support.
- Moderate firms: Could perhaps support, depending on which developing economies are included.
- Environmental groups: Likely to blame the President for failure to get an agreement.

Potential next steps and ramifications:

- Work to get agreement in Conference of Parties during 1998 or later, while insisting on developing economy participation.
- Could encourage more voluntary and Federal efforts, but may not be able to counter impression of undermining Kyoto.

SCENARIO 3 (?)

If the U.S. adopts some longer-term target, and does not necessarily rely on an increase in the relative price of carbon to achieve objectives. Instead, we could attempt to adopt aggressive technology effort combined with voluntary corporate programs to meet target. *However, there is strong disagreement among your advisers about the role of technology. See discussion above.*

Domestic policy package and impact

- Major technology initiative. The major policy initiative under this approach would be to accelerate R&D funding for “home run” technologies -- such as those identified in the PCAST/11-Labs studies. A [\$XX] billion per year R&D effort would [XXX].
- Voluntary corporate program. We could try to more aggressively develop voluntary corporate programs.

International reaction/potential for Kyoto agreement:

- “Rio II”: U.S. position sharply criticized as being completely inadequate to issue at hand.
- Kyoto agreement may be possible, albeit with much criticism of weak U.S. position.

Domestic reaction:

- Hill: Opposition from those who are truly concerned about problem. Perhaps some muted, private support from those who are more concerned with mitigation costs.
- Moderate firms: Support from renewable energy and high-tech firms. Others?
- Environmental groups: Charges that President broke promise to address this problem with real, credible steps.
- Economists and elite media attack plan as lacking in credibility, not attacking the problem, and being overly rosy on technology assumptions.

Potential next steps and ramifications:

- Develop technology program, start to make some progress regardless of Kyoto outcome.
- As scientific evidence accumulates, press for stricter international regime.

Appendix: Sources and Explanations for Table on Climate and Economic Variables under Alternative Emissions Paths *

Sources

Business As Usual (BAU) emissions projections are based on published IPCC IS92a emissions profiles. BAU concentration and temperature projections are from the MiniCAM model. Carbon permit price estimates and foregone consumption figures are from SGM model. All these were provided by Jae Edmonds, Marshall Wise, and Chris MacCracken at Battelle, Washington, DC.

Participation Cases

Annex I Participation Only: Assumes full compliance of stated targets and timetables by countries in Annex I; rest of the world behaves as in BAU.

Worldwide Participation: All nations including developing countries are assumed to comply fully with the same targets and timetables.

Targets and Timetables

1990 (-10%) in 2010: Emissions follow BAU through 2000, reduce to 1990 (-10%) levels by 2010, and remain at 1990 levels thereafter.

Peak in 2015, 1990 in 2040: Emissions follow BAU through 2005, peak at 2010 BAU levels in 2015, and stabilize at 1990 levels in 2040 and into the future. Because of linear interpolation in emissions profile between 2015 and 2040, this scenario may slightly overestimate the deviation of concentration from BAU.

Trading Scenarios

Domestic Trading: Trading only within each country.

Worldwide Trading: Permits are grandfathered to nations based on 1990 emissions levels. All countries participate in the trading of permits.

Price Assumptions

Carbon: U.S. permit prices for the policy options to attain 1990 emissions level in 2010 and 10% below 1990 emissions level in 2010 are from the DRI model used by EPA, which assumes that all revenues are used to improve the federal budget. The estimated permit price necessary under the policy option that peaks in 2015 is a linear interpolations based on these models.

Consumption: Deviations are 1995 present value of foregone consumption differences for United States in millions of dollars between BAU and scenarios. Consumption estimates go only to the year 2050.

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U.S. House of Representatives
Committee on Commerce

Room 2125, Rayburn House Office Building
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August 22, 1997

LINDA STRAKKEW
647-3550

Jeffrey Hunter

482-6055

The Honorable Janet Yellen
Chair
Council of Economic Advisors
Old Executive Office Building
Washington, D.C. 20502

Dear Ms. Yellen:

On July 15, 1997, you presented the Administration's views on the economic and environment impact of the proposed international global climate change agreement before the Energy and Power Subcommittee. On behalf and the members of the Subcommittee, I thank you for your informative testimony. The hearing was indeed enlightening.

With the conclusion of the eighth meeting of the Ad Hoc Group on the Berlin Mandate, I see significant benefit to a round of follow-up questions to clarify, for the record, some of the issues that were raised during your testimony and the question and answer session that followed.

Attached is a list of questions for you to answer on behalf of the Administration. I ask that you work with the other relevant departments and agencies in developing responses and providing the relevant documentation where requested. Your responses will be entered into the record in the same manner as your original testimony. Your responses would be appreciated on or before September 22, 1997. If you have any questions, please call Cathy Van Way at (202) 225-2927.

Thank you for your continued attention and assistance to the matter.

Sincerely,

Dan Schaefer
Chairman
Energy and Power Subcommittee



The Honorable Janet Yellen

August 22, 1997

Page 2

cc: The Honorable Tom Bliley, Chairman
The Honorable John Dingell, Ranking Member
The Honorable Ralph Hall, Ranking Member
Subcommittee on Energy and Power



SUBCOMMITTEE ON ENERGY AND POWER
HEARING ON GLOBAL CLIMATE CHANGE
FOLLOW-UP QUESTIONS

Interagency Analytical Team Report

1. Please identify each member of the Interagency Analytical Team (IAT) from the date of its inception to the present time, any other participants inside or outside the Administration, and specify their responsibilities.
2. When was the IAT formed and what were the IAT's instructions? Please provide any documentation regarding the formation of the IAT and its mission, responsibilities, membership or assignments.
3. Please indicate the total costs of the IAT's efforts and the share paid annually by each Department or Agency that was involved and please identify the source of the funds within each Department or Agency.
4. Is the IAT still in existence? If so, what are its current responsibilities?
5. Please provide a copy of all drafts of the IAT report in addition to the May 16 and 30, 1997 drafts, both earlier and later.
6. Please explain how the peer reviewers were selected? What instructions were those peer reviewers given? Please provide copies of any correspondence or instructions that were sent to the peer reviewers.
7. If the IAT effort is in fact a "failed" project as indicated in Administration testimony at the Subcommittee hearing how will the Administration determine the appropriate level of future international climate change commitments for Kyoto and later?
8. As late as last May when Dr. Ehrlich and others in the Administration held briefings on the then draft analysis and assessment there was no hint that the Administration considered this effort a failure and the models to be unreliable. What occurred since May that caused the Administration to apparently reach a different conclusion from that of Dr. Ehrlich?
9. The IAT draft analysis referred to three scenarios which resulted in costs of future climate commitments of approximately \$200, \$100 or \$50 per ton carbon tax equivalent. Has the Administration concluded that a \$200 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$100 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$50 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness. Please provide the basis for any of the above conclusions. If the Administration does not support any of the above costs, what analysis or other information does the Administration intend to rely on to support a different amount?

10. Is the paper prepared by the IAT both an analysis and assessment? How does it relate to the "analysis and assessment" referred to in Paragraph 4 of the Berlin Mandate? Has the Ad Hoc Group on the Berlin Mandate provided an analysis and assessment as required by the Berlin Mandate?
11. The IAT draft states that the central policy modeled for the analysis "is aimed at reducing carbon and other greenhouse gas emissions by stabilizing them at 1990 levels" and that policy would be "announced in 2000 and its restrictions are phased in over a ten year period, so that the policy would take full effect in 2010." Reports in the media after the Denver Summit that President Clinton attended also referenced this date of 2010. In light of EIA's projection of emissions 22% above 1990 levels by 2010, is the Administration considering a target and timetable that calls for stabilization at 1990 levels by 2010?
12. The Administration frequently cites the 2000 economists who say they support controlling greenhouse gases. Their statement supports as the mechanism either carbon taxes or emission permits. In the past, the Administration has said it opposes the use of taxes. Is that still the Administration's position?
13. The IAT draft explains that these emission reductions to achieve stabilization would be through "issuing tradable permits at the earliest point of energy production or when imported into the U.S." and that the permits "are initially auctioned in a way that is revenue neutral: i.e., all revenues generated would be recycled through the economy." Would these revenues be deposited in the treasury as miscellaneous receipts under the Economy Acts? Would they then have to be recycled through changes in the tax laws or by appropriation? How would they be recycled?
14. Does the Administration believe that permit auctions are the equivalent of a new tax? If not, please explain.
15. The IAT draft states that "among fuels, demand for coal bears the brunt of greenhouse gas stabilization." What is the impact on the U.S. economy as a whole and on the relevant coal regions of this policy towards coal? What will be the job impact? Is the Administration adopting an anti-coal policy? How is this policy consistent with President's Clinton 1995 reply to Mr. Dingell that the U.S. will not agree to any protocol that harms our economy and jobs or our competitiveness?

Kyoto Agreement

16. How long after December 1997 does the Administration think it will take to obtain Senate advice and consent of any Kyoto agreement, to ratify that agreement, and to enact implementing legislation?
17. Which Agency or Department would be responsible for implementing the provisions of any agreement reached in Kyoto, including provision relating to joint implementation, emissions trading, and advancing Article 4.1?

18. What consideration has been given or plans made regarding passage of legislation necessary to implement any agreement reached in Kyoto?

U.S. Draft Protocol

19. Article 17.4 of the Framework Convention on Climate Change (FCCC) specifies that only "Parties to the Convention may be Parties to a protocol." However, there is no assurance that all or even a majority of the 167 Parties to the FCCC will deposit instruments of ratification, acceptance, approval or accession to any protocol adopted by the Parties by consensus or otherwise in Kyoto. What assurances does the U.S. now have that most, if not all, developing country Parties to the FCCC will become Parties to a Kyoto protocol? Why is it in the U.S. interest to agree, without such assurances, to a protocol that proposes to set legally binding post-2000 targets and timetables for Annex I Parties only and also imposes on the U.S. new and legally binding commitments to advance implementation of Article 4.1. of the FCCC, such as those prescribed in paragraph 1, 2, 3, and 4 of Article 5 of the U.S. draft protocol?

20. In a July 18, 1994 letter to the then House Committee on Energy and Commerce, [the State Department] said:

We agree that there are substantial commitments beyond 2000 for all parties to the Framework Convention under Article 4. Article 4.1 (applicable to both developed and developing countries) contains commitments that are not limited by any specific timetable.

- a) Is there any evidence to date that the U.S. is not abiding by these Article 4.1 commitments? If there is none, why should the U.S. voluntarily agree to reaffirm, as required by Article 5.1 of the June draft, to what the U.S. already agreed to when it ratified the FCCC in 1992?
- b) Is the U.S. asserting that other Annex I Parties are not abiding by such commitments? If so, please identify those Parties.
21. Paragraph 2 of Article 5 of the U.S. draft Protocol mandates each Party to "strengthen its legal and institutional framework to advance implementation" of Article 4.1 commitments. What "framework" does the Administration have in mind? Does this suggest a new Federal or international agency or program? Would this be done through new legislation? If not, how would it be achieved in the U.S.?
22. Article 5.3 requires that each Party take "measures to facilitate investment in climate-friendly technologies." What "measures" does the Administration contemplate? How would they be implemented in the U.S.? What are their regulatory and budgetary implementations?
23. Article 16 of the draft provides that the Parties "shall adopt, by [2005], binding provisions so that all Parties have quantitative greenhouse gas emissions obligations and so that there

is a mechanism for automatic application of progressive greenhouse gas emissions obligations to Parties, based upon agreed criteria.”

- a) Does this mean that there could be a second protocol or another legal instrument by [2005] which is only 7 years after the December meeting in Kyoto?
 - b) Do the words “all Parties” in this Article mean that only the “Parties” to the U.S. draft protocol would be required to “adopt” by 2005 such an instrument? Unless developing country Parties to the FCCC, such as China, India and Brazil, become Parties to the Kyoto instrument (as proposed by the U.S.) prior to [2005], how does this Article address the issue of greenhouse gas emission growth by all non-Annex I Parties?
 - c) Could such a new instrument adopted by [2005] impose new and additional obligations on the U.S. beyond those proposed to be adopted in Kyoto? Why is that possibility a good result for the U.S. economy, trade, and competitiveness?
 - d) What “mechanism for automatic application of progressive greenhouse gas emissions obligations” does the Administration contemplate by this proposal? What are its implications for the U.S., including its sovereignty?
24. Article 16.1 of the Convention provides that “annexes shall be restricted to lists, forms, and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.” The U.S. draft protocol states, that it may not be “appropriate” to adopt the Article 16.1 Convention example. Please explain why. Does the U.S. support annexes that would be substantive and mandatory?
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26. The Global Climate Coalition sent a letter to the Department of State on February 14, 1997 raising a number of questions about the January 17, 1997 version of the U.S. draft protocol, particularly in regards to trading. The Administration has not yet responded to those questions. Please respond to them as part of your reply to this inquiry.

EU Bubble

27. The EU proposal made recently in Denver was developed last March as an EU "negotiating position for the ongoing negotiations on the Berlin Mandate" and it includes burden-sharing of a 10% reduction among EU members of the "overall emission reduction objective by the Community as a whole". This appears to be a form of differentiation, a concept the U.S. is not supporting. The existing FCCC bubble applicable to the EU presumably only covers policies and measures and, when adopted, it only covered the 12 Parties that were members of the EU in 1992. Does the U.S. understand that the EU is seeking, by its submissions and discussion with the U.S. delegation, to extend a form of the FCCC bubble to a protocol and another legal instrument that may be adopted in Kyoto, to expand the bubble to cover any target and timetable or financial obligations and not just policies and measures, and to expand the bubble to include all present and future members of the EU, such as countries from Central and Eastern Europe? Why is such an expanded bubble in the economic and competitive interests of the U.S.?
28. What is the potential impact of such an expanded EU bubble on the U.S. proposal for international emissions trading? Would it ensure that the EU would get the benefit of any emissions deficit derived from such Central and Eastern European Members and deprive the U.S., Japan, Australia and Canada of that deficit? Would the U.S. then have to rely primarily on Russia's emissions deficit in order to derive any of the benefits of trading?
29. Article 22.3 of the FCCC requires that regional economic integration organizations must declare the "extent of their competence" with regard to obligations under the FCCC. Does the U.S. believe that the EU has the competence to carry out legally binding targets and timetables and to enforce any differentiated targets for its members if they fail to achieve them?
30. The State Department's September 9, 1996 reply to the Committee stated that the U.S. did not agree to an "EU Bubble in Berlin" and that the U.S. delegation "successfully opposed including language in the Berlin Mandate which might have suggested that any country or group of countries could "bubble" in the post-2000 period." The reply then said:

Clearly, the question of "bubbling" with respect to post-2000 commitments is complex, and one that will be closely scrutinized and carefully considered as negotiations progress. The Administration has consistently and continuously consulted with Congress, as well as with U.S. industry and U.S. NGOs, on all aspects of the negotiations concerning post-2000 commitments and will continue to do so.

The Administration has not yet held meaningful discussions with this Committee on the issue of the EU bubbling to "meet and target and timetables," its implications for the U.S., its merits, or its complexities. Given the fact that negotiations are just approaching a conclusion in Bonn and Kyoto, when do you plan to consult us on this aspect of the negotiations?

31. Since 1992, the composition of the only "regional economic integration organization," namely the EU, has grown from 12 to 15 members and several other countries want to expand it further. Under what circumstances would the U.S. agree to an EU bubble that is or could be expanded?

EU Amendment to Convention

32. The EU has proposed an amendment to the Convention to provide for a vote to adopt all future protocols by three-fourths if all efforts at consensus are exhausted. The proposed amendment would appear to have a retroactive effect for Kyoto.
- a) Under this proposal, is it possible that three-fourths of the FCCC Parties could vote to "adopt" any Protocol that imposed new obligations for Annex I and/or non-Annex I Parties and then decide not to deposit an instrument of ratification, etc.?
 - b) Does the U.S. support such an amendment to the Convention?
 - c) Has the U.S. position changed from its June 19, 1996 response to this Committee in regards to any of these matters? Would the Administration agree to a resolution of one of these matters, namely voting on a protocol, without a resolution of the financial and budget matters for both the Convention and all future protocols?

Emissions Trading

33. Does the Administration intend that any international emission trading program would apply in the same way and to the same extent to public and private entities internationally and in the U.S.? For example, would it apply to local governments and to defense or other agencies of each Party and to the emissions of such entities? What will be the impact on the U.S. Defense Department of an international, or, for the matter, a domestic, emissions trading program?
34. Greenhouse gases not covered by the Montreal Protocol are not pollutants within the meaning of the Clean Air Act and are not subject to the command and control provisions of the Act or other environmental laws. It is our understanding that although the U.S. has cited (in a September 9th reply to this Committee) authority to implement the Climate Change Action Plan with voluntary measures, the U.S. draft protocol, because it may call for mandatory measures, could not be given full effect in the U.S. without the enactment of new legislation by Congress. Do you share that understanding? Is the Administration considering a domestic emission trading legislative program patterned on the 1990 Clean Air Act?

General

35. I understand that the Administration has recently established the White House Climate Change Task Force, a Deputies Group and an Assistant Secretaries group. Please explain the role and purpose of each in regards to the development of the Administration's position and policies for the international negotiations for a protocol or another legal instrument in 1997 and for the development of implementing legislation in the U.S. Please identify the members of each group. Please provide any documents regarding the formation of these groups, their membership, mission, tasks, and/or assignments.
36. Please provide a table of all contracts, cooperative agreements, grants, and interagency agreements and any extensions thereof (hereinafter referred to as "agreements") entered into with any individual, agency, or public or private entity (foreign or domestic) by or through any federal Department or Agency, including the Departments of State, Commerce and Energy, and the Environmental Protection Agency, for the period beginning July 1, 1994 to the present that relates to, or includes, (directly or indirectly) climate change matters or issues of any kind. These should include matters relating to (a) domestic or international emission trading, including economic and other analysis of such trading, the administration and verification of such trading in the U.S. and elsewhere, (b) public outreach, general and specific public education, grass roots, community outreach, workshops, (c) transportation efficiency, alternative fuels, transportation generally, utilities, impact on pollutants like ozone and particulate matter, and (d) any legal analysis of these matters and of the Convention or of any statutes concerning climate change or trading. Each table should identify the date of the agreement, the agreement recipient, the amount of Federal funds, the term, including extensions, a brief description, the product and whether it is publicly available, and the status. Please include with each table the applicable "Statement of Work", including any revision thereof, for each such agreement.



United States Department of State

Bureau of Oceans and International
Environmental and Scientific Affairs

Washington, D.C. 20520

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AMDate: 9/24/97
Time: _____

FAX Cover Sheet

A few ~~cuts~~ ^{revises}
markedTo: Michelle Julien
Org.: CEA
FAX: 395-6958
Phone: _____

JF

From: Linda Strachan / Franz Wuerfmannsdobler
FAX: 202-647-0217
Phone: 202-647-3550 / 202-736-7781Number of pages to follow: 14

Memo: Current Q's and A's per our conversation today.
They are being circulated to UMB. We still
have Q's and A's to fill in.

Schaefer Q's & A's

1

Questions for the Record Submitted by Chairman Schaefer to
Under Secretary of State Timothy Wirth
House Committee on Commerce
Energy and Power Subcommittee
July 15, 1997

1. Q: Please identify each member of the Interagency Analytical Team (IAT) from the date of its inception to the present time, any other participants inside or outside the Administration, and specify their responsibilities.

A: Attached is former Under Secretary Ehrlich's list of people to call regarding IAT meetings. Members of the IAT had varying levels of participation and responsibility.

2. Q: When was the IAT formed and what were the IAT's instructions? Please provide any documentation regarding the formation of the IAT and its mission, responsibilities, membership or assignments.

A: Previously, Agencies worked independently on climate change economic analysis. Beginning in February 1996, however, the Department of Energy and the Environmental Protection Agency began to work together on global climate change analysis and called it the IAT. Their joint efforts provided the analytical foundation for the Springfield Global Climate Change Workshop in June 1996.

Former Under Secretary Ehrlich joined the Administration's climate change analysis effort shortly after the June 1996 Climate Analysis Workshop. He oversaw the analysis from mid 1996 to May 1997. Under Secretary Ehrlich's instructions were to use the IAT to provide a set of analytic tools that would allow the Administration to better understand the economics of the climate change issue.

3. Q: Please indicate the total costs of the IAT's efforts and the share paid annually by each Department or Agency that was involved and please identify the source of the funds within each Department or Agency.

A: Costs for the IAT were primarily for personnel. No effort was made to ^{keep track of} accumulate costs related to the IAT activities. DOE and EPA, who had primary responsibility for the analysis efforts, did have some contract costs for modeling.

Schaefer Q's & A's

2

4. Q: Is the IAT still in existence? If so, what are its current responsibilities?

No IAT economic analysis of global climate change is underway.

5. Q: Please provide a copy of all drafts of the IAT report in addition to the May 16th and 30th, 1997 drafts, both earlier and later.

A: Enclosed with this response are photocopies of the May 12th, May 16th, and May 30th drafts of the IAT paper. The May 12th draft was circulated among members of the IAT and senior members of the Administration involved in climate change policy. The May 16th draft was circulated to the peer reviewers, members of the IAT, and senior members of the Administration involved in climate change policy. The May 30th draft was released to the public on July 15th.

6. Q: Please explain how the peer reviewers were selected? What instructions were those peer reviewers given? Please provide copies of any correspondence or instructions that were sent to the peer reviewers.

A: The peer reviewers were selected based on recommendations from senior IAT members. Former Under Secretary Ehrlich made the final selection after consultation with the IAT and members from the White House Task Force on Climate Change.

Former Under Secretary Ehrlich sent letters and attachments to each of the reviewers as well as personally contacting each of them. The letter dated March 20th is a copy of the initial letter sent to Professor Jorgenson. Identical letters were sent to the other peer reviewers over a period of weeks. Enclosed with this letter were a technology note and information on the IAT models and baseline. The undated letter is a copy of the letter that was sent to all reviewers on May 16th with copies of the May 16th draft of the IAT report. Copies of materials sent to the reviewers are enclosed.

7. Q: If the IAT effort is in fact a "failed" project as indicated in Administration testimony at the Subcommittee hearing how will the Administration determine the appropriate level of future international climate change commitments for Kyoto and later?

A: The IAT effort generated much useful information about how to model constraints on greenhouse gas emissions and their potential economic effects. However, the IAT process was unsuccessful in providing a sufficiently narrow range of estimated economic effects to support the Administration's overall decision-making process. As part of the

Schaefer Q's & A's

3

ongoing Administration decision process, a number of different economic and other analyses are being evaluated as guides to the likely effects of reducing greenhouse gas emissions.

8. Q: As late as last May when Dr. Ehrlich and others in the Administration held briefings on the then draft analysis and assessment there was no hint that the Administration considered this effort a failure and the models to be unreliable. What occurred since May that caused the Administration to apparently reach a different conclusion from that of Dr. Ehrlich?

A: When the Administration provided briefings on the work being done by the IAT, the focus was on determining baselines for emissions levels, economic growth, and other key variables, and for explaining the different models that were being used. As the work done by the IAT proceeded, the wide range of economic outcomes called into question the benefits of continued IAT work on these economic models, given the many other competing claims on agency resources.

9. Q: The IAT draft Analysis referred to three scenarios which resulted in costs of future climate commitments of approximately \$200, \$100, or \$50 per ton carbon tax equivalent. Has the Administration concluded that a \$200 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$100 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness? Has the Administration concluded that a \$50 per ton carbon tax equivalent cost will not harm the U.S. economy, jobs, and global competitiveness. Please provide the basis for any of the above conclusions. If the Administration does not support any of the above costs, what analysis or other information does the Administration intend to rely on to support a different amount?

A: The implicit price of carbon for the United States reported by the IAT ranged from \$9 to \$145, depending on the situations models, and the assumptions and models used. Similarly, the impact on the U.S. gross domestic product spanned a wide range. The IAT found that the estimates of the costs to the U.S. economy of a carbon emissions reduction policy depended on factors, including targets and timetables, technology assumptions and the implementation of international emissions permit trading. As Dr. Janet Yellen remarked in her July 15, 1997, testimony to the House Commerce Subcommittee on Power, "It boils down to this: if we do it dumb, it could cost a lot, but if we do it smart, it will cost much less, and indeed could produce net benefits in the long run"

Schaefer Q's & A's

4

10. Q: Is the paper prepared by the IAT both an analysis and an assessment? How does it relate to the "analysis and assess merit" referred to in Paragraph 4 of the Berlin Mandate? Has the Ad Hoc Group on the Berlin Mandate provided an analysis and assessment as required by the Berlin Mandate?

A: The IAT analyzed a wide range of emissions targets and timetables as well as a range of implementation plans (such as international emissions trading and joint implementation). The IAT analysis does not have any direct relationship to the cited paragraph from the Berlin Mandate.

11. Q: The IAT draft states that the central policy modeled for the analysis "is aimed at reducing carbon and other greenhouse gas emissions by stabilizing them at 1990 levels" and that policy would be "announced in 2000 and its restrictions are phased in over a ten year period, so that the policy would take full effect in 2010." Reports in the media after the Denver Summit that President Clinton attended also referenced this date of 2010. In light of EIA's projection of emissions 22% above 1990 levels by 2010, is the Administration considering a target and timetable that calls for stabilization at 1990 levels by 2010?

A: The IAT's analysis focused on a standard emissions target widely used in the academic literature. The Administration is in the process of determining its position on targets and timetables. The Administration's negotiating position is still in development.

12. Q: The Administration frequently cites the 2000 economists who say they support controlling greenhouse gases. Their statement supports as the mechanism either carbon taxes or emissions permits. In the past, the Administration has said it opposes the use of taxes. Is that still the Administration's position?

A: The Administration's position on implementation options or strategies relating to greenhouse gas emissions reductions is still under development. This position will be determined in conjunction with a position on targets and timetables, which is also under development.

13. Q: The IAT draft explains that these emissions reductions to achieve stabilization would be through "issuing tradable permits at the earliest point of energy production or when imported into the U.S." and that the permits "are initially auctioned in a way that is revenue neutral: i.e., all revenues generated would be recycled through the economy." Would these revenues be deposited in the treasury as miscellaneous receipts under the Economy Acts? Would they then

Schaefer Q's & A's

5

have to be recycled through changes in the tax laws or by appropriation? How would they be recycled?

A: The IAT considered a range of revenue recycling possibilities at a very abstract level. The IAT did not examine the legal framework under which these abstract options might be implemented in the United States.

14. Q: Does the Administration believe that permit auctions are the equivalent of a new tax? If not, please explain.

A: In general, they are not equivalent. Auctions focus on fixing quantities and leave prices free to fluctuate, while taxes focus on prices and allow quantities to adjust to ~~changed price levels~~.

15. Q: The IAT draft states that "among fuels, demand for coal bears the brunt of greenhouse gas stabilization." What is the impact on the U.S. economy as a whole and on the relevant coal regions of this policy towards coal? What will be the job impact? Is the Administration adopting an anti-coal policy? How is the policy consistent with President Clinton's 1995 reply to Mr. Dingell that the U.S. will not agree to any protocol that harms our economy and jobs or our competitiveness?

A: The IAT analysis found that the implicit price of carbon would range from \$9 to \$145 per ton depending on the model and assumptions used and the specific scenario analyzed. Economic and job impacts would similarly span a range depending on the factors such as the rate of technological change, targets and timetables, and international emissions permit trading.

It is important to stress that the IAT analysis is just that – analysis – and not policy, as the question suggests. The IAT examined a wide variety of different analytic scenarios as part of its work, and explicitly was not charged with making policy recommendations.

16. Q: How long after December 1997 does the Administration think it will take to obtain Senate advice and consent of any Kyoto agreement, to ratify that agreement, and to enact implementing legislation?

A: There is little information on which to judge the timeframe for the advice and consent process, or for the enactment of implementing legislation in the climate arena. The U.N. Framework Convention on Climate Change was ratified by the Senate in October 1992, only four months after it was signed by President Bush at the Earth Summit in Rio de Janeiro in June 1992. That Convention required no implementing legislation. However,

Schaefer Q's & A's

6

other Conventions, such as the Law of the Sea, have yet to be ratified, more than a dozen years after signature.

17. Q: Which agency or department would be responsible for implementing the provisions of any agreement reached in Kyoto, including provisions relating to joint implementation, emissions trading and advancing Article 4.1?

A: It is anticipated that several Departments and agencies would have a role in the implementation of provisions related to joint implementation, emissions trading and Article 4.1, including the Department of State, the Department of Energy, The Department of Justice, the Treasury Department, the Department of Agriculture, the Agency for International Development, the Environmental Protection Agency, and possibly the National Oceanographic and Atmospheric Administration and the National Aeronautics and Space Administration. The precise role of each could only be determined once specific provisions had been decided upon.

18. Q: What consideration has been given or plans made regarding passage of legislation necessary to implement any agreement reached in Kyoto?

A: While some consideration has been given to the activities required under various agreement provisions (particularly those introduced by the United States), the lack of general acceptance of any of these provisions in the international negotiations makes the development of any specific legislative proposals premature. The Administration would intend, as part of its package of material to be sent to the Senate, to include it proposals for legislation that would be required to fully implement any agreement.

19. Q: Article 17.4 of the Framework Convention on Climate Change (FCCC) specifies that only "Parties to the Convention may be Parties to a protocol." However, there is no assurance that all or even a majority of the 167 Parties to the FCCC will deposit instruments of ratification, acceptance, approval or accession to any protocol adopted by the Parties by consensus or otherwise in Kyoto. What assurances does the U.S. now have that most, if not all, developing country parties to the FCCC will become Parties to a Kyoto protocol? Why is it in the U.S. interest to agree, without assurances, to a protocol that proposes to set legally binding post-2000 targets and timetables for Annex I Parties only and also imposes on the U.S. new and legally binding commitments to advance implementation of Article 4.1 of the FCCC, such as those prescribed in paragraph 1, 2, 3, and 4 of Article 5 of the U.S. draft protocol?

Schaefer Q's & A's

7

A: [EGC]

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A. The Berlin Mandate calls for the negotiating process to "continue to advance the implementation" of Article 4.1 commitments, which also apply to developing countries. The primary U.S. objective, in proposing paragraph 2 of Article 5, was to encourage developing countries with inadequate legal and institutional frameworks to strengthen such frameworks so as to improve implementation of Article 4.1. However, it was considered that there was no reason why such an obligation could not apply to all Parties, namely that all Parties could reasonably be asked to do something to strengthen their frameworks. Even the United States, with its highly developed legal and institutional system, could, for example, enhance its existing administrative abilities to collect and report on inventories of greenhouse gas emissions. It was not intended that any international institutions or processes would be needed to implement such a provision.

Schaefer Q's & A's

8

22. Q: Article 5.3 requires that each Party take "measures to facilitate investment in climate-friendly technologies." What "measures" does the Administration contemplate? How would they be implemented in the U.S.? What are their regulatory and budgetary implementations?

A: [Seidel]

23. Q: Article 16 of the draft provides that the Parties "shall adopt, by [2005], binding provisions so that all Parties have quantitative greenhouse gas emissions obligations and so that there is a mechanism for automatic application of progressive greenhouse gas emissions obligations to Parties, based upon agreed criteria."

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Please explain why. Does the U.S. support annexes that would be substantive and mandatory?

A: You correctly note that Article 16.1 of the Convention limits the use of annexes to certain types of material. This is not because there is any inherent reason why annexes should be so restricted. Rather, it is because Article 16 goes on to provide an entry-into-force procedure for annexes (and amendments to annexes) under which an annex (or amendment to an annex) enters into force for a Party unless a Party affirmatively does not accept it. (Other modifications to the Convention must be affirmatively accepted by Parties to be binding on them.)

In the context of the Convention, as well as other treaties, the U.S. insisted that the quid pro quo for such a "tacit" amendment procedure with an "opt-out" provision was that annexes be limited to material of a technical (scientific, etc.) nature. This view is consistent with views expressed by the Senate. The purpose of the U.S. comment with respect to the climate change protocol was to flag that annexes are not automatically entitled to "opt-out" procedures; rather, it depends on their context.

25. Q: Article 9 of the U.S. draft provides that Parties "shall cooperate" in establishing a "long-term goal" regarding concentrations of gases. Article 10 calls for meetings at "regular intervals" to, among other things "periodically review the adequacy" of the Protocol and Article 8 calls for periodic review of the Protocol and guidelines "in light of evolving scientific knowledge related to climate change." Article 2 already suggests a minimum of two budget periods. Article 16 tells the parties to adopt "binding provisions" by [2005] for progressive "obligations." Does the State Department contemplate, over the next several decades a continuing process of meetings of both the protocol and Convention Parties annually and a series of IPCC assessments, special reports and technical papers leading to a series of protocols or other legal instruments that are likely to have significant economic impacts on the Parties and their people? Why is there a need for such frequent meetings and reviews?

A: The U.S. has proposed a periodic review of the agreement to insure that any changes in the science are fully taken into account by the Parties. Such flexibility insures that if new information emerges indicating a reduced need to act, the agreement could be modified; conversely, if additional actions needed to be taken to address the threat of climate change, appropriate action would not be delayed. The U.S. proposal also seeks to insure that Parties would be fully informed regarding the compliance of all other Parties – thus removing a potential problem of one Party gaining a competitive advantage though not fully meeting its obligations, while other complying Parties might be penalized. Finally, the U.S. proposal, while setting specific commitments for developed countries, recognizes the need for all Parties to participate. It therefore calls for the negotiation of a new agreement by [2005] that would require all countries – including developing

Schaefer Q's & A's

10

countries – to adopt legally binding limits on their emissions. We assume that at each stage of the process, a full assessment of the costs and benefits of action would be taken prior to committing the United States to any new legal obligation.

The U.S. proposal for an agreement does not specify the frequency of IPCC Assessments. These reports (the third of which is anticipated to be released in late 2000 or early 2001), have so far been scheduled on a five year cycle – long enough to allow new scientific information to develop, but frequently enough to provide the policy community with regular updates on the state of knowledge regarding the climate change issue.

26. Q: The Global Climate Coalition sent a letter to the Department of State on February 14, 1997, raising a number of questions about the January 17, 1997, version of the U.S. draft protocol, particularly in regards to trading. The Administration has not yet responded to those questions. Please respond to them as part of your reply to this inquiry.

A: [EGC]

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A: The EU has made clear that it believes the bubble covers not only policies and measures, but also any target and timetable. IT has argued that it may use the bubble not only in meeting the non-binding aim of the Convention, but also in meeting any new obligations established under the protocol or other legal instrument. To date, the EU has not discussed with us whether it also covers financial issues. They have also indicated they have not yet determined how or under what circumstances the bubble would apply to new member states.

Schaefer Q's & A's

11

The United States believes it is the interest of a stable Europe that the European countries continue to develop economically, and has so far been disinclined to intervene in the domestic affairs of any European nation. However, in the context of any new agreement under the Climate Convention, we have not yet accepted that the European member states should be allowed to "bubble" their obligations, nor would we support their doing so unless we were satisfied that such an agreement would not disadvantage the United States.

28. Q: What is the potential impact of such an expanded EU bubble on the U.S. proposal for international emissions trading? Would it ensure that the EU would get the benefit of any emissions deficit derived from such Central and Eastern European Members and deprive the U.S., Japan, Australia, and Canada of that deficit? Would the U.S. then have to rely primarily on Russia's emissions deficit in order to derive any of the benefits of trading?

A: The impact of an expanded EU on any emissions trading provisions is dependent on the level of the target, and the restrictions placed on a trading regime. If country targets or trading restrictions were set so that they required "real" reductions, no specific benefit would necessarily accrue to the European Union, and any reductions would entail real costs. Neither is it clear that the European Union would necessarily claim all the benefits of an expanded membership – emissions trading should in theory equalize the price of reducing a unit of emissions regardless of whether it is in Europe or Russia or the United States. Most analysis does suggest that if the U.S. is to use emissions trading to substantially offset its domestic emissions, even the entirety of the Eastern European country emissions would not suffice; Russia is the only country large enough to accommodate our current levels.

But EU would still have early reduction coming

29. Q: Article 22.3 of the FCCC requires that regional economic integration organizations must declare the "extent of their competence" with regard to obligations under the FCCC. Does the U.S. believe that the EU has the competence to carry out legally binding targets and timetables and to enforce any differentiated targets for its members if they fail to achieve them?

A: It is not yet clear how the EU competence will be applied in its implementation if any new obligations under a new legal instrument. We, along with others (e.g., Australia and Japan) have insisted that the issue of EU competence be made fully transparent and provisions for compliance be made acceptable to all Parties before we would agree to allow the EU to undertake its commitments as a single entity rather than individually through each member state.

Schaefer Q's & A's

12

30. Q: The State Department's September 9, 1996, reply to the Committee stated that the U.S. did not agree to an "EU Bubble in Berlin" and that the U.S. delegation "successfully opposed including language in the Berlin Mandate which might have suggested that any country or group of countries could "bubble" in the post-2000 period." The reply then said:

Clearly, the question of "bubbling" with respect to post-2000 commitments is complex, and one that will be closely scrutinized and carefully considered as negotiations progress. The Administration has consistently and continuously consulted with Congress, as well as with U.S. industry and U.S. NGOs, on all aspects of the negotiations concerning post-2000 commitments and will continue to do so.

The Administration has not yet held meaningful discussions with this Committee on the issue of the EU bubbling to "meet target and timetables," its implications for the U.S., its merits, or its complexities. Given the fact that the negotiations are just approaching a conclusion in Bonn and Kyoto, when do you plan to consult us on this aspect of the negotiations?

A: [EGC]

31. Q: Since 1992, the composition of the only "regional economic integration organization," namely the EU, has grown from 12 to 15 members and several countries want to expand it further. Under what circumstances would the U.S. agree to an EU bubble that is or could be expanded?

A: The U.S. has made it clear throughout these negotiations that there is no EU entitlement to a so-called "bubble" in the Kyoto agreement. Indeed, how a bubble would operate upon EU expansion is one of the many concerns that we and others (for example, the Japanese) have raised in connection with the EU proposal.

32. Q: The EU has proposed an amendment to the Convention to provide for a vote to adopt all future protocols by three-fourths if all efforts at consensus are exhausted. The proposed amendment would appear to have a retroactive effect for Kyoto.

- a) Under this proposal, is it possible that three-fourths of the FCCC Parties could vote to "adopt" any Protocol that imposed new obligations for Annex I and/or non-Annex I Parties and then decide not to deposit an instrument of _____ ratification, etc.?

Schaefer Q's & A's

13

- b) Does the U.S. support such an amendment to the Convention?
- c) Has the U.S. changed from its June 19, 1996, response to this Committee in regards to any of these matters? Would the Administration agree to a resolution of one of these matters, namely voting on a protocol, without a resolution of the financial and budget matters for both the Convention and all future protocols?

A: (a) Yes. Under the current Climate Convention, as well as this proposal, Parties could adopt an agreement (pursuant to whatever rule of procedure governs adoption) and then not ratify.

(b) We have substantial concerns about the provisional application aspect of the proposal. In effect, it amends the treaty without waiting for the Parties to ratify the amendment.

(c) [Unsure of response to Committee in July 1996 – must cross-reference.]

33. Q: Does the Administration intend that any international emission trading program would apply in the same way and to the same extent to public and private entities internationally and in the U.S.? For example, would it apply to local governments and to defense or other agencies of each Party and to the emissions of such entities? What will be the impact on the U.S. Defense Department of an international, or, for that matter, a domestic, emissions trading program?

A: [Seidel]

34. Q: Greenhouse gases not covered by the Montreal Protocol are not pollutants within the meaning of the Clean Air Act and are not subjected to the command and control provisions of the Act or other environmental laws. It is our understanding that although the U.S. has cited (in a September 9th reply to this Committee) authority to implement the Climate Change Action Plan with voluntary measures, the U.S. draft protocol, because it may call for mandatory measures, could not be given full effect in the U.S. without the enactment of new legislation by Congress. Do you share that understanding? Is the Administration considering a domestic emission trading legislative program patterned on the 1990 Clean Air Act?

A: [Seidel]

Schaefer Q's & A's

14

35. Q: I understand that the Administration has recently established the White House Climate Change Task Force, a Deputies Group and an Assistant Secretaries group. Please explain the role and purpose of each in regards to the development of the Administration's position and policies for the international negotiations for a protocol or another legal instrument in 1997 and for the development of implementing legislation in the U.S. Please identify the members of each group. Please provide any documents regarding the formation of these groups, their membership, mission, tasks, and/or assignments.

A: [Seidel]

36. Q: Please provide a table of all contracts, cooperative agreements, grants, and interagency agreements and any extensions thereof (hereinafter referred to as "agreements") entered into with any individual, agency, or public or private entity (foreign or domestic) by or through any federal Department or Agency, including the Departments of State, Commerce, and Energy, the Environmental Protection Agency, for the period beginning July 1, 1994 to the present that relates to, or includes (directly or indirectly) climate change matters or issues of any kind. These should include matters relating to (a) domestic or international emission trading, including economic and other analysis of such trading, the administration and verification of such trading in the U.S. and elsewhere, (b) public outreach, general and specific public education, grass roots, community outreach, workshops, (c) transportation efficiency, alternative fuels, transportation generally, utilities, impact on pollutants like ozone and particulate matter, and (d) any legal analysis of these matters and of the Convention or of any statutes concerning climate change or trading. Each table should identify the date of the agreement, the agreement recipient, the amount of Federal funds, the term, including extensions, a brief description, the product, and whether it is publicly available, and the status. Please include with each table the applicable "Statement of Work," including any revision thereof, for each agreement.

A: [Interagency]

Comments on Q&As

1. Insert period after "meetings".

3. Change "accumulate" to "account for".

7. Rewrite second sentence to read: "However, the IAT process was unsuccessful in providing a definitive answer on the economic effects to support the Administration's overall decision-making process." The range of results, as specified in the draft, are less of a concern (especially since the range is in part a function of the different trading, AEEI, and revenue recycling assumptions). Of more importance are the flaws raised by the peer reviewers. Note: Janet's testimony reads "the effort to develop a model or set of models that can give us a definitive answer as to the economic impacts of a given climate change policy is futile."

8. Rewrite second sentence to read: "As the work done by the IAT proceeded, the concerns raised by the peer reviewers called into question the benefits of continued IAT work on these economic models, given the many other competing claims on agency resources." Since the Committee already has the peer reviewers comments, there should not be any problem with referring to the peer reviewers.

9. Insert a comma after "situations" and delete "and models" at end of first sentence.

9. The range of the IAT results are incorrect. If the context is all permit prices for all runs reported, the highest permit price is \$207 in the year 2020 with Markal Macro under the 1990 -10% case. If the context is the highest 1990 permit price, then the highest permit price is \$200 with DRI under the 1990 -10% case. The \$145 value only applies to the 1990 in 2010 case.

9. The third sentence should be rewritten to read: "The IAT found that the estimates of the costs to the U.S. economy of a carbon emissions reduction policy depended on several factors, including targets and timetables, the use of market based incentives, technology assumptions, implementation of international emissions permit trading, and revenue recycling." There are probably other factors to list here as well, so let's talk about these.

10. Delete "wide" in first sentence.

11. Rewrite first sentence to read: "The IAT's analysis focused on a standard emissions target widely used in the academic literature for comparing model results."

12. Replace "or" with "and" in first sentence.

15. Rewrite answer based on revised answer 9 (permit price range, inserting factors affecting costs).

17. Do we want to list agencies, or just note that agency involvement will be a function of the characteristics of implementation?

18. Make "it" possessive in last sentence.

25. In the third sentence, is the statement following the dash necessary?

25. Do we want to state that a "full assessment of the costs and benefits of action would be taken prior to committing the United States to any new legal obligation" at the end of the first paragraph?

28. Should our discussion of international emissions trading be couched in more uncertainty, given that under some targets and timetables, we are actually a net seller of permits? Further, any JI might affect the conclusion drawn at the end of this answer.

Questions Unanswered:

19, 20, 23, 26, 30, 33, 34, 35, 36

Using A Border Adjustment To Take The Lead On Climate Change Without
Encouraging Runaway Shops

By Frank Muller and Andrew Hoerner

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Negotiations are currently underway through the Framework Convention on Climate Change (FCCC) for a new binding agreement by industrialized countries to reduce their emissions of greenhouse gases over the next few decades. The agreement is due to be signed in Kyoto, Japan, this December. It implements a key principle of the convention that was signed by President Bush in 1992 and ratified by the U.S. Senate: that developed countries should take the lead in combating climate change. Nevertheless, on July 25, in what has become known as the Byrd Resolution (after its chief sponsor), the Senate resolved that the United States should not sign the agreement unless it includes "new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period." Underlying this resolution are concerns that the Kyoto agreement will cause a loss of American jobs to China and other developing countries. Are these concerns justified? If so, does the Byrd resolution solve the problem? Is there a better solution?

Will the Kyoto agreement cause widespread loss of American jobs to developing countries?

No. An effective agreement will lead over time to lower employment in some industries, such as coal mining and higher employment in others, such as natural gas, energy efficiency and renewable energy technologies. But it will not cause widespread loss of American jobs to developing countries. Two-thirds of US carbon dioxide emissions come from energy used in transportation and buildings -- activities that by their nature cannot be exported. The remaining one third comes from manufacturing. In most of manufacturing, except for a few energy-intensive industries, energy is too small a cost factor for emissions limits to provide any real incentive for relocating overseas. Furthermore, American coal miners will not lose their jobs to China because emissions limits will apply equally to all coal consumed in the United States regardless of its origin.

Is there a risk of runaway shops in energy-intensive manufacturing?

Yes. It is widely recognized that to achieve long-term reductions in US carbon dioxide emissions at least cost will require an economy-wide incentive as well as incentives and other measures targeted to individual sectors. The two main options are a carbon tax or a system of tradable carbon emission permits. Either would raise the cost of energy from fossil fuels. Energy is a significant cost factor in a small number of industries including aluminum, pulp and paper, iron and steel, and basic chemicals (see attached table). Energy costs have always influenced where investments are made in these industries. Following the fuel price increases of the 1970s, for example, aluminum production was relocated from Japan and (to some extent) Europe to countries with cheaper electricity, such as Australia. Similarly, future investments might be redirected from countries where energy costs are expected to rise due to carbon dioxide emissions limits to countries with lower emissions constraints or no limits at all. In total, the industries facing this risk account at most for about 1 percent of US employment. In other words, critics have vastly exaggerated the magnitude of the runaway shop problem. Nevertheless, these

industries provide good jobs that form an important part of the economic base of some regions of the country.

Does relocation overseas of energy-intensive production help protect the climate?

No. Carbon dioxide has the same impact on the global climate system wherever emitted. In some cases, a marginal reduction in global emissions may be achieved, if efficient new greenfield plants overseas displace aging US production capacity. But, in other cases, displacement may involve greater utilization of existing inefficient power plants or manufacturing capacity in a developing or transition country, resulting in a net increase in global emissions. More importantly, though, the relocation option greatly weakens the economic incentive for developing more efficient production technologies and substitute low-emission products. The climate change convention's goal of stabilizing atmospheric greenhouse gas concentrations can only be achieved through a transition to sustainable production and consumption patterns. Simply shifting emissions around the world puts off the task of undertaking this transition. And from a political perspective, the threat of job displacement is used by special interests to undermine climate protection efforts, not only in the United States but also in every other developed country.

Does the Byrd resolution solve the runaway shop problem?

No. Even if developing countries agree at Kyoto to accept specific scheduled commitments on the same timetable as developed countries, this would not greatly diminish the risk of runaway shops. Senator Byrd himself has accepted that commitments will need to vary among countries according to level of development. Whereas industrial countries will be required to reduce emissions below current levels, developing countries at most will face limits to future growth. An American steel corporation, for example, could still move production and emissions to Mexico or Indonesia and export steel back to the United States without either country breaching its treaty commitments. Countries like China, India, and Indonesia with relatively low per-capita emissions (one-tenth of US levels or lower) would likely have considerable room within their emissions "budgets" to accommodate expansion in energy-intensive manufacturing for export to industrial countries. The Byrd resolution fails to address this problem, yet threatens to undermine the negotiations by reneging on earlier agreements by the United States.

Do joint implementation and international emissions trading solve the runaway shop problem?

No. US negotiators have proposed that the Kyoto agreement allow joint implementation (JI) between industrial and developing countries and emissions trading among industrial countries. Some proponents of JI and international trading have argued that these schemes address jobs concerns by promoting emissions reductions in developing countries and enabling affected US firms to reduce their compliance costs. Under JI, a firm could invest in a low-cost emission reduction project in a developing country and gain a credit for a share of the reductions against its own domestic emissions. Under international trading, a firm would purchase emission rights (directly or indirectly) from another industrial country with lower emission reduction costs that is able to do better than its treaty commitments. Whatever the merits of JI and international trading

in enhancing flexibility and lowering costs, though, they do not necessarily solve the runaway shop problem.

At best, JI and international trading would reduce, but not eliminate, the cost disadvantage imposed on US-based energy-intensive manufacturers by an effective emission-reduction agreement. Under such an agreement and a JI regime that provides real and verifiable emission reductions in developing countries, not just paper reductions, emission credits would be unlikely to cost less than around \$20 per ton of carbon. The purchase of such credits would still impose a significant cost disadvantage on energy-intensive plants selling into highly competitive global markets.

At worst, the expansive JI and trading schemes advanced by some proponents within the Administration and environmental community could actually promote footloose corporate behavior. For example, in the JI case, a US steel firm could invest in improving the efficiency of a steel plant in Brazil (or alternatively Mexico or Indonesia) as part of a joint venture deal that also included construction of a new steel plant. The firm could use the emission reduction at the upgraded plant to gain a credit under JI against its US emissions while also importing steel from the new plant to displace its highest-cost US capacity. Similarly, in the case of tradable permits, an aluminum major facing high electricity costs for its eastern US plants (or the coal-based utility which supplies it) might invest in Russia's inefficient and underutilized power supply and aluminum industries and close its oldest US plants. As Russia is expected to easily meet its treaty commitments, the deal could be partly financed through the sale of internationally tradable emission rights to the US utility. In these cases, JI and international trading form an integral element of the financing of deals that shift American jobs overseas.

Why not simply exempt energy-intensive industries from emission limits?

The manufacturing sector or particular energy-intensive industries could be exempted from a carbon tax or permit scheme. However, this would increase the cost to the economy as a whole by requiring a greater emission reduction effort in other sectors. It also would greatly diminish the incentive to improve production technologies in the exempted industries, develop substitute low-emission products and generally shift to more sustainable consumption patterns. Moreover, as the BTU tax debate demonstrated, exempting heavy industry would undermine broader support for the tax or permit scheme.

What is a border tax adjustment?

Under the "destination system" of border tax adjustments (BTAs), traded goods are subject to the taxes of the importing ("destination") country and exempted from the taxes of the exporting ("origin") country. For instance, gasoline trucked from Toronto to Buffalo is exempted from paying gasoline tax in Canada and subject to gasoline tax in New York, at the combined New York/federal tax rate. BTAs are a necessary part of a tax on national or in-state consumption, and are a nearly universal feature of sales, excise, value added and other taxes. Because BTAs are required for consistent treatment of a consumption tax base they are regarded as a normal part of the tax and not as a form of local favoritism.

How can a border tax adjustment solve the runaway shop problem?

BTAs are the most straightforward way to prevent firms in low-tax jurisdictions from preying on energy-intensive industries in high tax jurisdictions. A BTA system would rebate the tax on fuels used to produce energy-intensive exports (such as metal ingot and certain bulk chemicals), thus maintaining the competitiveness of exports. A comparable tax would be imposed on imports of energy-intensive basic materials to put foreign firms on a level playing field in the home market. This BTA system is a natural part of a tax on fuels used to produce goods consumed domestically.

BTAs should be distinguished from tariffs and other forms of industry protection. Energy-intensive manufacturers (e.g. basic chemicals, aluminum) already undertake large investments in developing countries that sometimes displace American production and jobs. Various factors make such investments attractive including lower resource costs and the prospect of winning large new markets. A BTA ensures that job displacement is not accelerated by the FCCC, but does not favor domestic over foreign production or otherwise alter underlying market conditions. Aluminum or ethylene production that already would have been shifted overseas, for example, will still be shifted. But it won't be shifted because of climate protection policies.

Why are border tax adjustments controversial?

Some advocates of unbridled free trade argue that BTAs for taxes on carbon embodied in energy-intensive traded goods are or should be barred by the General Agreement on Tariffs and Trade (GATT). (BTAs on the fuels themselves are universally accepted.) There are three major arguments for this position:

The basic policy argument. Many GATT experts take seriously the conclusion of the never-adopted Tuna-Dolphin decision that trade measures can be based only on taxes on *products*, and not on taxes on *processes*.

The practicality argument. Some administrators have argued that such BTAs would be *hard to enforce* or *easy to abuse*.

The technical legal argument. Some legal scholars argue that the rebate of taxes on embodied fuels is barred by the GATT Subsidies Code's ban on rebating *prior stage cumulative indirect taxes*.

Does the GATT forbid border tax adjustments on "process" taxes?

No. The GATT allows BTAs on taxes that fall "directly or indirectly" on like products. It was the intent of the original GATT negotiators that process as well as product charges be border adjustable. This language was first introduced in 1946 by U.S. negotiator Oscar B. Ryder at the London Preparatory Committee as part of the process of drafting the Havana Charter, the precursor to GATT. The Brazilian delegate, Mr. Rodrigues, demanded to know what was meant by the addition of the term "or indirectly." Mr. Ryder replied that the language was to allow border adjustments on "a tax, not a tax on a product as such, but on the processing of a product, which are covered by the word 'indirectly' here." The process/product distinction proposed by the Tuna-Dolphin Panel, like the Tuna-Dolphin decision itself has never been adopted by the GATT contracting parties or by the World Trade Organization (WTO).

Can border tax adjustments be administered effectively?

Yes. A BTA system for carbon taxes would be no more complicated than the BTA systems already in place for many other taxes. For instance, the U.S. administers border tax adjustments on hundreds of chemicals under the Superfund toxic chemical excise tax. BTAs apply to all taxed chemicals, and to all products manufactured primarily from a taxed chemical. If the producer documents the amount of taxed chemical used in the manufacture, the tax is based on the documented amount. Otherwise, it is taxed at a rate set by Treasury regulation, based on the amount of the taxed chemical that is used to manufacture the same product in the U.S. under the predominant method of production. This tax was held by the GATT to be consistent with international trade rules. The Ozone-Depleting Chemicals (ODC) Tax has similar BTA provisions, except that it is a "process" tax, in that it applies to products manufactured with taxed substances but not physically incorporating them, such as electronic parts cleaned with ODCs.

BTAs on the embodied carbon in energy-intensive goods would be administratively identical to the BTAs on these existing taxes. For plausible carbon tax rates, only a handful of energy-intensive basic materials -- fewer than are covered under the existing Superfund chemical excise -- would have price increases great enough to justify border adjustment.

Are border tax adjustments on taxes on embodied carbon barred as "prior stage cumulative indirect" (PSCI) taxes.

No. Border adjustment of carbon taxes is clearly not barred by the ban on PSCI taxes, for two reasons. First, the Uruguay Round Amendments to the GATT specifically excluded taxes on fossil fuels from the scope of the PSCI tax ban. Second, energy taxes are not PSCI taxes because they are not "cumulative." Although energy is used in every phase of the manufacturing process, each unit of fuel is taxed only once. This contrasts with the standard example of a PSCI tax, the cascade tax. A cascade tax is a tax on the value of all products sold, including goods used as materials in the manufacture of other goods. Cascade taxes cumulate, because the tax on, for example, sheet steel used to make an automobile, becomes part of the cost of manufacturing the automobile and the tax is *itself taxed again* when the automobile is sold. Cascade taxes were once common in Europe, but are now extinct in all but a few developing nations, having been replaced by VATs (which, like energy taxes, are not cumulative).

If the United States chooses a domestic emission trading scheme rather than a carbon/energy tax, could such a scheme include a border adjustment?

The Clinton Administration has not proposed specific domestic policies to implement the proposed Kyoto agreement. Current thinking within the Administration, however, favors a domestic tradable permit scheme over a carbon/energy tax. Such permits either would be auctioned by the government (most likely to coal, oil and gas companies at the point where carbon fuels enter the economy) or given away under "grandfathering" rules (most likely to utilities and other major industrial emitters). In principle, a border adjustment (at the current market price of permits) could be levied on imports and

rebated on exports of energy-intensive products as part of such a scheme. Doing so, however, would raise different and more difficult international legal and policy issues than in the case of a tax.

Whereas border adjustments on consumption taxes have long been used and accepted under international trade rules, this is not true for environmental requirements like emissions permits. In implementing a border-adjusted permit scheme, the United States could not rely on the above mentioned BTA provisions of Article III of the GATT, except by analogy, and therefore probably would have to claim an environmental exemption under Article XX from GATT trade rules otherwise prohibiting import charges and export subsidies. Such a scheme, therefore, would be more vulnerable than a BTA to a challenge through the WTO by a country seeking to exploit the climate change convention for competitive advantage. GATT and WTO dispute panels have not looked favorably on claims for environmental exemptions. Indeed, to date, no country has successfully defended the use of Article XX to justify an environmental policy measure that runs foul of GATT provisions. Given this history, the availability of border adjustments for tradable permits cannot be guaranteed without a multilateral agreement specifically allowing them as part of the Kyoto accord.

Although elements of the trade community might object to including such provisions in the Kyoto accord, there are precedents for including even stronger trade provisions in multilateral environmental agreements (e.g., Montreal Protocol, Convention on International Trade in Endangered Species). Article 5.3 of the FCCC states "Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade." The earlier discussion makes clear that BTAs do not constitute "arbitrary or unjustifiable discrimination" within the meaning of this article. Although legally different, the trade policy arguments for allowing border adjustments for auctioned emission permits are virtually identical. However, in the case of grandfathered permits, the trade community might legitimately argue that border adjustments at the market price of the permit unjustifiably discriminate in favor of domestic producers by overcompensating them for the actual costs imposed by the emission permit scheme. In summary, the runaway shop problem can be avoided with a border-adjusted carbon tax but achieving the same goal with tradable permits may require a specific provision in the Kyoto agreement overriding GATT trade rules.

Frank Muller is Director and Andrew Hoerner is Research Director of the Environmental Tax Program. For a more detailed discussion of border tax adjustments, see J. Andrew Hoerner and Frank Muller, "Carbon Taxes for Climate Protection in a Competitive World," Center for Global Change, University of Maryland, June 1996 (available from the authors, and also published in an abbreviated form by the Swiss Federal Office for Foreign Economic Affairs in E. Staehelin-Witt and H. Blöchliger, "Ökologisch orientierte Steuerreformen," Verlag Paul Haupt, Bern, Switzerland, 1997.)

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Direct Cost Impact of a \$50 per ton Carbon/Energy Tax for the 24 Most-Affected Manufacturing Industries

Industry Groups and Industries	Energy Tax (% of Shipments)	Employment (1,000s)	Cumulative Employment (% of manufacturing)	Cumulative Value of Shipments (% of manufacturing)
Lime	23.9%	4	0%	0%
Primary Aluminum	15.0%	20	0%	0%
Cement Hydraulic	13.7%	16	0%	0%
Alkalies and Chlorine	9.9%	8	0%	0%
Industrial Gases	8.4%	9	0%	1%
Nitrogenous Fertilizers	8.0%	7	0%	1%
Paper Mills	7.4%	30	1%	1%
Electrometallurgical Products	7.2%	5	1%	1%
Paperboard Mills	6.2%	51	1%	2%
Blast Furnaces and Steel Mills	5.9%	177	3%	3%
Industrial Inorganic Chemicals nec	3.9%	79	3%	4%
Beet Sugar	3.7%	8	3%	4%
Synthetic Rubber	3.7%	12	3%	4%
Cellulosic Manmade Fibers	3.7%	11	3%	4%
Pulp Mills	3.5%	17	3%	4%
Wet Corn Milling	2.8%	10	3%	4%
Flat Glass	2.7%	13	3%	4%
Industrial Organic Chemicals nec	2.4%	101	4%	6%
Glass Containers	2.3%	35	4%	6%
Primary Nonferrous Metals nec	2.3%	11	4%	7%
Mineral Wool	2.2%	18	4%	7%
Gray and Ductile Iron Foundries	2.1%	76	5%	7%
Petroleum Refining	2.0%	74	5%	12%
Pressed and Blown Glass nec.	2.0%	33	5%	12%

Source: Analysis by J. Andrew Hoerner using energy consumption estimates from the U.S. Department of Energy's Manufacturing Energy Consumption Survey. Employment and value of shipment data is from the National Bureau of Economic Research's Productivity Database. Manufacturing industries are defined at the four digit SIC level. All data is for 1991.

Notes: The tax would apply to all fossil fuels at a rate of \$50 per ton of carbon and to large-scale hydro and nuclear electricity at the national average rate for utility fossil-fired generation. Such a tax is at the high end of proposals by advocates of stronger climate change policy, and ideally would be phased in over 5-10 years. It translates into 13 cents per gallon on gasoline, and measured in terms of its impact on electricity is about three times President Clinton's 1993 Btu tax proposal. Due to high transportation costs and other factors, some of the above industries (e.g., cement) face limited international competition, and therefore little risk of job exports. All manufacturing accounted for 15.3 percent of U.S. non-farm employment in 1996.