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EXECUTIVE OFFICE OF THE PRESIDENT

Washington, D. C.

FAX TRANSMITTAL COVER SHEET

DATE: 04-Aug-94

TO: JOE STIGLITZ

SUBJECT:

POST-2000 DEPUTIES TASK FORCE

FROM:

MARGARET P. SMITH (202) 456-5373

ECONOMIC AND DOMESTIC POLICY

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1 hour 1/11 4/6 Es:AK

CLIMATE CHANGE POST-2000 DEPUTIES TASK FORCE

THURSDAY, AUGUST 4, 1994; 4PM - 6PM; ROOM 476
AGENDA

OVERVIEW

CHARGE
APPROACH
STRUCTURE

SUBSTANCE

SCOPE OF WORK
CONTENT OF REPORT

TIMETABLE

COORDINATION

INTERNAL
OUTREACH

DISCUSSION

CLIMATE CHANGE POST-2000

"President Clinton is directing: The White House National Economic Council, the Office of Environmental Policy and the Office of Science and Technology Policy to co-chair a long-term strategy working group to examine all budget, technology, R&D, regulatory and economic policies that could impact greenhouse gas emission levels beyond the year 2000. The task force will make initial recommendations by the end of 1994."

The Climate Change Action Plan

October 1993

APPROACH

- * Establish long-term strategy working group with representation from ongoing Administration climate change activities.
- * Develop integrating decision framework for scientific analysis and policy choice of long-run strategy.
- * Examine policies that could impact greenhouse gas emission levels beyond the year 2000, building on ongoing activities and developing further initiatives as necessary.
- * Conduct coordinated public outreach concerning Post-2000 effort.
- * Prepare year-end 1994 report synthesizing available results, identifying key ongoing work, and recommending next steps.

STRUCTURE

Climate Change Post-2000 Deputies Task Force

Co-chairs: NEC, OEP, OSTP, NSC
Members: Agency Deputies
Responsibilities: Provide policy guidance; Make recommendations to President

Climate Change Long-Term Strategy Working Group

Co-Chairs: NEC, OEP, OSTP, NSC
Members: Agency representatives of ongoing activities and further initiatives
Responsibilities: Examine policies; Prepare report

The NSC has been added as a co-chair, heading the subgroup responsible for long-range international strategy under the Framework Convention. Other subgroups are:

- | | |
|---|---|
| * decision framework | * biomass and renewables |
| * ultra-efficient residential and commercial systems | * carbon sequestration: forest offsets; marine and soil/biomass sequestration |
| * pricing/market incentives | * non-energy, non-CO ₂ options |
| * non-personal transportation: commercial transport; urban and rural mass transit | * global technology diffusion |
| * natural gas market share | * joint implementation |

8/2/94

CLIMATE CHANGE POST-2000
CONTENT OF REPORT

I. SETTING THE STAGE: THE SCIENTIFIC AND ECONOMIC EVIDENCE

To consist of the contents of three studies, plus discussions with stakeholders, covering:

1. The Science of Climate Change
2. The Physical, Ecological and Human Health Impacts of Climate Change
3. The Economic and Other Valuation of Climate Change)

This section is intended to provide a broad assessment of the current state of knowledge, including key uncertainties. It will present a picture of how natural phenomena and human activities affect the climate system, globally and regionally, and how society values those effects. Its role is to lay down a baseline of information that is broadly accepted as descriptive of the problem and our understanding of it.

II. DEVELOPING THE FRAMEWORK: BRINGING TOGETHER SCIENTIFIC ANALYSIS AND POLICY CHOICE

This section is intended to provide a basis for the organization of thought. It will include ways of thinking about global objectives and paths. Its role is to create an agreed-upon structure within which to address principal policy choices, so that debate can be focussed on making the choices, not stating the problem.

III. ISOLATING THE CRITICAL POLICY ISSUES: INFORMATION AND CHOICE

This section is intended to identify the fundamental issues that must be debated and resolved in order to make the principal policy choices, and the essential information that must be developed to support that debate. Its role is to bracket the range of global choice (alternative combinations of objectives and paths) so that information can be pursued and debate focussed on the fundamental issues.

IV. EVALUATING ALTERNATIVE MEASURES: SEARCHING FOR ROBUST NEXT STEPS

This section is intended to identify prospective reduction measures that would be consistent with any strategy within the range of choice. Its role is to move thought and analysis forward rapidly with respect to those actions that are plausibly invariant to future strategy decisions.

V. DEFINING U.S. EMISSION PATHS: TOOLS AND TRAJECTORIES

This section is intended to present a range of U.S. emission trajectories for the medium term -- out to 2030. DOE's National Energy Policy Plan will be the backbone for this analysis, with a number of particular scenarios developed using, eg., robust measures from section IV, proposals under discussion in international climate treaty negotiations as identified by the Department of State, and other measures of interest. The role of this section is to build alternative mid-term paths from selected measures, compare their effects in a consistent manner across economic sectors of the U.S., and indicate the global context in which they would be appropriate.

VI. INTEGRATING THE OVERALL ANALYSIS: SCENARIOS AND RECOMMENDATIONS

This section will present a small set of climate change scenarios -- states of the world and strategy responses -- which capture the principal long-term policy choices that must be made. The tradeoffs involved in making these choices -- between cost of prevention and value of prevention; between U.S. action and global action -- will be highlighted. Mid-term policy measures invariant to these pending long-term choices will be identified.

The role of this section is to summarize the preceding analyses in the form of discrete choices and provide a basis for initial recommendations.

EXECUTIVE OFFICE OF THE PRESIDENT

Washington, D. C.

FAX TRANSMITTAL COVER SHEET

DATE: 03-Aug-94

TO: JOE STIGLITZ

SUBJECT:

POST-2000 DEPUTIES TASK FORCE AGENDA

FROM:

MARGARET P. SMITH (202) 456-5373

ECONOMIC AND DOMESTIC POLICY

If there are any problems receiving this transmission,
please call the sender, or (202) 395-7370.

Thurs, 8/4/94, 4p

The first meeting of the Post-2000 Deputies' Task Force will take place on Thursday, August 4 in Room 476-OEOB from 4:00pm to 6:00pm.

The purpose of the meeting is to review and agree on objectives, work plans, and outreach coordination for the Post-2000 effort. If there are any changes you will be notified.

To provide clearance information, call 456-5373.

F Envt (Christi Chase)
~~Deputy 2009~~

Draft 8/9/93 "

BUILDING CLIMATE POLICY FOR THE FUTURE

This Action Plan is only the beginning of a national effort to deal with the challenge of global warming. The nature of the climate change problem is inescapably long-term and only partly known today; similarly, we must estimate with some uncertainty the future effectiveness and cost of policies we adopt today.

Sequential decisions under uncertainty. Our imperfect foresight of both the magnitude of the problem and the impact of our responses necessitates that our action plan evolve over time. It must be not a one-time list, but a commitment to a goal, constant attention to new scientific and economic information, and regular reassessment and readjustment of both the policies we are employing to reach that goal and the goal itself. Through this sequential process we can take actions justified even in the face of uncertainty. And we can continuously improve our policy set as we learn more.

A diverse portfolio. Moreover, building for the future means exploring a number of different kinds of policy options and identifying the most cost-effective opportunities from among all of these over time. Rather than putting all our eggs in one basket, we will explore a diversified portfolio of policies, gaining experience so we can sequentially adjust our policy portfolio in light of new scientific and economic information.

Evaluating performance. A key part of the action plan is therefore careful monitoring and evaluation of both net emissions trends and policy responses over the coming years. We will track the costs and effectiveness of policies compared to our initial projections, and use that information, in conjunction with scientific and economic information about the relative net benefits of reducing emissions, to help determine whether the action plan needs to be supplemented or otherwise adjusted.

Building on current policies

Several of the policies identified in the action plan could be expanded or emboldened if initial efforts prove especially successful, or if new information about the urgency of the problem warrants more aggressive responses. This section describes current contemplation of areas in which expansion in the near future might be desirable or necessary.

Energy

[to come]

Transportation

The transportation sector is projected to account for over 1/3 of increases in U.S. gross emissions over 1994-2000, and even more after 2000 [double-check]. The present action plan includes several significant actions which will hold down emissions and begin to fundamentally change patterns of consumption in the transport sector. But additional actions may be needed in the future to limit emissions more effectively, especially if vehicle miles travelled (VMT) increases faster than projected here. Among these actions might be:

Clean Car Initiative. The Administration is pursuing a cooperative arrangement with the major automobile manufacturers to develop and produce a new, low- to non-emitting vehicle. It remains to be seen if the clean car could penetrate markets rapidly enough to affect emissions by 2000.

National "Pay at the Pump". Building on the state pay-at-the-pump option included in this action plan (action AT2), the Administration is examining the possibility of a federally-implemented national program. This option would shift part of what motorists already pay for auto insurance to the gas pump. Unlike a gasoline tax, this option would simply collect a partial insurance premium on each gallon of gas, and then rebate the same amount, for no net cost to the typical driver and no regional burden on high-driving states. By shifting part of the insurance payment from a fixed annual cost to a variable cost of gasoline, it would yield significant reductions in GHG emissions (20-30 MMTcE in 2000 for a \$0.25/gallon premium). This option would not engage in any insurance or tort reform, nor would it affect diesel (trucking) fuel. It would also have additional benefits, including incentives for safety, increased insurance purchases, and eliminating state border disparities. Pay-at-the-pump may be one of the most cost-effective options available -- near \$0 per MTcE -- to achieve major GHG reductions.

Improved Fuel Efficiency. The Administration is interested in ways to improve fuel efficiency cost-effectively. Although raising the Corporate Average Fuel Efficiency (CAFE) standard is frequently proposed, CAFE is a very cost-ineffective means to reduce emissions. Perversely, it creates a "rebound effect" that, by decreasing the marginal cost of driving, increases drivers' VMT and hence marginal emissions; and it raises the cost of new cars and thus keeps older, lower-mileage cars on the road longer. Moreover, it only affects new additions to the national auto stock, so it would have little impact by 2000.

One set of options being considered would raise CAFE only if CAFE is made more cost-effective, benefiting both the economy and the environment. For example, CAFE performance might be made tradeable among manufacturers. Those who produced a fleet averaging below the standard could purchase credits from manufacturers performing above the standard. This program would be similar to the tradeable permit program being used to reduce

sulfur dioxide emissions. In the aggregate, the standard would be achieved, but at lower cost as improvements are made by manufacturers who can do so at least cost. As another example of making CAFE more cost-effective, CAFE performance credit might be awarded to manufacturers for early retirement of older "clunker" vehicles that emit disproportionately more pollutants. This could help reduce emissions (of several pollutants) without creating the perverse bias against new, higher-mileage vehicles.

Another set of options would be alternatives to CAFE. These include replacing CAFE with a gas guzzler tax, or a guzzler tax / sipper rebate ("feebate"). Such a policy could improve fuel efficiency and reduce emissions much more rapidly for a given cost to the economy. At the same time, such a policy might affect certain vehicle makes more than others, with distributional consequences or consequences for American manufacturers competing with imported vehicles.

These are not policy reforms the Administration takes lightly. But if future information warrants more aggressive action, or if the policies in this action plan are not performing as projected to meet the President's commitment to return to the 1990 emissions level by 2000, additional measures may be needed. The Administration will remain absolutely committed to selecting the most cost-effective, creative and innovation-enhancing policies possible.

Long-run programs

[see OSTP draft]

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LONG-TERM STRATEGY WORKING GROUP ON GREENHOUSE GAS EMISSIONS**1. Background**

President Clinton has directed OSTP, OEP and NEC to co-chair a long-term strategy group to examine all budget, technology, R&D, regulatory and economic policies that could impact greenhouse gas emissions beyond the year 2000. The purpose of this working group will be to explore reasonable U.S. and global emission goals beyond the year 2000, and to identify realistic domestic and international paths to achieve these goals. The range of possible solutions will attempt to integrate other key objectives of the U.S. government including: (i) strengthening the U.S. economy and its international competitiveness, (ii) positioning U.S. industry to capture a large share of the projected international energy market; (iii) re-establishing world leadership in the development and commercialization of renewable energy technologies; (iv) decreasing U.S. dependence on foreign energy sources; and (v) improving environmental quality in the U.S.

The strategic plan will have three major components:

- I. **Scientific and Economic Basis for Action.** An analysis of the scientific and economic imperative for national and global action to reduce greenhouse gases: (i) changes in the climate system; (ii) vulnerability of, and adaptation strategies for, human health, ecological systems, and socio-economic sectors; (iii) economic costs of action and inaction; and (iv) research needed to reduce uncertainties. The policy relevance of uncertainties will be explicitly examined.
- II. **Long-Term Vision for Energy Supply.** An examination of the technical, economic and political feasibility of long-term greenhouse gas emissions reductions by transforming the energy sector away from carbon based fuels. The path to a low-carbon supply future requires early attention to R&D and other long-lead time efforts in order to have options available over the next 20 - 50 years. The ancillary benefits of low carbon futures will be explicitly examined.
- III. **Mid-Term Analysis of Potential Emission Trajectories (2000-2015).** A rigorous examination of the characteristics of energy supply, energy demand, and land-use, and potential changes in them, for the 2000 - 2015 timeframe. In addition, mid-term control strategies for other greenhouse gases e.g., methane, nitrous oxide, halogenated chemicals, and tropospheric ozone precursors, will be identified.

The strategic plan will:

- * provide the scientific, technical and economic foundation needed to develop the U.S. position on the issue of "adequacy of measures" under the Climate Convention;
- * provide a blue print for R&D investments in energy efficiency, renewable energy and low-carbon technologies;
- * identify paths for cost-effective reductions of domestic emissions in both the mid- and long-term (through the commercialization of existing technologies, the development

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- and commercialization of new technologies, and use of various policy tools),
- * explore ways in which the US can position itself to capture a major share of the international trade in renewable energy and energy efficient technologies;
- * provide guidance on how international economic assistance programs, and the private sector, can facilitate joint implementation programs.
- * identify approaches to reduce emissions in other countries so that U.S. policy actions are part of a larger whole.

2. Proposed Approach

The strategic plan will:

- * build upon existing governmental and private sector work, including:
 - President Clinton's Climate Action Plan, and the ongoing CCMC (Climate Change Management Committee) overseeing the implementation of the plan
 - the ongoing transportation working group "Car Talk" (involving NEC, OEP, and OSTP),
 - reports by the Intergovernmental Panel on Climate Change, the National Academy of Sciences, the Office of Technology Assessment, the Environmental Protection agency and the Department of Energy,
 - the President's Council on Sustainable Development.
 - the International Working Group on adequacy of measures in support of the Climate Treaty negotiations (DOS/NSC)
- * be developed within the Administration, but with extensive participation by all interested stakeholders, i.e., Congress, state and local government, industry, environmental NGOs, and the academic community.
 - we will use **public fora** to review and revise Part I: *The Scientific and Economic Rationale for Action*, as per discussions at the 12/27/93 principals meeting.
 - we also propose several **Interagency working groups** (listed below) to work on Part II (*Long-term Analyses*) and Part III (*Mid-term Analyses*).

3. Proposed Work Plan

Chairs: OSTP, NEC and OEP

Staff Lead: R. Watson and R. Bierbaum of OSTP will serve to coordinate all parts; NEC and OEP will lead efforts in key working groups below.

In-house paper and public forum for Part I: *Scientific and Economic Rationale for Action*.

Develop the scientific and economic imperative for action, and discuss policy implications of different stabilization goals. Paper to be written in-house and vetted in a public forum. OSTP with OEP and NEC participating in review and fora.

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Working Groups¹ for Part II: *Long-term Analyses*, and Part III: *Mid-term Analyses*.

- A. **Energy Supply:** Mid- and long-term energy supply strategy. DOE/OSTP
- B. **Energy Demand:** Mid-term demand strategy. EPA/DOE/OEP
- C. **Transportation² and urban design:** Transportation strategy. DOT/NEC
- D. **Agricultural Land Use³:** Carbon sequestration and biofuels. USDA/OSTP
- E. **International:** Joint Implementation, specific country analyses, and global action strategy. DOS/NSC/OEP/OSTP/NEC
- F. **Synthesis:** This group will examine cross-cutting issues and look at interactions across sectors. OSTP/OEP/NEC/CEA/Treasury

There will be an overall Steering Committee composed of members of each of the working groups to assure compatibility of analyses and to oversee writing of the final report.

4. Timetable

The scientific and economic imperative, and the policy and economic implications of different stabilization goals will be completed by early June for presentation to the President and Vice-President. OSTP will draft the text in collaboration with a small number of Federal and outside experts, obtain White House and Federal agency clearance, and submit the document for a critical peer-review by all interested stakeholders in a White House sponsored forum.

The remaining sections of the report will be completed by the end of 1994, unless there is a need to finish earlier in order to: (i) include some of the material in the U.S. Action Plan, which must be submitted by August, 1994, or (ii) evaluate the US government position on "adequacy of measures". Interim results should be reviewed by late June.

5. Outline of the Report**PART I: SCIENTIFIC AND ECONOMIC BASIS FOR ACTION**

¹Each working group should analyze the market or other barriers that limit the diffusion of existing technologies into the marketplace, develop an R&D priority strategy for the most promising technologies, a strategy for commercialization and export of new technologies, and develop policy instruments to reduce greenhouse gas emissions in their sector.

²This working group needs to closely coordinate with the "Car Talk" working group.

³This group needs to work closely with the energy supply group on biofuels, and with the transportation group on land-use planning.

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1. Setting the Stage

- A. **The Earth's Climate: Will it Change?** Climate change at both the national and global scale, i.e., what are the predictions of the magnitude, timing and regional patterns of climate change, and what is the level of confidence in these predictions.
- B. **How Vulnerable are Human Health, Ecological Systems, and Socio-Economic Sectors to a Changing Climate and how can these Systems Adapt?** The impact of climate change on human health, ecological systems (e.g., forests, grasslands, and wetlands), and socio-economic systems (e.g., agriculture, forestry, fisheries, water supplies, and energy systems), i.e., how sensitive are these systems to the rate, or the absolute magnitude, of climate change, and how can these systems adapt. What is our level of confidence in these predictions?
- C. **What are the Costs of Inaction?** The economic costs, and regional dislocations, associated with climate-induced changes in human health, ecological systems, and socio-economic sectors. What is our level of confidence in these predictions?
- D. **What Research Is Needed to Reduce Uncertainties?** The time frame and research needed to reduce the uncertainties associated with predicting the magnitude, timing and regional patterns of climate change, and the associated impacts on human health, ecological systems, and socio-economic sectors.

2. Policy Implications of Different Stabilization Goals

- A. **What are the Projected Global and National Emissions of Greenhouse Gases?** Predicted emissions of greenhouse gases as a function of GNP, population, technology, trade, labor productivity, energy prices and availability.
- B. **What Emissions are Required to Stabilize Atmospheric Concentrations of Greenhouse Gases?** An analysis of the relationship between global and regional emissions and atmospheric concentrations for a wide range of "stabilization goals".
- C. **What are the Relative Radiative Forcings of Different Greenhouse Gases?** Quantification of the relative radiative forcing of different greenhouse gases for a range of time horizons.
- D. **What are the Costs of Action?** A rough calibration of the economic resources expended or redirected in order to meet alternative stabilization goals, and resulting effects on the U.S. macroeconomy and competitiveness.

PART II: LONG-TERM ANALYSES**1. Strategy for moving the U.S. to a "low/no net emissions" future**

- A. Analyze future energy needs in the 2015 to 2050 time frame.

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- B. Examine ongoing U.S. R&D on solar, wind, biomass, hydrogen, nuclear, fusion. Review relative budgets for each of these renewables, development and diffusion rates, success, U.S. competitiveness. How can commercialization be speeded by different funding levels for different technologies? What innovative government/industry partnerships can be developed?
 - C. Examine options for leveling the playing field for renewables compared to other traditional supply sources. What are the comparative social costs of various energy supply technologies?
 - D. What role can advanced carbon scrubbing and sequestration technologies play in offsetting U.S. emissions beyond 2015?
2. **Slowing growth in World greenhouse gas emissions**
- A. Implications of different emissions trajectories regionally on world emissions. Analysis of the importance of participation in a world treaty by LDCs and key energy-using countries.
 - B. Opportunities of U.S. business to make low-carbon technologies available to Central Europe and Third World Countries.
 - C. Role of Institution building and infrastructure development.
 - D. Role of Natural resource policies/land-use planning.
 - E. Role of Population, education, family planning.

PART III: NEAR TERM ANALYSES--the years 2000-2015

- 1. **U.S. emissions paths over the next several decades.** (See appendix for more detail.) CO₂ emissions will be key to the period. The following sectoral studies should present plausible future scenarios given near-commercial technologies and examine if we have mined all possible cost-effective reductions in the near term.
 - A. **Energy Supply**

Fossil/non-fossil mix possibilities over the near term
Incentives/regulatory options to reduce emissions
R&D needs
 - B. **Energy Demand**

Buildings: Residential and Commercial
Transportation ("Car Talk" group, NSTC Committee on Transportation, PCSD)

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Industry (Environmental Technology Workgroup, PCSD)

- C. **Forestry (C sequestration)**
 - D. **Agriculture (energy emissions, CH₄, N₂O, biomass production, land use, subsidies, environmental concerns).**
- 2. International Considerations: Joint Implementation in the 2000-2015 time frame**
- A. **General Opportunities for the U.S. to help reduce emissions abroad**
 - B. **Best Available energy supply technology (efficient coal, oil and gas technology)**
 - C. **Renewables market for supply**
 - D. **Demand side management technologies**
 - E. **Land-use interactions**
 - F. **U.S. Federal Role in helping reduce emissions abroad.**
 - G. **Bilateral and Multilateral funding and loan policies**
 - H. **Barriers/Opportunities for U.S. Joint Ventures/Role of the Private Sector**

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APPENDIX (Details of U.S. Mid-term analyses)**A. MID-TERM ENERGY SUPPLY**

1. Trends in Energy Use: coal, oil, gas, biomass, nuclear, solar, wind
2. Mid-term research needs to prepare us for lower carbon futures
3. Evaluation of Success of ongoing programs
4. Estimates of supply needed between 2000 and 2015 under different policy regimes
5. Technological, economic, institutional and behavioral barriers to changing demand
6. Further options:
 - Incentives
 - price signals
 - fuel switching/blending
 - marketable permits
 - plugging leaks in the system (T&D losses; CH₄)
 - carbon scrubbing
7. Research, Development and Demonstration Needs

B. MID-TERM ENERGY DEMAND

1. BUILDINGS: Residential and Commercial
 - a. Trends in Energy Use (residential and commercial separately)
 - b. Evaluation of Success of ongoing programs
 - c. Technological, economic, institutional and behavioral barriers to changing demand
 - d. Estimates of demand between 2000 and 2015 under different policy regimes (residential and commercial separately)
 - e. Further options:
 - both Residential and Commercial
 - Incentives
 - Tax Credits
 - Demand-side Management
 - Appliance Standards
 - Building Energy Codes
 - Enhanced "Cool Communities"
 - Information programs
 - Commercial only:
 - cogeneration
 - Office equipment
 - Public buildings/state incentives
 - Shared-cost demonstrations
 - f. Research, Development and Demonstration Needs

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2. TRANSPORTATION

- a. Trends in Energy Use
- b. Evaluation of Success of ongoing programs
- c. Estimates of demand between 2000 and 2015 under different policy regimes
- d. Technological, economic, institutional and behavioral barriers to changing demand
- e. Further options:
 - Incentives for manufacturers
 - Efficiency standards
 - Rebates/Feebates
 - Alternate fuels
 - Scrappage of old vehicles
 - Airplanes
 - Off-road vehicles
 - Operation and maintenance
 - Fuel price signals
 - Vehicle price signals
 - Transportation control measures
 - Settlement patterns
- f. Research, Development and Demonstration Needs

3. INDUSTRY

- a. Trends in Energy Use
- b. Evaluation of Success of ongoing programs
- c. Estimates of demand between 2000 and 2015 under different policy regimes
- d. Technological, Economic, Institutional and Behavioral barriers to changing demand
- e. Further options:
 - Motors
 - Fuel price or "effective price"
 - Fuel switching/blending
 - Cogeneration
 - "System integration"
 - Process changes
- f. Research, Development and Demonstration Needs

C. FORESTRY

- 1. Trends in Wood Use
- 2. Trends in Carbon sequestration
- 3. Evaluation of Success of ongoing programs
- 4. Technological, economic, institutional and behavioral barriers to changing carbon

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storage

5. Further options:

- incentives to private landholders
- management of federal lands
- increased planting
- Conservation reserve program
- biomass energy crops
- urban trees

6. Research, Development and Demonstration Needs

D. AGRICULTURE

1. Trends in emissions--N₂O, CO₂, CH₄
2. Evaluation of Success of ongoing programs
3. Technological, economic, institutional and behavioral barriers to greater emissions reductions:
 - livestock
 - fertilizers
 - land use changes
 - biomass energy crops
 - low input agriculture
 - post-harvest loss
 - irrigation

4. Research, Development and Demonstration Needs

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WINDPOWER2000



"I am instructing my Administration to produce a cost-effective plan by August that can continue the trend of reduced emission. This must be a clarion call, not for more bureaucracy or regulation or unnecessary costs, but instead, for American ingenuity and creativity, to produce the best and most energy-efficient technology."

—President Clinton
April 21, 1993

10,000 Megawatts for the New Millennium

American Wind Energy Association

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS

DATE: 5/24/93

TO:

Joe Stiglitz

FROM:

Jonathan Wiener

Here are copies for
you of the edits we
submitted on:

Climate Change
testimony

by State (Wirth)
EPA (Sussman)
DOE (Tierney)

Note State's treatment of Joint Implementation,
EPA's use of the word "stabilization,"
and DOE's emissions forecasts.

05/20/93

17:51

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CEA edits
5/24/93

DRAFT

Testimony of Timothy E. Wirth
Counselor, Department of State

Committee on Energy and Commerce
Subcommittee on Energy and Power

May 26, 1993

Inserted text
is circled.

Comments are
in brackets.

I am delighted to be with you today, along with my colleagues from the Department of Energy and the Environmental Protection Agency, to discuss the Clinton Administration's policies on global climate change.

Addressing this issue will require close collaboration between the Administration and the Congress, including this Committee. It will also require significant U.S. leadership because we cannot solve this problem on our own: we must help guide the international resolve that has developed in support of action to prevent dangerous human intervention in the complex climate system that influences so many aspects of our society and our world.

Let me begin by reviewing the international context in which we now confront the issue of global warming.

While concern about human intervention in the Earth's natural climate system has existed for some time, global warming has emerged rapidly in recent years as a powerful foreign policy and diplomatic issue. Driving this process have been advances in the scientific basis for concern. As our understanding of the atmosphere has improved, we have become more aware of how our actions affect it. It is clear that human activities are increasing atmospheric concentrations of "greenhouse" gases (carbon dioxide, methane and nitrous oxide). While there are uncertainties about the magnitude, timing and regional patterns of effects of increased greenhouse gas concentrations, there is sound scientific evidence that the rate of climate change in the next century could far exceed any natural changes that have occurred in the last 10,000 years, and that the Earth would be warmer than it has been in millions of years. Furthermore, the change in atmospheric composition will persist for decades and possibly centuries because of the long atmospheric lifetime of some of these gases. Still,

there is as yet no unequivocal evidence that human-induced global warming is under way.

chiefly

reason to believe
[it's model predictions,
not empirical evidence]

is a result of human emissions of greenhouse gases. 5/24/93

Linda Strachen 647-3550

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The Climate Convention

Last year, the international community acknowledged this scientific concern and took the first steps to address this significant challenge for the world. More than 150 nations signed the Framework Convention on Climate Change at the Earth Summit last June -- and to date it has been signed by more than 160 countries. The United States, along with sixteen other nations, have now ratified the treaty.

As you and this committee are aware, Mr. Chairman, the Climate Convention was the subject of considerable discussion and debate last year. Let me take a moment to discuss what specifically is in the treaty.

The Convention's ultimate objective is to:

"[A]chieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

This is a major undefined challenge, ~~perhaps requiring massive reductions in emissions~~. As a first step to agreeing on the international action required, the Convention set forth a series of commitments in Article 4. While the language of these commitments is rather confusing, let me quote the critical lines from paragraph 2 (a) and (b) of this Article. Article 4.2(a) states:

"... parties shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting ... anthropogenic emissions of greenhouse gases and protecting and enhancing ... greenhouse gas sinks and reservoirs. These policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objectives of the Convention, recognizing that the return by the end of the present decade to earlier levels of anthropogenic emissions ... would contribute to such modification..."

Article 4.2(b) goes on to say:

"In order to promote progress to this end, each of these Parties shall communicate ... detailed information on its

[That's
more
alarmist
than
informative.]

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policies and measures referred to in subparagraph (a) above, as well as its resulting projected anthropogenic emissions by sources and removals by sinks of greenhouse gases ... with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions ..."

Does not create a binding target level for

It is "binding" on parties to adopt emissions reduction actions - just as quantitative target is required.

While the language contained in these paragraphs ~~non-binding in terms of emissions reductions, requirements,~~ the intent of the negotiators was to have countries move toward the Convention's ultimate objective through the preparation of inventories of their net greenhouse gas emissions -- including both sources and sinks of all greenhouse gases, and the adoption by developed countries of national policies and measures to ~~mitigate climate change and to~~ limit greenhouse gas emissions. Furthermore, the Convention calls for developed countries to provide resources to help developing countries meet their obligations under the Convention. And, finally, it calls for countries to report on the actions they are taking to meet their commitments. The Conference of the Parties, which the United States anticipates will meet for the first time in mid-1995, will review these reports, and the adequacy of the commitments under the Convention. Subsequent reviews will take place at regular intervals, with the second review coming no later than December of 1998.

[redundant]

Clinton Agenda

Since assuming office, President Clinton has directed his Administration to conduct a broad review of international environmental concerns, including global climate change. Through this process, the President has determined that the United States should provide leadership to help guard against undesirable global climate change.

President Clinton clearly set forth the direction of our climate policy in his Earth Day speech. He said:

"We ... must take the lead in addressing the challenge of global warming that could make our planet and its climate less hospitable and more hostile to human life. Today, I reaffirm my personal, and announce our nation's commitment, to reducing our emissions of greenhouse gases to their 1990 levels by the year 2000.

"I am instructing my administration to produce a cost-effective plan by August that can continue the trend of reduced emissions. This must be a clarion call, not for more bureaucracy or regulation or unnecessary costs, but instead, for American ingenuity and creativity, to produce the best and most energy-efficient technology."

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[It's not a "domestic" effort - it's a national effort - it's included joint implementation actions. The U.S. is the language in the Convention. The And that's the U.S. to 6. Why State Dept. or So. is the term "domestic" misleading here.]

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The Administration is committed to seeing the Convention promptly implemented, and, if necessary, strengthened. To this end, the Administration is taking a two-pronged approach: a national action plan domestic effort to reduce emissions and enhance sinks of greenhouse gases; and an international effort, including working to implement the convention, and to support developing countries, and countries moving toward free market economies, in meeting its goals.

The National Action Plan The Domestic Effort

To realize the domestic requirements of the President's commitment -- the details of which will be addressed more extensively by Mr. Sussman and Ms. Tierney -- preparations have begun to develop a plan that will identify steps we can take to return U.S. emissions to 1990 levels by the year 2000. This will be the focus of our efforts in developing the August Plan.

Under the Climate Convention's Article 12, developed country Parties must report on their actions within six months of the Convention's entry into force, which is expected by late 1994. While the August plan will be the cornerstone of that report, we anticipate that the next full version of the U.S. National Action Plan will be developed after August in time to meet our Convention commitment.

The Clinton Policy on Climate: A Break from the Past

The essential difference between the Clinton Administration and the previous Administration on climate change is that we are developing a domestic climate change policy, and will use that policy to play a leadership role in promoting an effective global response. Our policy development process will represent a significant departure from that undertaken by the Bush Administration when it produced a draft Action Plan in December.

are committed to achieving a specific target level of net emissions through a national

However, our domestic actions alone, even as large as we are, will not be enough to reverse the upward trend in global atmospheric concentrations of greenhouse gases. We must establish a partnership with other countries. Sources of emissions are spread globally, and action to reduce emissions undertaken anywhere on the planet has global significance. The United States currently contributes about 20 percent of global net emissions, although our share is declining. Developing countries represent an increasing share of the total emissions, about 40 percent today and perhaps rising to 60 percent by 2030.

a source of emissions as the US is,

To make a significant contribution to protecting the climate, the United States must first demonstrate its own resolve and then leverage our example in encouraging efforts to

[Good]

[The key difference is the target, not a domestic policy.]

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reduce emissions the world over. Within the scope of our limited resources, the United States must promote a "partnership" approach between developed and developing countries. Such an approach must reconcile different but compatible interests in environment and development. That there are compatible interests is clear -- assistance we provide to developing countries will meet both our needs: ours, with respect to the strong concern we have for the preservation of the global environment and for the creation of domestic jobs in environmental technologies; theirs, both for their own environmental concerns, and for the concomitant requirement to continue along the path of environmentally sustainable economic growth.

[Good]

To begin resolving this issue, industrialized countries will have to take the lead in implementing the Convention's commitments (as agreed in the Convention language itself) and encourage developing countries to follow. In the Administration's view, such leadership will be linked to the quality of our national responses, as well as to the extent of the financial and technical assistance we and other industrialized nations can provide to developing countries.

Country Studies

The United States has already begun to demonstrate our concern for addressing the longer term global effort. We are providing \$25 million to a U.S. country studies initiative which will provide an analytical and institutional foundation from which countries may develop appropriate measures and actions to address climate change. Studies enable countries to address vulnerabilities to climate change, measures to limit net greenhouse gas emissions, or both. Country studies could also be used to assess the measures necessary to meet the obligations of the Convention, including by developing national inventories of greenhouse gases and by identifying actions and measures to mitigate greenhouse gases or to adapt to climate change.

Participants in the Country Study Program will generally receive funds and associated technical assistance both during the organization of the work and as it progresses. Assistance would cover specific high-cost activities, including data development, institutional or infrastructural development, model-building, or procurement of special equipment, as well as lower cost technical assistance and project monitoring. The Country Studies Initiative, which is coordinated through a State department committee, is operated by DOE, EPA and AID. The first country study teams from the agencies left last week to begin bilateral discussions with our developing country partners in this effort.

Handwritten note:
The above is page 7. This goes after "United States National Action Plan" and country studies are part of the international diplomatic effort.

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Joint Implementation

Joint implementation will be ^{an} another important piece of the long-term, global solution to climate change. Under joint implementation, countries would be able to offset domestic emissions of greenhouse gases through emissions reductions achieved anywhere in the world. Because emissions of greenhouse gases everywhere contribute to the build-up of atmospheric concentrations, reductions anywhere can diminish the threat of global climate change. However, reductions may be achieved more cost-effectively in some countries or regions than in others.

[Good]

The Framework Convention on Climate Change allows Parties to implement policies and measures jointly with other Parties. The relevant paragraph of Article 4 says:

"... Parties may implement ... policies and measures jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention..."

The principal advantage of joint implementation is its efficiency; joint implementation could allow global emissions reductions to be achieved at the lowest overall cost. In fact, some analysts estimate that the total economic cost reduction could be up to 65 percent under certain conditions. There could also be beneficial and perhaps more rapid transfer of resources and technology from developed to developing countries and to countries with economies in transition under a joint implementation scheme. Furthermore, because many measures to reduce greenhouse gas emissions have other environmental benefits (e.g., forest conservation or protection of wildlife species), joint implementation could stimulate action to reduce other environmental stresses.

[Good]

In regard to our discussions at the INC 8th plenary, ~~However,~~ a number of questions about joint implementation need to be addressed, and there is no agreement as yet. The Convention internationally ~~on~~ ^{agrees} guidelines for joint implementation. ^{calls for}

The Intergovernmental Negotiating Committee will take up the issue of joint implementation at its 8th Plenary in August. We anticipate that the INC will explore such questions as who would be the participants in joint implementation schemes, how baselines would be measured, how joint implementation projects would be quantified, and how information about such activities would be communicated and acknowledged.

We will ~~also~~ be addressing ^{joint implementation} such issues in developing the August plan called for by President Clinton, and in our

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Things to be addressed are addressing III in
the August plan called for by President Clinton, and in our
August plan called for by President Clinton, and in our

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in August
preparations for the INC's 8th Plenary. The State Department will chair an interagency Working Group to meet both objectives. In doing so, we plan to consult closely and broadly with the private sector, environmental organizations, state officials, and the Congress.

• Modifying the Convention

INSERT ¶s from p. 6

INSERT section on "Country Studies" from p. 5

Under the provisions of the Climate Convention, all parties are called upon to formulate and implement programs to reduce greenhouse gas emissions, with developed countries taking the lead. There is broad agreement about the first step in this effort: countries are aiming to return their emissions to 1990 levels by the year 2000.

To move forward, I believe that our work under the Convention must focus on the longer term. Once all countries have ratified the Convention -- and the State Department will be beginning a campaign to encourage this -- we must evaluate the obstacles to its implementation, and work to overcome them. As I noted earlier, the preponderance of future emissions are most likely to come from the developing countries. We must therefore begin now to develop appropriate responses to help these countries reduce their emissions while continuing in the path toward economic prosperity, a response that is sure to involve the development, and commercial exchange of new environmentally sound technologies.

One of the charges that has in the past been leveled against those who have advocated a strong environmental policy -- such as the one required to address global warming -- is that environmentalism and economic growth cannot coexist. I do not agree. I strongly believe that a sustainable environmental future is economically imperative. We must think about the long-term nature of the environment we pass down to our children. And, simultaneously, we must also concern ourselves with the present welfare of our country. Investment in environmental technology is one way to reach this goal.

As President Clinton noted in his Earth Day speech, there will be, by the end of this decade, a \$300 billion market for environmental technologies, and the United States must capture as much of that market -- and the tens of thousands of jobs it will create -- as possible. This in an area in which the United States can and must continue to be a leader.

These are the kinds of programs that this Administration will support in our efforts to address climate change.

As adopted, the Climate Convention is but one piece of the international policy framework that can help us redirect our

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thinking. To address this critical issue, we must continue to advance on all fronts -- international and domestic. I look forward to working with you all as we move ahead.

Thank you. I would be happy to respond to any questions you may have.

Testimony of

ROBERT SUSSMAN

DEPUTY ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY

Before the

COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND POWER

May 26, 1993

Good morning. I am Bob Sussman, Deputy Administrator of the U.S. Environmental Protection Agency (EPA). I am pleased to be here today to discuss the Administration's new policy on global climate change.

The Policy Imperative

Enough is known regarding the ^{potential} general impacts of global climate change, and there is sufficient scientific concern, to have persuaded the world community to start acting to curb the buildup of greenhouse gases. The atmospheric concentrations of greenhouse gases are increasing year by year due to human activities. The world community agrees that the continued addition of greenhouse gases to the atmosphere will alter global climate patterns, increase average temperatures, and change rainfall and other weather patterns, causing highly uncertain effects on human societies and ecological systems. The Intergovernmental Panel on Climate Change (IPCC) has concluded that ^{if emissions continue unabated, the best models forecast that} the global mean temperature will increase

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0.3°C per decade during the next century. This translates into a likely increase in the global mean temperature of about 0.5°C to 0.1°C above today's levels by 2025 and 3°C before the end of the next century. Such an increase would be greater than any seen over the past 10,000 years.

The United States is the world's largest contributor of greenhouse gas emissions. To reduce world emissions and, hence, atmospheric concentrations, the United States must play a meaningful role.

Clinton Administration Leadership

In his Earth Day speech this year, President Clinton pledged U.S. leadership to address the challenge of climate change. He said that his Administration is fully committed to reducing U.S. emissions of greenhouse gases to their 1990 levels by the year 2000. In issuing this challenge, President Clinton delivered a "clarion call, not for more bureaucracy or regulation or unnecessary costs, but instead, for American ingenuity and creativity, to produce the best and most energy-efficient technology."

In your letter of invitation to testify here, you asked a number of specific questions regarding programs, options, and analysis. Let me begin my response by highlighting the process we will use to respond to the President. To develop, implement, and sustain the actions necessary to stabilize our greenhouse gas emissions by 2000, we will call upon the active participation of the American people. The Clinton Administration intends to bring

together important stakeholders and involve them in the development of an *Action Plan* to meet the President's goals. This plan will be grounded in sound analysis and formulated through an interactive process with widespread participation.

As we begin to look at the options available to control greenhouse gas emissions, we will remain committed to three overarching principles of the Administration's environmental policy.

First, a healthy environment is necessary for a healthy economy, ^{and vice-versa.} Only a prosperous society can have the confidence and the means to protect its environment. Climate change mitigation through energy efficiency and intelligent, sustainable business practices is an integral part of our policies to protect our environment, promote economic growth, and provide millions of new, high-skill, high-wage jobs.

Second, we must protect the environment at home and abroad. We share our atmosphere, our planet, and our destiny with all the peoples of this world. We must coordinate our actions internationally and ensure that all countries are acting collectively to reduce the risks of global warming.

Third, we will move beyond the antagonisms among business, government, and individual citizens. Our climate change policies will be part of our effort to reinvent government -- to make government a partner, not an overseer. We intend to lead by

example and not by bureaucratic fiat.

To bring together all the stakeholders in climate change policy, the Administration has formed Interagency Working Groups comprised of representatives from key White House offices and executive branch agencies. These Working Groups will examine specific economic sectors and greenhouse gas reduction opportunities, including the enlargement of greenhouse gas sinks, such as forests and soils. Most important, these Working Groups will convene workshops to identify options and help evaluate policies. The workshops will be comprised of representatives from industry, state and local government, labor, environmental organizations, universities, Congressional staff, and other vital constituencies. The workshops will identify technical options, provide independent assessments, and develop policy options. In short, the workshops will provide affected interests the opportunity to participate in and contribute to the *Action Plan*.

The Working Groups and the workshops will ^{feed into [?]} be supported by an Interagency Analysis Team ^{staffed by technical experts} ~~constituted from the technical staffs~~ of the Council of Economic Advisors (CEA), the Department of Energy (DOE), EPA, and other key agencies. The Analysis Team will synthesize information into a common analytical framework and integrate options into alternative policy packages for senior administration decisionmakers.

Strategies

You mentioned a number of specific mitigation strategies in your letter of invitation. Without prejudging the results of the Working Groups, let me briefly discuss some of those that undoubtedly will play an important role.

Domestic

EPA's *Green Programs* are voluntary partnerships with both public and private organizations to encourage profitable investments in energy efficiency. EPA's flagship voluntary program, *Green Lights*, currently has over 890 participants, including businesses, state and local governments, and non-profit organizations. These participants have committed to improving lighting efficiency in more than 3 billion square feet of U.S. commercial/industrial space, or 5 percent of the U.S. total. EPA's program provides all participants with information that helps markets work better, including technical manuals, decision support software, product information, and a financing database. With these tools, *Green Lights* partners often achieve energy savings of 50 percent or more, and they are harvesting these reductions at a profit, often achieving internal rates of return exceeding 20 percent.

The *Green Lights* program has served as a model for other voluntary programs that save energy and reduce air pollution. *Energy Star Computers* has signed partnerships with over 60 percent of all computer manufacturers and over 80 percent of all printer manufacturers to develop and introduce energy efficient computer products -- machines that

will go to "sleep" when not being used. These new models will be introduced into the market next month, and they will be widely available within a year. They will be recognizable by the EPA *Energy Star* logo.

This spring EPA also is launching its *Energy Star Building Program*, in which companies sign a memorandum of understanding with EPA that commits them to upgrading all their building energy systems to maximize energy savings wherever it is profitable. Like *Green Lights*, the *Energy Star Building* program partners retain complete control of quality and quantity decisions and receive no federal financial assistance. The Program will help reduce energy use in commercial buildings, often leading to a 50 percent reduction in total building energy use.

Green programs also have targeted more potent greenhouse gases such as carbon tetrafluoride (CF₄) and carbon hexafluoride (C₂F₆) with 5 to 10,000 times the warming potential of CO₂. EPA will shortly launch *Aluminum Star*, a voluntary program with aluminum production companies to reduce emissions of these gases.

As a complement to its technology-based *Green Programs*, EPA is working with DOE to leverage Section 1605 of the Energy Policy Act into an effective greenhouse gas reduction program. The EPA/DOE *Green Companies Program* will build upon the mandates in Section 1605 requiring DOE to establish a process by which firms can voluntarily report greenhouse gas emissions and reductions achieved through various actions.

The *Green Companies Program* will entail setting up an accounting methodology, establishing targets, and providing outreach and technical services to participating organizations.

Recovery of both coalbed and landfill methane offers large potential for reductions in greenhouse gases. To help reach this potential, EPA is developing landfill gas regulations under the Clean Air Act. Comments on a proposed rule are being reviewed, and we hope to issue a final rule this year. An outreach program, coupled with a financial incentive directed at coalbed methane, will assist the market to profitably reduce emissions of methane, and we expect to implement recovery projects at 3 to 5 gassy mines in Appalachia this year.

To help reduce methane emissions in natural gas transmission and distribution systems and improve system efficiency, EPA also has initiated the *Natural Gas Star* program. Seventeen companies, representing 40 percent of the U.S. natural gas industry, have enrolled in this voluntary program, which promotes the use of cost-effective technologies and practices that can profitably reduce natural gas emissions by up to one-third.

EPA works with the Department of Transportation and DOE to ensure that the mobile source provisions of the Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act are implemented in a manner that reduces both ambient criteria air pollutants and greenhouse gas emissions. We also are examining our own regulations to ensure that they encourage innovation that permits the United States to produce the best and

most energy-efficient technology. As an example, we are exploring the benefits of electric utilities' using natural gas during peak smog seasons. Such use may reduce emissions of criteria air pollutants while significantly reducing CO₂ emissions as well.

INTERNATIONAL

EPA's strategy to cope with global climate change is both domestic and international. Any effective and efficient strategy must include both components. Although the United States now contributes over one-fifth of global, human-related emissions of CO₂, the most important greenhouse gas, the vast majority of future growth in emissions of CO₂ likely will come from developing countries and economies in transition. U.S. policy must address U.S. emissions; we would not be credible otherwise. However, our longer-term objectives also must seek to limit the growth of greenhouse gas emissions internationally; without doing so, even the most strenuous efforts in the United States would not mitigate climate change effectively. Moreover, many greenhouse gas reductions will be available in other countries. Joint implementation activities will therefore play a crucial role in our cost-effective overall strategy. As part of our international efforts, at a lower cost than some options in the United States.

the Administration is working closely with other countries to restructure the Global Environment Facility (GEF). Operated jointly by the World Bank, the United Nations Environment Program, and the United Nations Development Program, the GEF will serve as the operating entity under the Climate Convention for helping developing countries meet their obligations. *to help* *financial assistance to*

In an effort to reduce emissions of methane internationally, EPA's Green Programs

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3) Not enough info given to explain GEF.
4) Let State or Treasury lobby to lobby.

have expanded to lead an effort to improve the operation of the Russian natural gas infrastructure. Over the past half year, the Russian organization Gazprom and EPA have conducted a series of visits and meetings which have led to the development of a U.S./Gazprom Working Group. As a result of this cooperation, five U.S. companies signed protocols of intent with ~~Madym~~Gazprom to pursue technical and commercial relationships to achieve the Working Group's goals of energy efficiency and environmental protection. In addition, EPA is working with Russia, Ukraine, the Czech Republic, Slovakia, Poland, and China to identify and encourage development of profitable projects to reduce methane emissions from coal mines.

EPA also has several programs underway to expand international markets for CFC free, energy efficient technology in the home refrigeration market. As one of the largest growing technologies in developing countries, especially China and India, the rapid growth of home refrigeration creates an exponential demand for ozone depleting CFCs and additional potential for global warming and local air and water pollution through increased energy use.

A joint EPA/Chinese project, involving government, academia, and industry, has been evaluating CFC substitutes and technologies to increase the energy efficiency of Chinese refrigerators. This year's program will convert a refrigerator factory line in China to CFC alternatives and at the same time increase the energy efficiency by 50%. The goal of the program has been to secure Chinese participation in the Montreal Protocol to protect the ozone layer and to channel investment in China to preventing pollution rather than generating

additional energy supply. U.S. industry participation in the program will lead to increased U.S. exports of CFC-free, energy efficient technology.

We are also evaluating potential energy efficiency projects in refrigeration in India and Russia, and technology transfer of energy efficient lighting and buildings programs to India, Russia, Mexico, Chile, China, and other countries.

One of the more important efforts the United States is undertaking bilaterally, with substantial participation by the EPA, is the Country Studies Initiative. This interagency program provides technical and financial assistance to developing and transitional countries to lay the groundwork for the national climate policies and measures required under the Climate Convention. This initiative should help open foreign markets for U.S. expertise in energy efficiency, renewable energy, and pollution control technologies. We are very pleased with the enthusiastic, international response for this ground-breaking program, which is, in my view, a model of interagency technical cooperation.

EPA also has sponsored international cooperation in developing methods to estimate greenhouse gas emissions and sinks. More than 40 countries are engaged in this effort. We also are working through the IPCC and the Organization for Economic Cooperation and Development (OECD) to train officials in other countries to prepare their inventories. If other governments do not understand their sources and sinks of greenhouse gases, they will not be able to develop and carry out effective reduction efforts. This project also will help

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make the Climate Convention more enforceable in the future.

EPA also supports specific mitigation strategies. Working with the U.S. Agency for International Development, EPA is initiating a program with the Russian environment ministry and the Moscow area electric utility to share with them the U.S. experience with economic incentives, including integrated resource planning (IRP). This training will expose Russian technicians to the skills needed to both generate and use electricity more efficiently. EPA also has efforts underway to improve the operation of the Russian natural gas infrastructure, and encourage the development of profitable projects that reduce methane emissions from coal mines in Russia, Ukraine, the Czech Republic, Slovakia, Poland, and China. Finally, we have in conjunction with other agencies started Energy Efficiency centers in Moscow, Prague, and Warsaw to encourage the introduction of technologies, develop new regulations, and spur legislation to encourage energy efficiency.

Working with the OECD, EPA is sponsoring a series of studies on the effect of energy subsidies in member countries. Initial screening analysis indicates that the removal of inefficient subsidies could reduce greenhouse gas emissions significantly. Our support to Thailand has helped with the adoption of an national IRP policy, now in the early stages of implementation. Although we have only limited efforts of this type, we believe they will help developing countries reduce their emissions, assist with transfer of U.S. technologies, and perhaps open up opportunities for "joint implementation" under the Climate Convention.

EPA supports the State Department in trying to implement the Climate Convention both promptly and effectively. The greenhouse gas inventory I described earlier is an example of how we're promoting a prompt start. We also are developing analyses of joint implementation, carbon offsets in the forest and agriculture sectors, procedures for review and assessment of national policies and measures under the Convention, and other key topics.

Sinks

EPA puts a significant emphasis on sinks of greenhouse gases, both in the United States and internationally. In the short term, protecting and enhancing sinks, such as forests and soils, may be a very cost-effective means of reducing greenhouse gases in the atmosphere. Such options may bring ancillary benefits, such as budget reductions, protection of recreational resources and habitat, etc. ^{for biodiversity} EPA has been working closely with the U.S. Department of Agriculture (USDA) for over two years to evaluate such options as tree planting, enhanced paper recycling, and forest wetlands reclamation. Our preliminary analyses suggest that sequestration actions could bring significant carbon offsets, perhaps with net financial benefits in a few cases. We expect to release a series of technical reports by the end of FY 1993 documenting the EPA and USDA analyses. We hope to continue to improve these analyses further in FY 1994.

There are, however, a number of difficult questions regarding whether and how to account for changes in sinks. ^{may be difficult} Accurate measurements will elude us, and most other countries, for years. Also, our current analyses suggest that, due to past practices, the

United States currently has net sequestration of carbon in the forest sector, ^b But the rate of sequestration is declining.

[Not true -
not in
the
Convention]

~~This is a complex question that cannot be decided by the United States alone. It must be negotiated with the other Parties to the Climate Convention.~~ Nonetheless, EPA believes

that protection and enhancement of sinks is an important element of an efficient climate strategy that we will promote domestically and abroad. EPA ^{is playing} played a key role in launching the Forests for the Future Initiative as a U.S. effort to protect and enhance sinks in key countries. We have negotiated projects on reforestation and improved forest management in Russia, Mexico, and two other countries, and await final concurrence from our Appropriations Committee with our Administration's decision to begin this work in FY 93.

The New Action Plan

The President's commitment to return US emissions to 1990 level by the year 2000 relies on the success of cost-effective methods of implementation, and as a result, we anticipate the new Action Plan will include an important role for voluntary programs. The Green Programs and other voluntary programs will enable the U.S. economy to not only reduce emissions but also to increase growth and productivity. Although one would think that profitable efficiency gains need not be supported, two years of real experience has ^{indicated} proven that there ^{can be} is a role for the government in providing significant assistance, technical support, and motivation to organizations to install energy efficient technologies. Successful partner organizations will benefit from saving billions of dollars from reduced utility bills which will strengthen our

← The President did not use the term "stabilization." Let's use his language.

international competitiveness.

The Benefits of Action Now

The impacts of climate change, as projected by the IPCC and other scientific bodies, could have significant implications for mankind and the environment. In 1989, the EPA published a Report to Congress entitled, *The Potential Effects of Global Climate Change on the United States*. The "Effects Report" came to several major conclusions. For example, it concluded that as a result of climate change, agricultural yields could be reduced, agricultural productivity could shift northward, and shifts in agriculture may cause harm to the environment in some areas. Sea level rise could lead to the loss of many coastal wetlands, and estuaries may enlarge and become more saline. Water quality in many basins could change, and water use conflicts increase. In forestry, the range of trees may be reduced, and changes in forest composition are likely to occur. Climate change also could affect human health, with summer mortality increasing, winter mortality decreasing, and regional morbidity patterns changing. Moreover, climate change could increase global electricity demand, with related increases in air pollution, especially smog.

The rate of global warming may be the most important factor affecting both natural and managed systems. The faster the warming, the harder it will be to adapt. The ability of natural ecosystems (forests, wetlands, barrier islands, national parks) to adapt to a rapidly warming climate is limited. Rates of natural migration and adaptation are in many cases much slower than the predicted rate of climate change. The populations of many species

could decrease, and many could face extinction. The ultimate effects could last for centuries, and they would be virtually irreversible.

The Framework Convention on Climate Change (FCCC), which already has been ratified by the United States, commits signatory countries to develop national plans that include actions to reduce greenhouse gas emissions. While no legally-binding targets and timetables for emissions reductions were specified, the aim is ^{to return} ~~the stabilization of~~ greenhouse gas emissions ^{to} 1990 levels in the year 2000. While such a target is an uncertain ecological ^{value} imperative, it does provide a vital motivating benchmark by which the actions of all countries can be measured. Moreover, the long lifetimes of these gases, the slow turnover of major capital investments, and the lengthy time required to get governments to act requires that countries have such milestones. Under the FCCC, the commitments specified in the Framework Convention can be revisited.

← [FCCC uses this terminology; does not say "stabilization" in Art. 4.]

New tools and methodologies are being developed to evaluate the socioeconomic impacts of climate change and estimate the benefits of actions that may be useful to analysts in the United States and other countries. EPA's research program provides a firmer scientific foundation upon which to build our ongoing assessment, and mitigation and adaptation analysis activities. EPA is also participating in the activities of the IPCC, contributing to the new Working Group III ("Cross-cutting Socioeconomic Issues"), Working Group II ("Impacts, Mitigation, and Adaptation"), and Working Group I ("Science"). A better understanding of the socioeconomic impacts of climate change and the distribution of

those impacts across different segments of society will enable policymakers to justify specific mitigation and adaptation policies, and ensure that they are effective, efficient, and equitable. EPA's benefits assessment program has been designed to be comprehensive, and we will communicate to policymakers the best available information about the socioeconomic impacts of climate change.

Mr. Chairman, thank you for your invitation to present testimony before the Committee. This has been a welcome opportunity to discuss the Administration's climate change policy. I would be pleased to answer any questions you may have.

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S. Tierney (Policy)
D. Forrester S-1
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U.S. House of Representatives
Energy and Commerce Committee
Subcommittee on Energy and Power

Hearing on
Global Climate Change

May 26, 1993

Testimony of
Assistant Secretary Susan Tierney
Office of Domestic and International Energy Policy
U.S. Department of Energy

B. Campbell 586-8238

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Mr. Chairman, and members of the subcommittee, I thank you for inviting me to discuss the Administration's new policy on global climate change. Today, I will address several aspects of this policy. First, I will briefly discuss the President's Earth Day commitment on greenhouse gas emissions. I will then discuss our emissions projections, how we will tap the creativity and ingenuity within both the government and the private sector to develop and deliver the cost-effective action plan called for by the President, and some key issues that will be addressed as the plan is assembled. Finally, I will review the Department of Energy's plans for implementing various global climate provisions contained in the Energy Policy Act of 1992.

THE PRESIDENT'S COMMITMENT

In his Earth Day address, President Clinton reaffirmed his personal commitment, and announced our Nation's commitment, to reducing our emissions of greenhouse gases to their 1990 levels by the year 2000. This statement marks a clear change of direction from the policy of the previous Administration and reasserts America's leadership in this important environmental policy area.

Numerous existing and proposed activities will help us meet this commitment. The Energy Policy Act, enacted by the last Congress, and in no small part due to the leadership of the Chairman and members of this Subcommittee, will play a critical role in reducing greenhouse gas emission levels. The proposed Etc tax in the President's comprehensive economic plan, and other

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elements of that package, will also play a significant role.

The President spoke of the need to continue the trend of reduced emissions ~~beyond 2000~~. The actions taken to reduce net emissions to 1990 levels by the year 2000 will also significantly reduce emissions trends after 2000. The development of improved energy supply and energy use technologies, a key focus of the Energy Policy Act, will be particularly important in lowering emissions trends after the turn of the century.

[He did not say "beyond 2000."]

CURRENT AND PROJECTED GREENHOUSE GAS EMISSIONS

In 1990, emissions of carbon dioxide, methane, and nitrous oxide totalled between 1,520 and 1,617 million metric tonnes of carbon equivalent (MMTCE) -- reflecting a range of uncertainty in estimates for the carbon-equivalency factor for methane and nitrous oxide emissions. By the year 2000, these greenhouse gas emissions could have been projected to grow to between 1,716 MMTCE, and 1,830 MMTCE, had the Energy Policy Act not been passed and the President's economic policy proposals not been made. Most of the growth in greenhouse gas emissions is caused by increased emissions of carbon dioxide due to the burning of fossil fuels in motor vehicles, in electric powerplants, in industrial production processes, and other uses.

We estimate that carbon emissions from energy use and industrial processes in 1990 were about 1,361 MMT. Without the Energy Policy Act, carbon emissions would have been expected to grow to 1,565 MMTC in the year 2000, an increase of 184 MMTC.

2

We want people to compare the reductions achieved by EPA's, BTU tax, etc. to all-GHG forecasts, not CO₂ alone.

No need to present CO₂ number alone - the issue is all GHGs, both explicitly and per the President's speech 4/21/93.

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④ The Energy Policy Act is expected to reduce ~~carbon~~ ^{the projected} emissions by about 40 MMTC from ~~the~~ year 2000 level. This reduction is achieved through a combination of provisions for efficiency standards, energy market reform, and increased research and development. Standards will begin to act immediately to promote more energy efficient and environmentally beneficial options in homes, business, and vehicles. Increased levels of research and development on clean and efficient energy supply technologies and end-use equipment will have a growing emissions-reducing impact over time as products are commercialized and market penetration grows.

In addition to its support for the Energy Policy Act implementation, the President's economic policy proposes a Btu tax that will promote energy conservation with associated environmental benefits and enhanced energy security. The tax will reduce energy consumption and switch some end-use consumption of petroleum to natural gas, which emits less carbon when burned. By the year 2000, the Btu tax is projected to reduce greenhouse gas emissions by 25 MMTC from projected levels; by the year 2010, the reduction will be 35 MMTC.

Additional programs contained in the President's economic package are expected to reduce greenhouse gas emissions by an additional 5 to 24 MMTC in the year 2000. These proposals, such as voluntary "green" energy efficiency programs, weatherization assistance, increased purchases of alternative fuel vehicles, enhanced Federal building energy efficiency, improved renewable

MMTC:

1520-1617 in 1990

project 1710-1830 in 2000

= growth of 99
 1710 (1710-1617)
 + 300 (1830-1520)

3

Do we want to cite specific numbers? Shows big gap:

Reductions:

EPA = 40

Btu tax = 25

Gap = 5424
 Version = 70 to 89

= gap of
 10 to 240 MMTC
 in 2000 left
 to close

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energy and energy conservation, increased natural gas utilization, and others are aimed at increasing energy efficiency and the use of environmentally beneficial energy resources.

I am sure you will appreciate that all of the projections cited above are based on a number of assumptions. Among the most important of these are: economic growth rates, changes in energy prices, and market diffusion rates of energy-efficient technologies. Consequently, actual emissions might be higher or lower than these emissions estimates in the future. If economic growth is more robust than expected, for example, more emissions will occur and additional actions will be needed to meet the President's commitment. Higher than expected world oil prices, conversely, would lower emissions by reducing demand, making it easier to meet the President's commitment.

Looking beyond the turn of the century, the Department's energy and environmental models project a total increase of about 150 MMTCe in greenhouse gas emissions between 2000 and 2010, even with the full implementation of the Energy Policy Act and proposals in the President's economic package. Although we are projecting that energy efficiency (decline in energy use per unit of Gross Domestic Product) will improve by 12 percent during the 2000-2010 timeframe, energy consumption is still expected to increase by about 12 percent over that period. Of course, the concern regarding the role of assumptions becomes even more significant over this longer forecast horizon.

The accuracy of our emissions projections will only be

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revealed as the future unfolds. But, based on our best current estimates, we expect that more actions to reduce greenhouse emissions will be needed to meet the President's commitment.

PROCESS FOR DEVELOPING THE MITIGATION PLAN

The President instructed his Administration to produce by mid-August a ~~deliberate~~ cost-effective plan to reduce greenhouse gas emissions. The August deadline corresponds to the next intergovernmental meetings on implementation of the Climate Convention. ✓

As announced by the White House last week, an Interagency Climate Change Mitigation Group (CCMG), chaired by the Office of Environmental Policy (OEP), has been charged with the task of preparing recommendations on elements of a mitigation plan for Cabinet-level consideration. The CCMG will designate working groups to examine specific economic sectors and greenhouse gas reduction opportunities and associated policy mechanisms and options. Actions to reduce greenhouse gas emissions, actions to increase sinks that absorb greenhouse gases from the atmosphere, and public and private actions that provide both domestic and international emission reductions will all be considered. The eventual plan could include either voluntary actions, or administrative policy changes, or legislative proposals, or a consideration of all three.

The Department of Energy has been asked to chair or co-chair half of the working Groups, and expects to play an active role in

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several others. Secretary O'Leary and her cabinet colleagues are emphasizing the need for close consultation and cooperation. Our recent experience of fruitful collaboration with EPA in the analysis of energy taxes, is illustrative of a "can do" approach that effectively draws on resources throughout the government and avoids the unproductive bickering that characterized interagency relationships in the previous Administration.

We recognize that it is impossible to reinvent government or its policies without drawing on the creativity and ingenuity of outside stakeholders and experts. We will do this through a series of public workshops in which stakeholders can bring to the table their action proposals, and especially their experience with ongoing greenhouse gas mitigation projects. We expect to touch base with interested parties on a regular basis throughout the process of developing the mitigation plan. We will also be consulting with Congressional staff and legislative support agencies so that our efforts can benefit from the considerable expertise at this end of Pennsylvania Avenue.

MEETING THE CHALLENGE: ISSUES

Based on the previously cited projections, a return to 1990 greenhouse gas levels ^{by 2000} would require an additional reduction of 71-79 MMTCES in net emissions of greenhouse gases. This figure may change as recent legislation, private initiatives, and current regulations and policies are reevaluated in the plan development process.

? how is this calculated?
See p. 3 - the numbers presented seem to indicate a gap of 10 to 240.

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In considering the design of a plan to reduce emissions, several points merit attention. First, even though my testimony here focuses on energy-related emissions, the Administration recognizes that policies to address all sources and sinks of all greenhouse gases, both domestic and international, can effectively reduce atmospheric concentrations of greenhouse gases. *The Climate Convention provides for such a comprehensive approach, and our* *will* *in all these areas* cost-effective plan for further emission reductions should take maximum advantage of attractive and affordable reduction opportunities. While energy-related emissions constitute the bulk of domestic greenhouse emissions and the bulk of reductions already identified, their role in a further reduction increment has yet to be determined.

Second, insofar as a diversified plan is consistent with cost-effectiveness, a diverse portfolio of reduction actions is clearly desirable. A balanced set of actions that avoids putting "all of our eggs" in a very small number of baskets would have the advantage of reducing uncertainty. It would also develop experience that could prove invaluable in structuring more far-reaching mitigation efforts that may be necessary in the future.

Third, given the trends of global greenhouse gas emissions, there is clear value in structuring our plan in a manner that provides maximum encouragement for others to follow through on their own greenhouse gas reduction commitments. For this reason, it may be useful to link our long-term emissions reduction planning to the actual progress of our trading partners in

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meeting their own near-term greenhouse gas reduction objectives. Given the role of assumptions in emissions projections, periodic reviews will also be required even in the period before 2000 to assure that we remain "on track" towards meeting our commitment.

and to mobilize emissions reductions in developing countries

where emissions are growing the fastest.

Ultimately, the content of the Plan will depend on the emissions reduction impact of available options and their costs, to the government, directly affected parties, and society at large. The Administration will be developing emission reductions and associated cost estimates for the actions that it will be proposing in the Plan that is expected to be announced this August. At this time, however, it is premature to speculate about how easy or difficult and how cheap or expensive it might be to achieve the President's goals.

ENERGY-RELATED EMISSIONS REDUCTION

The Administration's mitigation plan will contain a number of actions that improve energy efficiency and reduce greenhouse gas emissions in the economy through support for increased use of environmentally beneficial resources and energy efficient equipment. In electricity supply, DOE has active programs in both the renewable energy and clean coal technology areas, which offer opportunities for substantial reduction in the carbon intensity of electricity production. The Department recently selected five additional clean coal technology projects which will result in high efficiency, environmentally clean electric

power generation from coal.

Integrated resource planning in the utility encourages both innovative supply technologies and reduction in electricity demand growth. The Administration is committed to supporting such efforts, as directed by the Energy Policy Act. DOE is also pursuing increased energy efficiency in buildings, industrial, and transportation activities, through standards and labeling requirements, and through initiatives in materials processing and electric motor drives, as well as alternative fuels, electric and hybrid vehicles, and fuel cell research and development.

Programs that combine the development of new energy efficient technologies with information programs that allow consumers to choose the energy technologies that are best for them will allow energy efficiency to continue to improve in our economy. This Administration recognizes the value of encouraging emission reductions through voluntary programs to increase the market penetration of economically viable technologies that reduce greenhouse gas emissions in the energy sector and elsewhere. Programs such as EPA's "Green Lights", DOE's outreach and deployment support efforts, and the Energy Information Administration's (EIA) database for recording voluntary emission reductions pursuant to Section 1605 of the Energy Policy Act will be key components of the Administration's efforts to reduce greenhouse gas emissions.

These voluntary action programs will work in conjunction with utility demand-side management (DSM) activities, funded by

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electric utilities at \$1.8 billion in 1991, and energy efficiency research and development to reduce energy consumption. Although it is desirable to disaggregate the costs and benefits of each of these components, it is analytically impossible to do so credibly, since the results of these programs are intricately tied together. For example, research and development of more energy efficient devices leads to new technologies which require less energy. Utilities then target these technologies for adoption. Utility DSM programs, supported by voluntary action programs, identify these technologies and accelerate their penetration in the market.

Other Energy Policy Act provisions also have significant potential for reducing worldwide greenhouse gas emissions. As noted in your invitation letter, the Act authorizes the establishment of three global technology transfer programs covering innovative renewable energy (section 1211); innovative clean coal (section 1332); and innovative environmental technologies (section 1608). These programs are to be developed in conjunction with the Agency for International Development (AID) and in consultation with other members of the Committee on Renewable Energy Commerce and Trade (CORECT), the Committee on Energy Efficiency Commerce and Trade (COEECT), and the Clean Coal Technology (CCT) Subgroup.

Although no funds yet have been appropriated, and the Administration's FY 1994 budget requests no funding in these areas, we are nonetheless hopeful that these innovative programs

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will be considered for funding in FY 1995. Therefore, the Department is proceeding with a number of "pre-solicitation" activities. We have recently completed negotiations for an umbrella Memorandum of Understanding with the Agency for International Development (AID) that it is currently making its way through the Department's final review process. We would hope to be able to sign this agreement soon.

Other ongoing "pre-solicitation" activities conducted by the Offices of Fossil Energy (FE) and Energy Efficiency and Renewable Energy (EE), the program offices responsible for implementation of these provisions, include developing a list of eligible technologies and potential projects, investigating different solicitation mechanisms, and considering forms of financial assistance (loans, advanced payments, and insurance) that would serve to maximize the export potential of each program. Our efforts have included discussions with the EXIMBANK, the Overseas Private Investment Corporation (OPIC), AID, industry trade groups, corporations, and CORECT. In conjunction with this activity, a public forum will be held in early FY 1994 to gather comments on a proposed solicitation structure and financing mechanisms.

These two offices have also organized a working group which meets regularly to review and coordinate what each is pursuing and has learned through their respective studies. It is important to note, however, that due to the different technologies, market applications, customers, barriers, and

risks, it may be necessary to use specially tailored implementation approaches to maximize the export promotion benefits of each program.

It is a little early to tell which, if any of these programs, will be part of the mitigation plan. As part of its participation in the CCMG, the Department is currently reviewing all of its programs for possible inclusion into the plan. These programs will be assessed along with a host of other programs. Until the CCMG has completed its assessment, it would be premature for me to comment further.

Your invitation letter also asked about "joint implementation" -- an approach under which a ~~developed~~ country could implement policies and measures called for in the Climate Convention jointly with other parties. Joint implementation of greenhouse gas emission reductions and sink enhancements is provided for in the Convention, and establishment of the international mechanisms for instituting this approach have been identified as a task for the very first meeting of the Parties.

Joint implementation appears to be a very cost-effective approach to greenhouse gas mitigation. ~~We recognize that~~ Congress included several provisions that support joint implementation in last year's Energy Policy Act, and that U.S. companies are already proceeding with several joint implementation projects. The offshore forest management activities of New England Electric System, part of a larger "NEESPlan" strategy that meets both environmental and economic

effectiveness gains may be dramatic, but the cost ~~may be~~ perhaps by a factor of 2 or more.

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Because GHGs mix globally in the atmosphere, emissions reductions achieved anywhere on the planet are of global significance. Yet because the cost of such reductions varies widely, the US may be able to do more to protect the climate, at lower cost by investing abroad than by regulating here.

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needs, is one very interesting joint implementation project with which I am familiar from my recent experience in Massachusetts State government. The United States, through its approach to joint implementation in the context of programs such as the mitigation plan we are discussing today and the EIA database for voluntary emissions reductions to be established pursuant to Section 1605 of the Energy Policy Act, can take a pro-active role in establishing a framework for credible, verifiable, joint implementation actions that explicitly recognize the key role of the private sector in contracting for, and achieving, verifiable net emissions reductions. The Administration is committed to taking the lead in developing measurement and verification methods in support of these efforts.

Approaches adopted in the context of our domestic programs can serve as the starting point for international deliberations regarding joint implementation. Beginning with the August 1993 meeting of the Intergovernmental Negotiating Committee, countries will commence preparation of a draft proposal for the first meeting of the Conference of the Parties to the Convention

(anticipated in early 1995). As part of that process, the appropriate recognition of countries that help other countries limit and reduce their emissions by providing financial and technical assistance will be negotiated. The Department is continuing to develop and coordinate its position on joint implementation with the State Department and other government agencies in order to assure that resources devoted to greenhouse

That's up
to each
contract.
the parties
split the
credit as
mutually
agreed.
Not for
international
negotiation.

gas mitigation yield the maximum greenhouse emission reduction benefits.

One activity that may be utilized under ^{both} a joint implementation scheme and in a purely domestic setting involves initiatives to increase forest carbon sinks. Tree planting and forest ~~management~~ ^{conservation} programs hold an enormous potential for reducing atmospheric greenhouse gas concentrations in a cost-effective manner. Based on all recent analyses that incorporate the option of carbon dioxide removal and sequestration from the atmosphere, increases in permanent biomass through tree planting and improved forestry ~~management~~ ^{conservation} practices appear to be highly cost-effective. Although the process for determining the exact components of the mitigation plan is just now getting underway, it is clear that the President's charge -- to use American ingenuity and creativity to produce a cost-effective plan -- would suggest that tree planting and forest ~~management~~ ^{conservation} programs will receive careful consideration as cost-effective options for inclusion in the national mitigation strategy for greenhouse gases.

CONCLUSION

Mr. Chairman and members of the Subcommittee, I have provided you with a summary of the issues the Administration is seeking to address in the global climate change area and shared with you some of our latest thinking on approaches to mitigate emissions of greenhouse gases. I hope you agree with me that the

Administration has taken a great step forward in this important area. The Department will work closely with other federal agencies, the legislative branch, state and local governments, outside stakeholders and, through the State Department, other nations, in crafting a new, pro-active, approach to mitigate greenhouse gas emissions.

Thank you for the opportunity to share with you our views on this very important topic. I would be happy to answer any questions the Subcommittee may have.

*** SENSITIVE *** DO NOT DISTRIBUTE ***

August 20, 1993

TO: JOSEPH E. STIGLITZ

FROM: RAY SQUITIERI

SUBJECT: Climate Change Action Plan--Warning Flags

The IAT met Wednesday and Thursday to review the entire package of climate change options. This memo flags for you several items that arose in the meeting. To summarize: while I do not anticipate a train wreck, the journey from here to a final Action Plan will be rougher than we believed.

Schedule: The entire package is to be wrapped up by Friday September 3.

Vetting. Several "voluntary" options must be vetted with the affected industries. These options may impose significant costs on industry. Companies may view these programs coercive rather than voluntary, with EPA holding over them the threat of even more burdensome regulation. In any case, the companies must be on board before a public announcement.

HFC3 Aluminum voluntary program. This would reduce emissions of CF_4 and C_2F_6 in aluminum production; it will require cooperation from the aluminum industry.

HFC1 Reduce HFC-23 emissions in HCFC-22 production. Significant quantities of HFC-23, a potent greenhouse gas, are produced during production of HCFC-22.

Budget. We have no assurance that the new money called for in the package will be forthcoming. OMB has acquiesced to \$200 per year million of the \$300 million per year required by the current package, and Jim Mietus, representing T.J. Glautier, continues to do a nice job of working out the OMB side. The proposals will also require agency approval for a rearrangement of their budgets; Bob Sussman of EPA has explicitly cautioned us not to assume that EPA will sign on. Then too Congress must go along as well. A serious challenge by OMB, Congress, or one of the agencies could upset the Plan.

Parking cash out (7.1 MMT). Treasury Tax Policy continues to fret about this one. As of Friday morning, they intend to propose a revision to the existing option. Killing this option would be bad not only for the carbon totals--even with the option, we remain about 20 MMT short of the goal--but for the budget as well. We estimate revenues of \$800 m per year when fully phased in.

Tough options. The CCMG may be presented with a list of tough options to provide further reductions in case the present list does not meet the target, including:

- Elimination of rice subsidies; reduces methane emissions by 0.6 to 4.2 MMT, but wipes out the U.S. rice industry. Proposed by State. Economic agencies would support. EPA would not oppose, and may support. USDA opposes (USDA representative asked, "What good would it do to eliminate one subsidy if we are just going to replace it with another subsidy anyway?", thus establishing the principle of No Net Loss of Subsidies.)
- Hydro reform (0.8 to 1.6 MMT). Rationalizes federal hydro pricing, raises \$600 m to \$2 billion annually. But will encounter fierce opposition from those now benefiting from federal largesse.
- Elimination of tax-free treatment of employer paid parking (17.5 MMT, \$6 billion per year revenue). This is a stronger version of the parking cash-out option now under study by Treasury Tax Policy.
- Higher CAFE standards.

Laugh test. Several features of the package may not pass the straight face test:

Electricity growth rate. The package of options would reduce the annual growth rate in Kwh consumption from about 2% over the last decade--a time of considerable improvements in economy-wide energy efficiency--to 0.7%. Private analysts and forecasters project 1% to 2%, with a median estimate of 1.5%.

Sinks: Reduced harvest on National Forest Service Lands (4.5MMT). Will this produce real carbon reductions worldwide, or will reduced cutting in the U.S. result in more cutting in Canada? The Forest Service modelers claim to have accounted for this carbon leakage, but doubts persist.

Rush Limbaugh test. Several options may fail this test, among them:

Improve ruminant productivity (1 - 2.6MMT). This option aims to reduce methane from cow burps. It will be hard to squelch the laughter from the Junior High School set. Maybe it should be renamed.



DEPARTMENT OF THE TREASURY
WASHINGTON

FACSIMILE COVER SHEET
OFFICE OF ECONOMIC POLICY

DATE 8/20/93

NUMBER OF PAGES TO FOLLOW: 2

TO: Joseph Stiglitz

ADDRESSEE'S FAX NUMBER: 395-6947

ADDRESSEE'S CONFIRMATION NUMBER: _____

FROM: Ray Squitieri

SENDER'S FAX NUMBER: (202) 622-1294

SENDER'S CONFIRMATION NUMBER: 622-2340

COMMENTS/SPECIAL INSTRUCTIONS:

X
F. En... (Ch...)

SUPPLY OPTIONS: ES7, ES5 AND ES9/10 UPDATED SUMMARIES AND POLITICAL ANALYSIS

July 30, 1993

- 1) bio
- 2) nuclear
- (3) hydro - pricing

partially

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Ev Ehrlich

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Due Th...
- Donor

Subsidies

Brook... Contingent

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PMR

REA

Public Power

ES-7

BIOMASS COFIRING: ZERO-NET CO₂ POWER GENERATION

July 19, 1993

Summary: Options for reducing CO₂ emissions from coal-fired units include fuel switching to natural gas, installing CO₂ scrubbers, repowering to improve efficiency, reducing electric output, and retiring units. Another option involves cofiring coal with biomass, a renewable energy resource. Because they remove CO₂ from the atmosphere during growth, biomass feedstocks can be utilized to offer a zero-net CO₂ power generation technology. Biomass cofiring capacity can be added for \$185/kW - \$400/kW, costs well below the \$1000 - \$1500/kW required for greenfield biomass installations. In terms of its impacts on the cost of electricity, the cofiring alternative is projected to add, at most, 0.2 cents/kWh to the COE of the existing facility, although at biomass fuel prices equal to or below \$0.50/MMBtu the effect is a reduction in COE. By expanding the EPACT production credits to all cofired units regardless of biomass feedstock, cofiring projects result in a reduction in generating costs for biomass fuel prices at or below \$1.55/MMBtu. When the incentives are applied, the incremental COE for cofiring retrofits fueled with \$1.55/MMBtu biomass feedstocks is effectively transferred from the utility, its ratepayers, and its stockholders, to the Federal government. The majority of biomass feedstocks for cofiring will come from wood and forest product industry wastes, silvicultural practices, and urban wood waste. These resources are typically priced in the \$0.50-\$2.00/MMBtu range. Assuming the expanded definition of the EPACT production incentive, it is projected that each coal fired boiler in the United States can be retrofit to provide an average of approximately 10 MW of biomass cofiring. Therefore over 17,000 MW of biomass capacity can be introduced in existing coal-fired utility boilers, displacing nearly 80 million metric tons of CO₂ to supply 20% of the industry's required reduction. Over 1 quad (1 quad = 10¹⁵ Btu) of wood wastes and residues required is currently available, although many of these resources have previously been under-utilized and/or unaccounted; end-use demand and a positive market price will bring these materials to market.

	Low Implementation Case	High Implementation Case
(1) Description	Expand EPACT incentives to all publicly owned cofired units regardless of biomass feedstock. Technical assistance to investor owned utilities.	Expand EPACT incentives to all investor-owned utility cofired units regardless of biomass feedstock.
(2) Emissions reduction (mmtc-e) - 2000 - 2010	4.8 4.8	14.1 14.1
(3) Compliance cost (\$M) - 2000 - 2010	Cost to utilities is offset by 1.5 cent/kWh production incentives.	Cost to utilities is offset by 1.5 cent/kWh production incentives.
(4) Federal budget cost (\$M) ^{2,3} - FY '94 - FY '95 - FY '96 - FY 2000 (est.)	32 \$M 71 \$M 118 \$M 225 \$M	100 \$M 238 \$M 405 \$M 797 \$M
(5) Cost-effectiveness (\$/mmtc-e) ¹ - 2000 - 2010	44 \$/mmtc-e 0 \$/mmtc-e	53 \$/mmtc-e 0 \$/mmtc-e
(6) Interaction with other options		

- 1 Calculated on the basis of total cost/carbon reduction as of given year.
- 2 In 1992, biomass power produced approximately 375 \$M in federal tax revenue and 94 \$M in state tax revenue. By 2000 tax revenue is anticipated to grow to 713 \$M and 78 \$M in federal and state tax revenue, respectively. The cofiring option will account for nearly 25% of these totals.
- 3 Renewables accounted for approximately 50 \$M in FY '92 budget outlays compared to 1.7 \$B for natural gas, 1.1 \$B for coal, 0.9 \$B for nuclear, 1.8 \$B for electricity, and 0.6 \$B for conservation.

POLITICAL ANALYSIS

Co-firing biomass with coal is an opportunity identified at the June 11th public meeting and later submitted by the renewable energy community as an Initiative and reworked by the Department. This Initiative with its 17,000MW's goal was considered perhaps too aggressive and required a revision of the "closed-loop" eligibility requirement for the cent and half tax credit. The revised Initiative submitted by OSTP, based on co-firing wood wastes and planting dedicated crops in quantities equivalent to the amount of wastes co-fired with the crops to be harvested in the post 2000 time frame and provided as a fuel supply for advanced biomass conversion systems, passes political muster easier than the prior version provided that it meets the current legal interpretation of a "closed-loop" biomass system. The Department supports even this lower goal. It would enjoy support from the wood products and coal fired utility industry. However, coupling financing of co-firing and CRP credits complicates the co-firing Initiative considerably. Because utilities will essentially will have to become farmers to earn CRP credits, it may be too difficult to implement. Both sustainable crop development and co-firing are widely supported. The Department has funds for programs to stimulate sustainable crop development, but no funds are available to stimulate co-firing other than to support studies.

ES-5

Conversion of Defense Facilities and Equipment for Renewable Energy Project Development

Summary: There are currently 80 military installations slated for closure, representing over 150,000 acres of land that could be made available for renewable energy development. There are thousands of additional acres that could be available from scaled back operations at other bases and DOE facilities, like the Nevada Test Site. Renewable energy proposals are also likely to be prominent in the first round of Technology Reinvestment Project under ARPA's \$472 million program. This effort would complement and if possible leverage these proposals, and the overall defense conversion effort. Under this effort DOE would facilitate the development of solar energy projects on unused portions of military bases and other Federal facilities affected by defense conversion, employing underutilized resources at the sites to prepare them for energy development as they scale back operations or prepare for closure. Using these sites as host locations for renewable energy projects would encourage expanded renewable energy development and accompanying environmental and energy benefits. In addition the activity would reduce the impact of defense reconversion on local economies and lay the foundation for offsetting displaced military activity with a self-sustaining renewable energy industry.

The Nevada Test Site is being assessed for conversion to a solar energy production and manufacturing facility as a result of Congressional mandates in the Defense Authorization Act, and is thus the most well-developed prototype. The scenarios for the Nevada Test Site would involve privately owned solar generating and/or manufacturing facilities at the site and its accompanying facilities in Las Vegas to produce power for sale to utilities in the region and to manufacture renewable energy products for sale domestically and internationally. Power would be transmitted through the Western Area Power Administration's transmission system or other utility's lines.

To foster private development at the NTS the Federal government would provide a package of incentives including free federal land, upgraded transmission and natural gas supply for hybrid applications, and assistance from Nevada Test Site personnel and equipment in site construction and permitting. Additional incentives could include access to Federal financing, loan guarantees, interest buydowns or other support, in particular for technologies like photovoltaics whose deployment at the test site could help foster major improvements in manufacturing and performance that are needed for broader competitiveness.

Use of the site would be offered to developers on a competitive basis to the best proposals; developers would be responsible for project development, management, power sales and outside financing. Near term projects could be initiated as early as 1996, and would be expected to stimulate additional construction on a phased basis through 2000 and beyond.

	Low Implementation Case	High Implementation Case
(1) Description	See summary. Assumes 1000 MW of commercial installations attracted to site by 2000, additional 1000 MW by 2010.	Same as low implementation case
(2) Emissions reduction (mtc-o) - 2000 - 2010	0.94 2.0	
(3) Compliance cost (\$M) - 2000 - 2010	no compliance cost; private investment funds expected for for-profit venture	
(4) Federal budget cost (\$M) - FY '94 - FY '95 - FY '96 - FY 2000 (est.)	\$0 \$49 \$49 \$0	
(5) cost-effectiveness (\$/mtc-o) - 2000 - 2010	\$10.41/MT for initial project \$5.20/MT for later projects	
(6) Interaction with other options	2000 results independent of other options; 2010 results likely to be independent.	

POLITICAL ANALYSIS

This Initiative is new and responds to the Administration's objective of replacing defense jobs with jobs in clean environmentally acceptable technologies. It is widely supported by renewable energy groups, environmental organizations, and areas threatened by Defense downsizing. By using existing Federal authorities, it minimizes downstream obligations. Funds used to bring sites to the point that they can be made available for renewable energy projects and not for the projects themselves may have some critics. Initiatives that are aimed at employment and the environment enjoy support by states and communities affected. There is an Initiative close to this one submitted at the June meeting. The FY94 Defense Authorization legislation includes a requirement to study such an effort for the Nevada Test Site. The results of this study will be available in thirty days. Congressional support starts with the Nevada delegation. No funds are currently available or budgeted for site conversion.

**Combined ES-9 and 10
Renewable Energy Market Mobilization Collaborative**

Summary: An estimated \$10 billion in combined U. S. private and public research and capital investment expenditures for renewables has brought them to the starting point of commercial availability. Consensus is that increased purchases will initiate significant production cost learning and user confidence resulting in sustainable markets and widespread cost competitiveness. National leadership through a market mobilization challenge would stimulate this final development stage. This challenge issued to American utilities and independent power producers (IPP) calls for forming a collaborative that would accelerate market acceptance of all appropriate renewable technologies and applications and supported by an appropriate market infrastructure. This collaborative has two levels of federal involvement. The first supports a voluntary utility/IPP consortium formed to aggregate near term markets of developed or near-commercial renewable based technology small scale power systems in order to enable the industry to attract capital and achieve production economies of scale. The second level of participation would be to partner with the consortium and states through cost-shared demonstrations to spread the risks of fielding new technologies and new applications not yet cost effective and to share in the evaluation of prototypes and performance of technologies in these initial applications. This support would allow investors to acquire field experience with the technologies--increasing familiarity, testing operability with specific systems and lowering risks. This two part challenge would provide a huge incentive for renewable technology manufacturers enabling them to attract investment capital and achieve production economies of scale resulting in significant and important outcomes. Within four years annual domestic sales will more than quadruple, five times the current number of utilities and IPPs will have working experience and confidence for making future purchases, production capacity will increase and costs will be lowered by 25% to 50%. Cumulative capacity additions will total more than 17,000 by year 2000 --all bringing increases in U. S. jobs and attendant economic benefits and creating a downward trajectory of greenhouse gas emissions.

	Low Implementation Case	High Implementation Case
(1) Description	Federal cost share of purchase consortium for aggregating markets for small cost effective systems. Cost \$5M	Federal cost share of purchase consortium and participating in heavily cost shared demonstration of new technologies and/or applications to induce 12,300 cumulative installed capacity by 2000. collaborat. Cost \$434M over 4 to 6 years.
(2) Emissions reduction (mtc-e) -2000 -2010	0.1 0.75 Supports only small scale photovoltaics and wind; no central station projects.	1.6 6.4 Supports a wide variety of technologies and applications.
(3) Compliance cost (\$M) -2000 -2010	no compliance cost; private cost sharing expected to be \$5M/yr	no compliance cost; private cost sharing expected to be \$372M/yr, varied by technology
(4) Federal budget cost (\$M) -FY '94 -FY '95 -FY '96 -FY '97 -FY '98 -FY '99	\$0 \$5 \$5 \$5	\$72 \$72 \$72 \$72 \$72 \$72
(5) Cost-effectiveness (\$/mtc-e) ¹ -2000 -2010	Average \$2.00/MT over life of assumed projects	Average of \$5.82/MT over all technologies.
(6) Interaction with other options	Leveraged by IRP, Fed Gov. purchases, other information options	Leveraged by renewable consortium, information options

¹ Calculated on the basis of total cost/average carbon reduction per year over 115% of

POLITICAL ANALYSIS

There is widespread stakeholder support for using demonstrations to both improve user confidence and create renewable industry cost-learning curves. It will result in strong market response. The consortia idea capitalizes on the benefit of the Federal government cooperating with the private sector to bring about change. The Initiative builds in the comments from all the industry groups, including the utility organizations and environmental community. The Department's FY95 Target (at the Energy Efficiency Renewable Energy Assistant Secretary level), does not support this Initiative. The Initiative is responsive to the Energy Policy Act and because FY94 markup has been delayed to September, there is an opportunity for FY94 "get-start" funds, if so desired. The proposed program can be quickly implemented. Including this initiative is a signal of the strongest possible support to the U.S. renewable energy community by the Clinton Administration.



KOREA ENERGY ECONOMICS INSTITUTE

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Telex KCPAD K32384 FAX 82-343-21-0688 Tel 82-343-21-0681

July 23, 1993

Dr. Joseph E. Stiglitz
Council of Economic Advisers
Executive Office of the President
Washington, D.C. 20500
U.S.A.

Dear Dr. Stiglitz :

I was delighted to receive your letter of June 4. The IPCC Plenary meeting in late June approved the final work plan. The Working Group II and III are in the process of finding lead authors and contributors. The WG III bureau will meet July 29-30 to determine lead authors.

I will appreciate very much any suggestion you may have regarding WG III lead author selection. I expect the list will be finalized by mid August, and the lead authors meeting is scheduled during September 6-8 in Seoul.

I look forward to meeting you in the near future.

Sincerely yours,

Hoesung Lee
President

KOREA ENERGY ECONOMICS INSTITUTE

665-1, Naeson-Dong, Euiwang-Si, Kyunggi-Do, Korea, 437-082
Telex KCPAD K32354, Facsimile 82-343-21-0688, Telephone 82-343-21-0681

FACSIMILES MESSAGE

PLEASE PASS THE FOLLOWING MESSAGE TO :

NAME : Dr. Joseph E. Stiglitz

ORGANIZATION : Council of Economic Advisers
Executive Office of the President

FAX NO : (202) 395 - 6947

FROM : Hoesung Lee, President

DATE : July 23, 1993

Number of Pages : 2 (including cover sheet)

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

To

Dept./Agency

Fax #

NSN 7540-01-317-7365

From

Phone #

Fax #

5093-101

GENERAL SERVICES ADMINISTRATION

JUL 15 1993

MEMORANDUM

SUBJECT: Including HFCs and PFCs in the Greenhouse Gas Baseline

FROM: Robert M. Sussman
Deputy Administrator

TO: Climate Control Mitigation Group

OFFICE OF
THE ADMINISTRATOR

The Environmental Protection Agency (EPA) believes it is necessary from a practical and policy perspective, that the hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) be included in the baseline and the National Action Plan.

Why Include them in the Baseline and in the National Action Plan?

HFCs are a growing portion of the climate problem. Explicit recognition of this issue and cost-effective solutions are necessary to avoid the future effects from these particularly potent substances.

The arguments for including these chemicals in the baseline have been stated many times in the past:

- ◆ HFCs and PFCs are *potent greenhouse gases*. Measured atmospheric lifetimes are long and the chemicals have high global warming potentials (GWPs).
- ◆ HFCs and PFCs have been emitted for years, including in 1990 and later, as manufacturing by-products. *A solid baseline has been established for these classes of chemicals.*
- ◆ While CFCs and HCFCs are excluded from the baseline according to the Climate Convention, their replacements are *not* excluded.
- ◆ Both *industry and environmental groups are expecting the National Action Plan to include HFCs and PFCs*. (Some industry representatives are interested in also including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), although it is not certain at what level.)
- ◆ *Inclusion of HFCs and PFCs now is critical to real reductions in the future. By 2010, without any controls, HFC and PFC emissions are expected to grow to 67 million metric tons of carbon equivalent (MMTCE).*



-2-

If HFCs and PFCs are in the baseline, is there anything that can be done to minimize emissions?

Reductions of 13-16 MMTCE from four practical options can help reduce the gap of 25 MMTCE (see attached). The options which can help reduce the emissions of HFCs and PFCs are unlikely to be implemented if the compounds are not included in the baseline now.

What will happen if HFCs and PFCs are not in the baseline?

- ◆ If left unaddressed, the real impact of HFCs will be felt after 2000.
- ◆ The real world gap will be much bigger if we don't account for these chemicals now. Without any signal to the market, unlimited growth of these chemicals may lead to problems that may be more costly to correct in the future.
- ◆ Measures to assure effective programs and program implementation will not be pursued thereby delaying reductions, accelerating the greenhouse problem, and making future reductions more costly.

For the National Action Plan to be technically, politically and procedurally credible, it must include HFCs and PFCs.

Attachment

Attachment

Emissions and Reductions: 1990 and 2000

1990 Emissions (MMTCE)	2000 Emissions ¹ (MMTCE)	Gap (MMTCE)	Reductions (MMTCE)
~ 20	~ 45	~ 25	~ 13-16

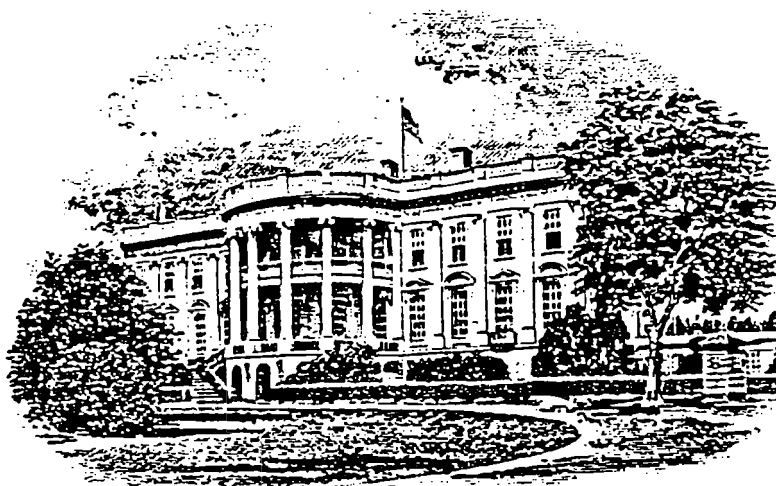
¹ 2000 baseline emission estimate includes ~ 10 MMTCE reductions from fully implemented recycling of HFCs under Section 608 and limited restrictions of high GWP compounds under Section 612 of the Clean Air Act.

**Cost-Effective Options to Reduce HFC and PFC Emissions
by 2000**

Program	Target Gas	Potential Reduction (MMTCE) ¹
Reduce HFC-23 Emissions from Manufacturing	HFC-23	< 5
Narrow Uses of High GWP Chemicals under 612 of the Clean Air Act	HFC for Solvent	4
Voluntary Program with Aluminum Industry	C ₂ F ₆ , CF ₄	3-6
Voluntary Corporate Stewardship Programs	PFCs, HFC-134a	~ 1

¹ Reduction potential is based on the expansion and implementation of these programs to achieve these reductions; 8 FTE and \$4 million.

74



F
Envision
Change

Revised
slides for
GHB
presentation
6/7/93

FAX TRANSMISSION

**The National Economic Council
The White House**

To: Jonathan Weiner

Phone: _____ FAX: _____

From: Heather Ross

Phone: 202-456-2802 FAX: 202-456-2223

Date: for today's 4pm Mtg.

Time: _____

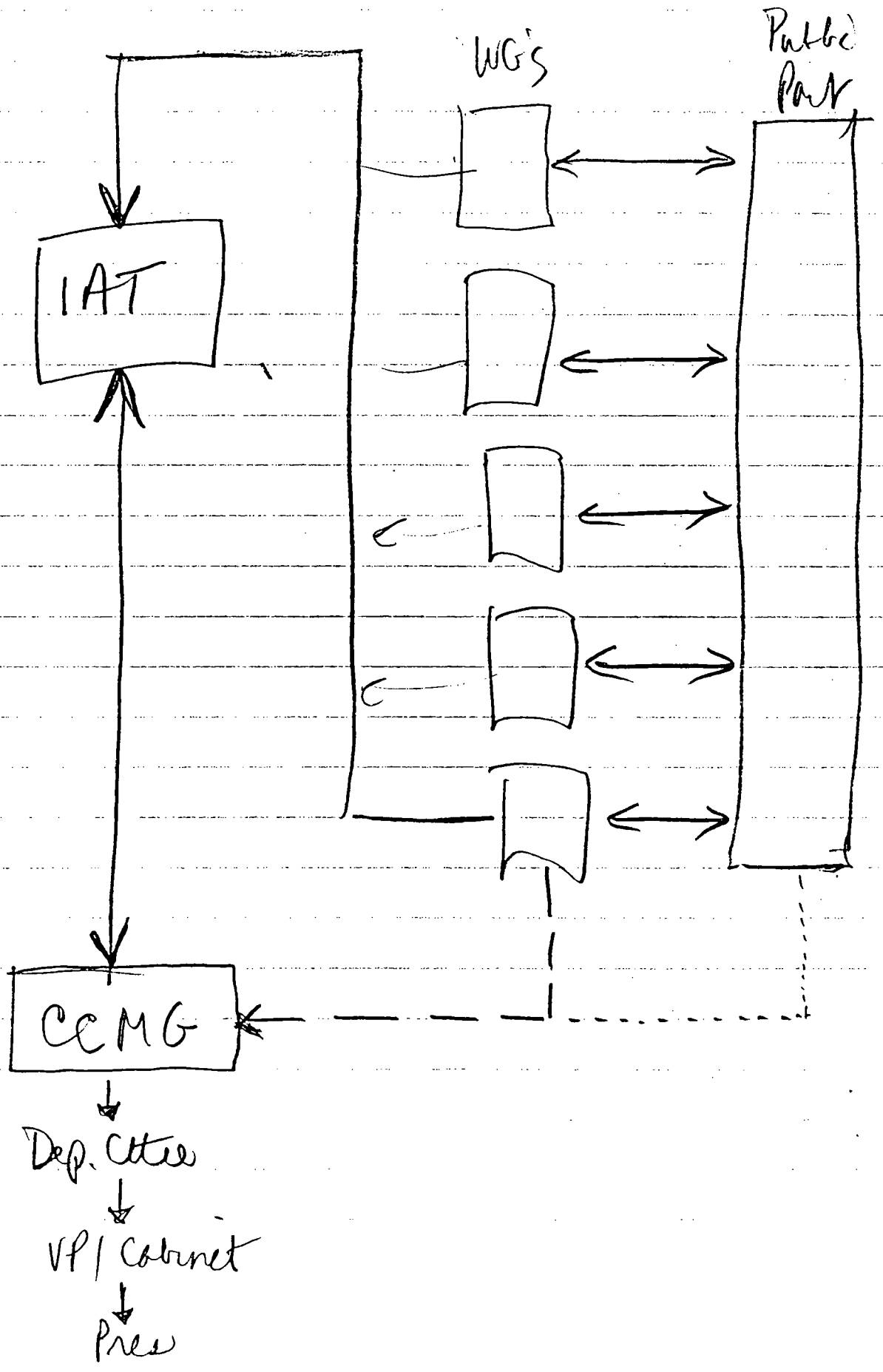
Pages to follow: _____

CCMG PRESENTATION

1. Action Plan Organizational Structure
2. Action Plan Personnel
3. Action Plan Timetable
4. IAT / CCMG Interaction
5. IDEAS model
6. Base Case development
7. U.S. Carbon Emissions
8. Greenhouse gas estimates
9. Emission Reduction Actions
10. Possible Paths
11. Illustrative Time Path
12. Grouping Example
13. Plenary Session
14. Next Meeting

1

ACTION PLAN ORG. STRUCTURE



(2)

ACTION PLAN PERSONNEL.

list WG heads

CMG members

OEP leadership

(3)

ACTION PLAN TIMETABLE

lay out - all the way to Pres.
decision

(4)

IAT / CCMG Interaction

Timing of IAT meetings and
CCMG meetings to fit
overall timetable.

Standard time and place
Schedule, Specified up front.

THE IDEAS U.S. ENERGY MODEL

Features:

- Integrated framework relates U.S. energy demand, production and prices from 1950 - 2030;
- Structural simulation approach explicitly represents key energy market mechanisms: energy investments, production, conversion technologies, end-use service demand and conservation.

Track Record:

- Subjected to extensive peer review;
- Used for the National Energy Plans since 1979;
- Integrating model for the 1991 National Energy Strategy;
- Used for numerous energy policy analyses.

*others are
frankly.*

6

2

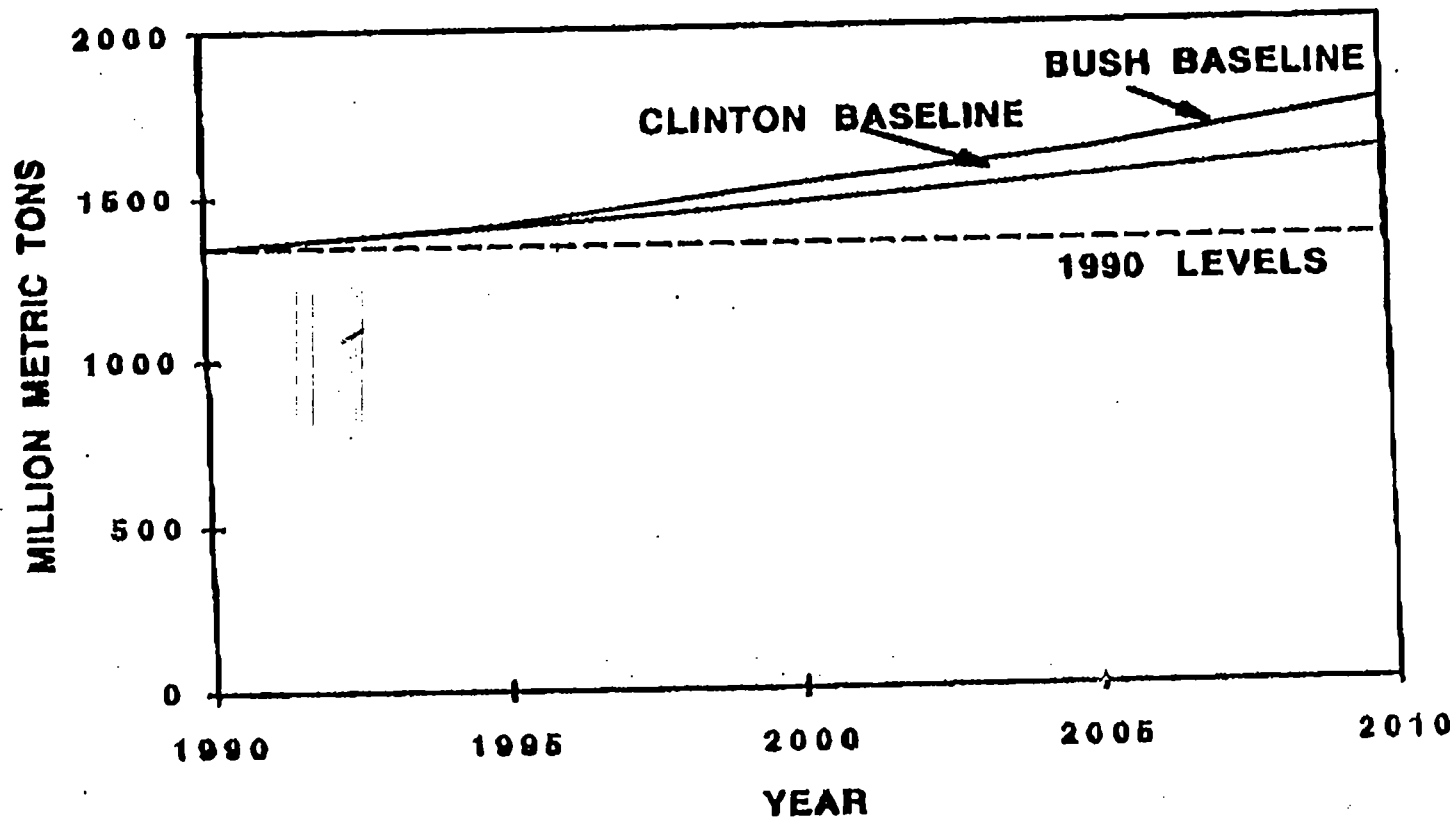
BASE CASE DEVELOPMENT

- **Two cases were created:**
 - one with historical policies;
 - one including implementation of the 1992 Energy Policy Act, Btu tax and Clinton economic package;
 - The second case is the starting point for the August plan development.
- **Purpose**
 - consistent "point of departure" for option analysis;
 - credible starting point to focus attention on option analysis.
- **Methodology**
 - calibration to EIA's 1993 Annual Energy Outlook;
 - the Energy Information Agency (EIA) is an independent statistical agency of DOE;
 - incorporation of alternative assumptions from CEA, DOE, and EPA to reflect policies already planned.

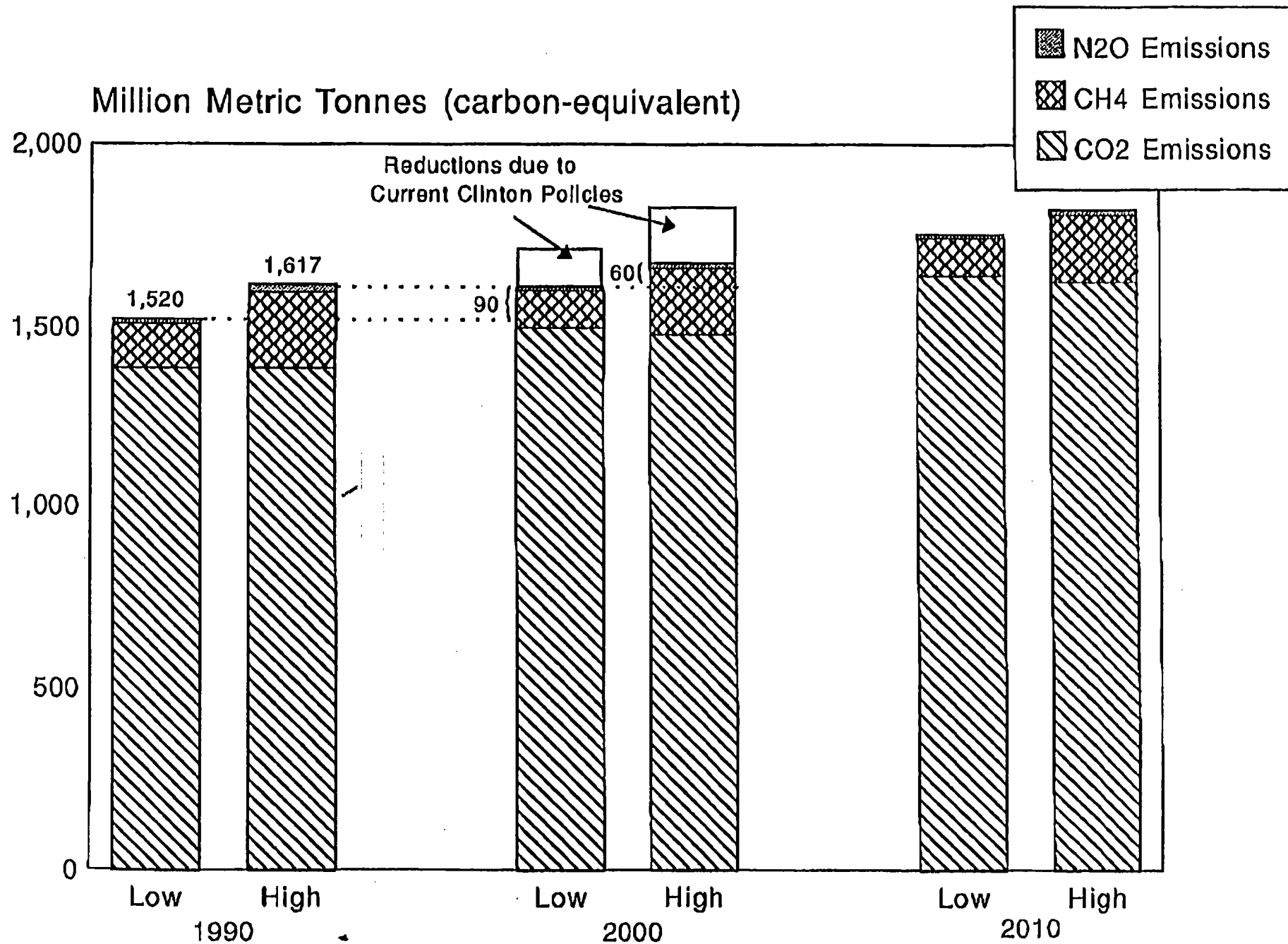
TOTAL P.87

U.S. CARBON EMISSIONS

- In the Clinton Baseline, the starting point for the August Plan, carbon emissions in 2000 are projected to be 120 million metric tons (9 percent) above 1990 levels and 270 million tons (20 percent) higher than 1990 by 2010.



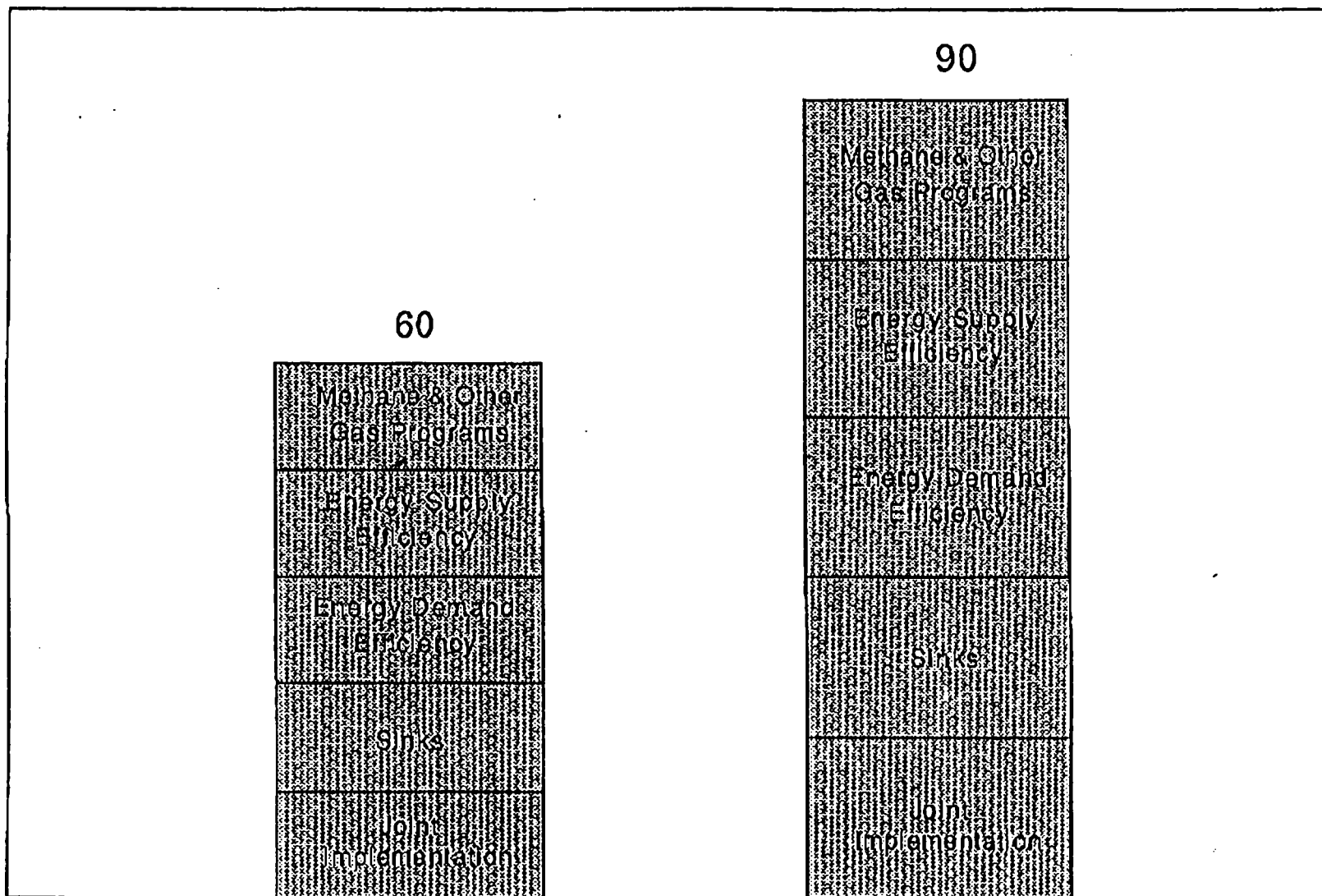
Greenhouse Gas Estimates



Emission Reduction Actions

9

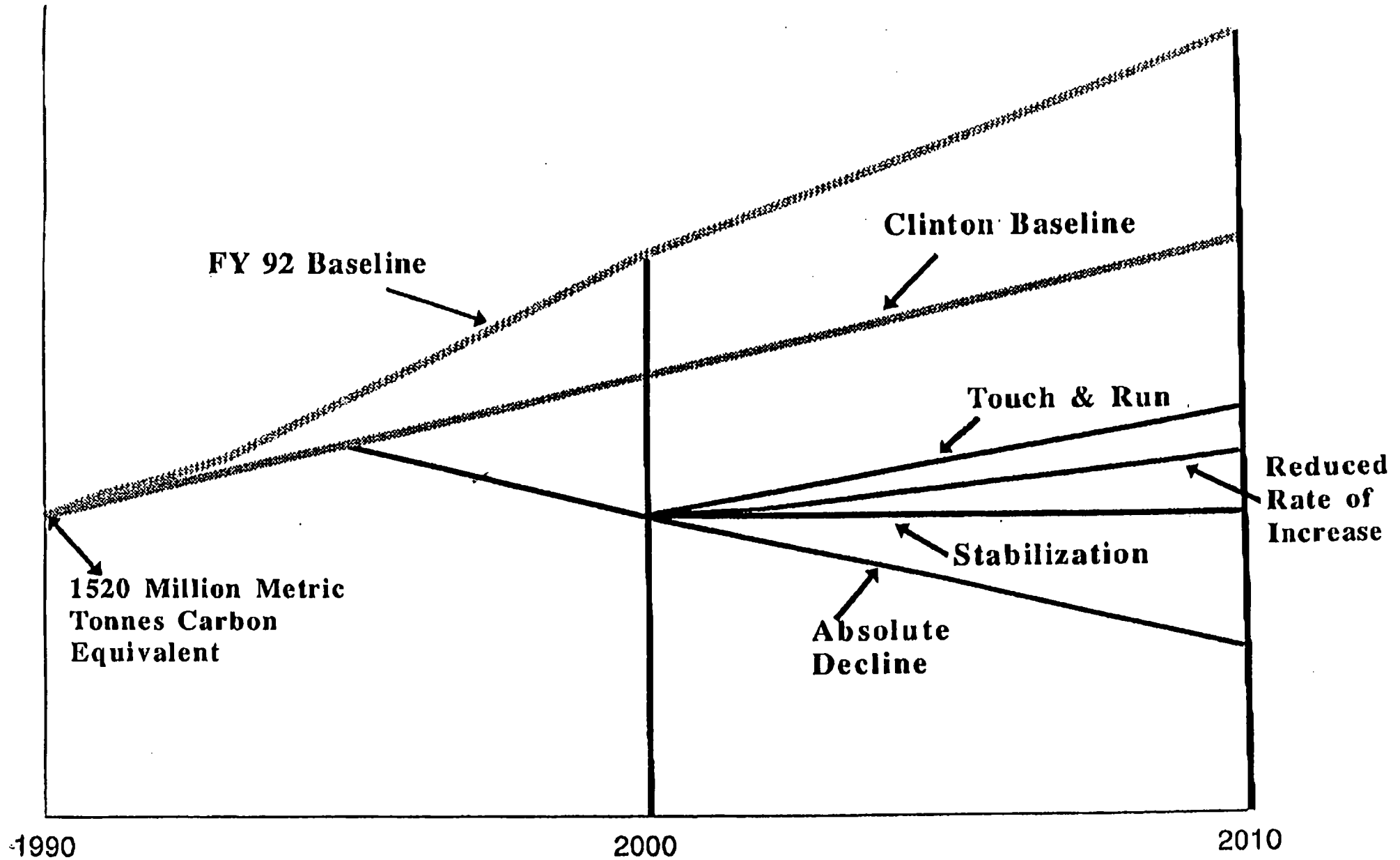
Million Metric Tonnes (carbon-equivalent)



Year 2000

* Action reduction effects are not drawn to scale.

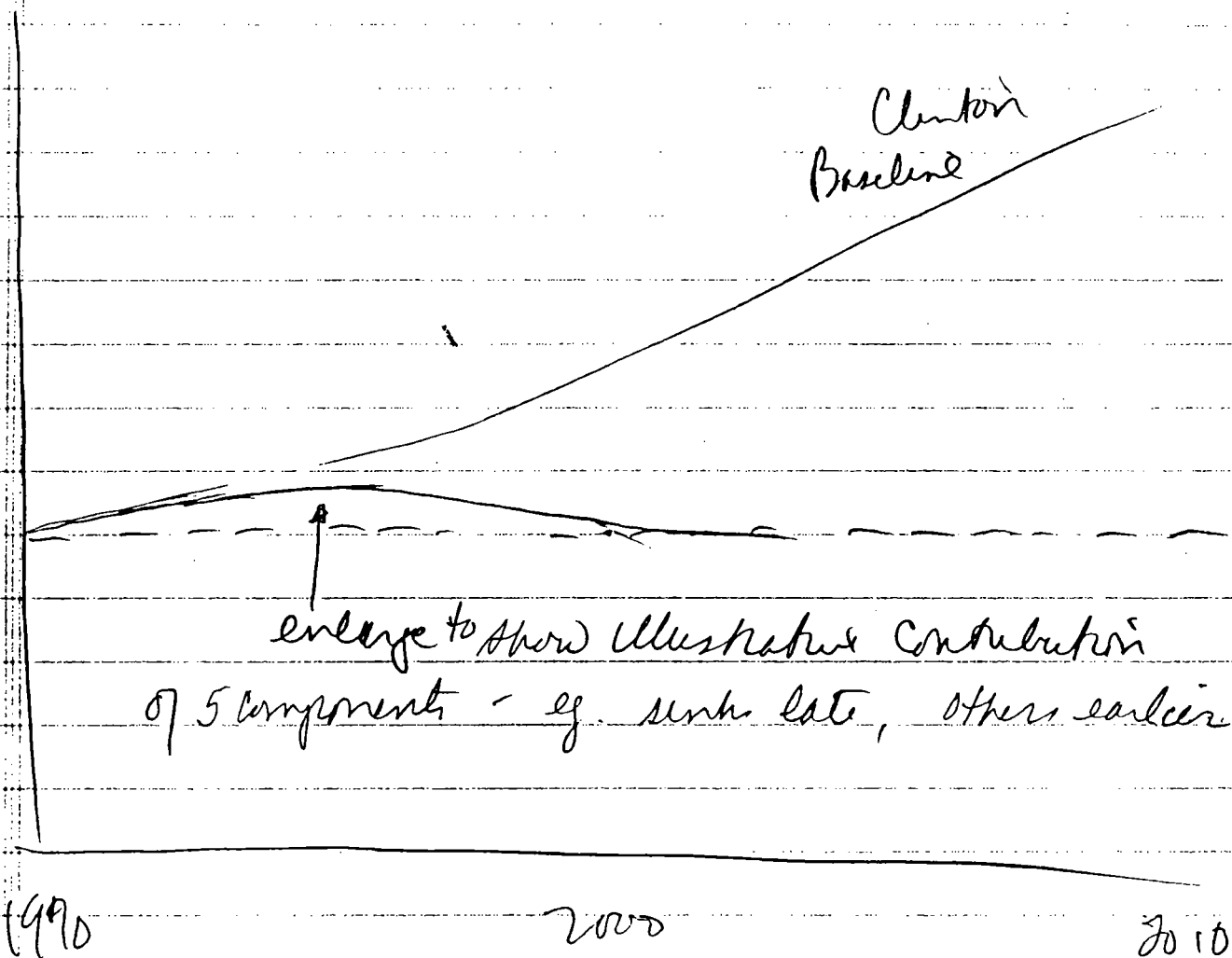
Possible GHG Emissions Paths Beyond the Year 2000



No Scale

(11)

ILLUSTRATIVE TIME PATH



(12)

GROUPING EXAMPLE.

Show how multitude of elements
coming from plenary / working groups / elsewhere
can be grouped to allow synthesis of options.
One example with real world content -
perhaps demand side.

PLENARY SESSION

Outline structure, purpose
and use of results

NEXT MEETING

Reinforce date (after plenary/
workshop results assembled) and
State purpose and agenda.

Selected Policy Options
for
Global Climate Change

*Full
Summary
(Domestic
Changes)*

July 6, 1993

The working group chairs and the Office on Environmental Policy have selected nearly 50 policy options out of roughly 175 individual policy options put forward by the workshops and working groups. This preliminary list is intended for discussion only, and has no "standing" beyond the fact that working groups have deemed these measures as promising. The interagency analysis team has not yet evaluated these measures from the standpoint of cost-effectiveness or whether this "package" would fulfill the President's commitment. However, preliminary estimates of emission reductions attached to some individual options indicate that a policy package of this magnitude could potentially fulfill the commitment. However, further analysis may show that interactions among the various policy elements may cause this list of options to fall short of the goal.

These options have been selected from four working groups: energy supply, energy demand, transportation, and methane/other gases (sinks and joint implementation will be considered later). The alphanumeric code (e.g. ES25) refers to the following:

ES - Energy Supply

RD - Residential Demand

CD - Commercial Demand

ID - Industrial Demand

CT - Commercial Transport

TI - Transportation Infrastructure

AT - Auto/Truck

ME - Methane & Other Gases

This compilation is a very abbreviated version of the 1-2 page descriptions which provide additional information regarding implementation, cost effectiveness, and the likely responses of affected stakeholders.

ENERGY SUPPLY OPTIONS

Integrated Resource Planning Options

Many state public utility commissions (PUCs) require utilities to perform Integrated Resource Planning (IRP). Under IRP, electric and gas utilities compare the economic and environmental implications of both supply and demand options when evaluating options for system expansion. This expands the scope of traditional regulation, which focused exclusively on reliability and price.

Several provisions in the Energy Policy Act of 1992 (EPAc) encouraged states to pursue or expand IRP activities. Beyond funding these provisions, the Federal government should use the development of a national greenhouse gas reduction strategy as an opportunity to clarify and perhaps modify the Federal role in encouraging environmentally sound state regulation. A proposal on IRP could include the following options identified in the working groups:

- a) ES2 **Encourage state public utility commissions to remove barriers to increased use of natural gas through DOE-supported IRP programs.** DOE and EPA could assist state regulators to identify regulatory impediments to natural gas use in current planning systems.
- b) ES8 **Promote effective and innovative state regulation of renewable electric technologies.** A small grant program could assist states in properly evaluating the environmental benefits and energy value of renewable power options.
- c) ES18 **Support the development of utility externality adders in IRP.** The federal government could issue guidance on the emerging practice of incorporating estimates of external costs of energy supply and demand options into IRP exercises.
- d) ES26 **Reform of utility fuel adjustment clauses.** DOE could interpret EPAc Section 111(a)(9) as requiring that states consider the potential efficiency gains of reforming fully reconciled fuel adjustment clauses, which shift fuel price risks to consumers and reduce the incentives to improve supply efficiency.
- e) ES27 **Education and outreach on reducing greenhouse emissions through planning for cost-effective Clean Air Act compliance.** EPA could provide state regulators technical assistance in evaluating the greenhouse gas emission reduction potential of encouraging selected strategies for Clean Air Act compliance.

MMTs of reductions: 5 - 20 MMT by 2000, depending on comprehensiveness of IRP policy and interactions with other programs; difficult to score.

Costs: Modest budget cost -- probably \$10-\$20 million

Voluntary Commitments

ES19 Green Utility program. (see also ID21 and CD10)

The intent of this program is to lead companies to develop their own greenhouse gas reduction programs using new emission reporting programs, industrial benchmarking program, goals and incentives for voluntary emission reductions. Several utilities have already undertaken voluntary stabilization commitments, using expanded demand side management, conservation programs, supply efficiency upgrades and renewable energy to offset projected service demand growth. A formal program could be structured where utilities sign an agreement with the Federal government to hold return to 1990 emission levels by the year 2000, in exchange for flexibility in reaching voluntary targets. These agreements could be linked to EPA Act Section 1605 voluntary reporting program. The specific provisions of the agreement, including penalties for non-compliance, requires further development. Several utilities are interested in pursuing this approach.

MMTs of reductions: Could be large -- 10 - 30 MMT?

Costs: Difficult to quantify

Natural Gas Options

ES3 Focus DOE's natural gas R&D program on cost-effective opportunities to reduce greenhouse gas emissions.

This option would ensure that DOE develops a R&D strategy that considers the reduction of GHG emissions in its evaluation of natural gas technologies, and reflects a appropriate level of natural gas funding in light of changed national priorities.

MMTs of reductions: ?

Costs: Expanded or redirected appropriations in DOE budget

ES29 Seasonal gas use for NO_x control (see also ID11).

This option would aggressively promote innovative NO_x reduction strategies, including the summer use of natural gas in utility coal plants (which will also reduce CO₂ emissions). EPA could issue guidance in response to NO_x Reasonably Available Control Technology (RACT) and Economic Incentive Program requirements in Title I of the Clean Air Act Amendments.

MMTs of reductions:	?
Costs:	Possible savings

Renewable Energy Options

ES4 Retain/improve hydro generation at existing dams.

Hydro generation could be enhanced in environmentally benign ways through the removal of regulatory barriers and modification of FERC rules. These rules could enhance the return on investment for existing powerplant upgrading activity, displacing the need for fossil fuel generation.

MMTs of reductions:	6 MMT
Costs:	\$2.5 million

This option could be linked to ES41 "Establish forum for collaboration between environmental groups and hydroelectric facilities operators."

ES6 Increase Federal government utilization and promotion of renewable energy technology.

Through Executive Order, require federal policies that establish the federal government as a "green purchaser" of renewable technology. This executive order would build upon existing interagency activities in renewable energy. However, this policy directive would require only that renewable energy options be exercised when cost-effective, with analytical costs initially supported by DOE.

MMTs of reductions:	?
Costs:	?

ES10 Establish an electric utility renewable energy consortium.

This initiative would establish a utility or utility/government consortium to acquire renewable electric generation. Through coordinated financial commitments and a competitive technology demonstration and selection process, the consortium would guarantee a market for vendors of developed or near-commercial renewable power generation technology in order to enable the vendors to attract capital and achieve production economies of scale.

MMTs of reductions:	< 1 MMT
Costs:	\$5 million (budget)

ES11 Support development of utility green pricing programs

Green pricing is an optional service to customers who may want to increase their utility's reliance on renewable resources. Customers who value environmental improvement can opt for a slightly higher electricity rate, utilities must use the additional revenues to fund the incremental costs of renewable power. Key elements of a green pricing premium are: the program must be attractive to and easily understood by customers, enforceable and additive to least-cost acquisition of renewables, simple to administer and neutral with respect to non-participating customers.

MMTs of reductions:	< 1 MMT
Costs:	\$500,000/year

ES37 Reorient Federal renewables R&D programs toward commercialization

In collaboration with industry, DOE would review all renewable R&D activities at the national laboratories in terms of their contribution to commercialization of solar and other renewable energy technologies. DOE would also establish a formal industry-government mechanism for ensuring the market-relevance of all future federal renewable energy R&D.

MMTs of reductions:	?
Costs:	?

Related Programs:

ES9 Expand cost-shared joint venture demonstrations of solar and wind technologies.

This initiative would promote field validation of wind, solar and geothermal technologies through a series of demonstrations (costs shared with private industry). The program would be administered by DOE under existing legislative authority (101-189 and EPAct), and would require additional appropriations (current spending is below authorized

levels). Proposals would be solicited from private industry, public and private utilities and states.

MMTs of reductions: < 1 MMT
Costs: ?

ES30 Increase funding for solar manufacturing and commercialization initiatives.

The recommended action is to ramp up funding for existing manufacturing initiatives, such as "PV-MaT" for photovoltaics and "Solar-MaT" for solar thermal technologies, and for commercialization/deployment initiatives such as the Joint Ventures Program.

MMTs of reductions: ?
Costs: ?

ES34 Establish national leadership collaborative group on renewable technologies.

The recommendation is to establish a collaborative group made up of regulators, utility managers, renewable industry and environmental representatives who would select a portfolio of renewable technologies which are cost-effective (or close) and which have the potential to generate significant amounts of power.

MMTs of reductions: ?
Costs: ?

Federal Power Marketing Options

ES5 Create a Federal solar Power Marketing Authority

DOE would create a solar energy development site on unused portions of the Nevada Test Site. Solar power from the facility would then be sold to utilities in need of new, clean capacity via a Power Marketing Authority. Legislative action to direct funding and activities within normal DOE authorizations and appropriations may be required.

MMTs of reductions: ?
Costs: ?

ES35 Create a regional renewable power marketing authority.

The midwest and western U.S. contains significant amounts of renewable resources while the major markets for new generation are located on the coasts. A regional PMA could be established with twin goals of regional economic development and job creation. This

RPMA could be established as a new PMA or be piggy backed onto an existing PMA, e.g. WAPA.

MMTs of reductions: ?
Costs: ?

ES40 Mandate PMA purchases of renewables.

DOE, or the appropriate authority, would require the various PMA's to purchase a renewable power to satisfy a specified percentage of their future electrical purchases as long as the cost of the renewables is within 20% of the next lowest cost alternative.

MMTs of reductions: 1.5-3 MMT
Costs: ?

Nuclear Options

ES45 Support life attainment and life extension for existing nuclear facilities.

A wide variety of specific options are recommended to support life attainment (through secured waste disposal facilities) and life extension (through stable regulatory environment) of the current generation of nuclear power plants.

MMTs of reductions: ?
Costs: ?

System Efficiency Options

ES20 Voluntary program for utility supply-side efficiency.

Supply-side efficiency measures that can be encouraged include capital improvements (amorphous core transformers, adjustable speed drives, etc.) and optimal O&M practices. This is an administrative option that could be implemented under EPA's current authority.

MMTs of reductions: ?
Costs: ?

ES47 Improve electric distribution system by using high efficiency transformers.

The efficiency of the electric distribution system would be improved by using transformers with high efficiency amorphous metal cores instead of the old technology iron core transformers. Amorphous Metal Transformers (AMT) achieve energy savings of 70%, compared to the most efficient iron and over 90% compared to less efficient iron. Several options are listed to accelerate the use of AMT, including voluntary programs and options that can be implemented under existing legislative authority.

MMTs of reductions: ?
Costs: ?

ENERGY DEMAND OPTIONS

Residential Sector

RD7 Support home energy rating systems and energy-efficient mortgages.

Home Energy Rating Systems (HERS) provide an estimate of the annual energy use of a building; Energy Efficient Mortgages allow a borrower a higher debt to income ratio when building energy performance reduces monthly energy bills. This provides an attractive source of financing for residential energy efficiency upgrades. The Energy Policy Act offers statutory authority for support, and implementation will require coordination between DOE, HUD, VA, Fannie Mae, and Freddie Mac.

MMTs of reductions: 1-15 MMT possible.
Costs: Could double DOE funding from \$740K in FY93 to \$1.5M in FY95; private investment dominates energy demand reductions.

[NOTE: Other Residential Sector Options are under review, but one-page descriptions were not sufficiently to put into initial proposal.]

Commercial Sector

CD6 Expanded Green Lights.

An expansion of EPA's current voluntary Green Lights program would augment several sub-programs: Non-Profit Marketing, Small Companies, Super Ally, Assist and Distributor Ally. The project would be implemented under the authority of the requirements of the CAA.

MMTs of reductions: 5.3 MMTC
Costs: \$14 million, 18 FTE

CD7 Expanded Energy Star Buildings program.

The program will target current and future Green Lights Program participants and will focus on accelerated voluntary implementation of cost effective, comprehensive upgrades in existing commercial buildings. Expanded funding will result in a significant increase in the market penetration, to a projected total of 16% of the U.S. commercial building market. This project is authorized under the CAAA of 1990.

MMTs of reductions: 2.7 MMTC
Costs: \$11 million

CD8 Risk analysis of substitute refrigerants.

Current refrigerant alternatives that provide better energy efficiency (5%) are flammable. To allow the market to determine if flammable risks are acceptable, risk assessment, testing, liability analysis and insurance options are necessary for each use sector: home refrigeration, home air conditioning, supermarkets and chillers. This type of review could accelerate the penetration of more energy efficient commercial equipment, and could be implemented under Section 612 of the CAA.

MMTs of reductions: 1.5 MMTC
Costs: \$2 million, 4 FTE in additional funding

CD11 Expand Cool Communities Program in cities and Federal facilities (same as SK10).

Building-scale studies have demonstrated that strategic landscaping to shade buildings can reduce energy use, when combined with lightening building and ground surface colors to reduce absorption of sunlight. The proposal is to expand the existing public/private Cool Communities demonstration program to 50 cities and to DOD bases and other federal facilities.

MMTs of reductions: 3 MMTC (up to 10 if fully implemented?)
Costs: ?

Industrial Sector:

ID11 Provide incentives for fuel switching and co-firing to lower carbon fuels (see also ES29).

This option would provide incentives and remove disincentives for seasonal and permanent fuel switching at industrial facilities. EPA could issue a Policy Action exempting fuel switching from New Source Review (NSR); issue guidance to the states allowing seasonal co-firing without triggering Reasonably Available Control Requirement (RACT); exempt boilers that switch to cleaner fuels from New Source Performance Standards (NSPS); allow NOx emissions banking and trading; and eliminate the confiscation of emissions credits from shut-downs.

MMTs of reductions:	9-10 MMTC
Costs:	Possible savings

ID19 Electric motor systems initiatives.

This voluntary program would address electric motors, motor controls, drive systems and motor driven processes. New Federal programs would be developed in concert with the DOE Electric Motor Systems Program to improve electric motor system efficiency.

MMTs of reductions:	5 MMTC (20 MMTC possible?)
Costs:	\$15 million over 7 years

ID21 Green companies: emission targets and reporting.

Companies could develop their own greenhouse gas reduction programs using a new emission reporting programs, industrial benchmarking program, goals and incentives for voluntary emission reductions. A formal program could be structured where companies sign an agreement with the Federal government to return greenhouse gas emissions in 2000 to 1990 levels, in exchange for flexibility in reaching voluntary targets. These agreements could be linked to EPA Act Section 1605 voluntary reporting program. The nature of the agreement, including penalties for non-compliance, needs further development

MMTs of reductions:	?
Costs:	?

TRANSPORTATION OPTIONS

Commercial Transport

CT1 Congestion pricing (for states).

The Intermodal Surface Transportation Efficiency Act (ISTEA) provides the legislative authority for states to charge tolls for driving during peak periods on selected congested roadways. Congestion pricing is intended to discourage truck and automobile use during periods of low efficiency, while simultaneously encouraging the increased use of mass transit. It also provides a reliable source of funding for new transportation investment.

MMTs of reductions: ?
Costs: ?

Transportation Infrastructure

TI1 Aggressively implement the transportation provisions (conformity) of the Clean Air Act.

The CAAA of 1990 require states and cities to demonstrate that transportation spending plans conform to the purpose of the CAA. This "conformity determination" seeks to ensure that new transportation projects do not slow attainment of CAA standards. Implementation would encourage EPA to adopt a final rule intended to shift local priorities away from new road building toward providing mobility through transit and demand management.

MMTs of reductions: 3 MMT (18 MMT ?)
Costs: ?

TI3 SIP credits and other incentives for increasing transportation system efficiency.

The many explicit or implicit subsidies for vehicle use are a major contributor to ever increasing vehicle use and rising emissions from the transportation sector. This policy provides technical guidance for states and education outreach on the benefits of use-based financing for transportation infrastructure.

MMTs of reductions: ? MMT (20-40 MMT ?)
Costs: ?

T14 Cashing-out employer paid parking

The Federal tax subsidy for employer-paid parking, up to \$155/month, is a powerful incentive to drive to work. If this subsidy were converted, this incentive could be dampened. The exemption for parking would be retained, but employees would be given the right to obtain the fair market value of the parking either in cash or in a mass transit or ride-sharing subsidy. These benefits would come from a one-line change in the Internal Revenue Code.

MMTs of reductions: 10 MMT
Costs: ?

Personal vehicle:

AT9 Green cars (multiple options).

A Green Cars program could combine several elements: government incentives for design and production of cars meeting specified efficiency, emission, and cost objective (as in the Clean Car initiative being negotiated with the Ford, Chrysler, and GM); a labeling program identifying the most efficient vehicles in each vehicle class; and private or government fleet commitments to purchase cars that meet certain performance criteria. [See **AT21 -- Establish a Green Machine Challenge**] A "Green Machine Challenge" would create a market for ultra-efficient motor vehicles through coordinated purchase commitments by public buyers as well as private individuals. These purchase commitments could be supplemented by cash awards or rebates for early introductions of the vehicles. Participation would be voluntary.

MMTs of reductions: ? MMT
Costs: ?

AT11 Enhanced inspection/maintenance programs for vehicle efficiency.

States would be encouraged to increase use of I/M with additional inspection activities focused on vehicle efficiency, based on existing statutory authority. It is hoped that on-road improvements of 0.5 MPG in existing vehicle stock can be achieved.

MMTs of reductions: 1 - 5 MMT
Costs: ?

AT12 Fuel economy labels for tires.

A labeling program would be established to encourage consumers to purchase more fuel efficient tires. This may be not require new statutory authority, but would require test procedures for economy labeling.

MMTs of reductions: ? MMT
Costs: ?

AT15 End Federal preemption of state feebate programs.

In 1992, NHTSA issued a legal opinion a state feebate program was preempted by the Motor Vehicle Cost and Savings Act. DOT could review this legal finding and either reverse it or seek legislative clarification to allow state programs.

MMTs of reductions: ? MMT (0-1 MMT ?)
Costs: ?

METHANE AND OTHER GASES OPTIONS

ME1 Increase stringency of Landfill Rule.

The Landfill Rule, which requires control of landfill gas under Sections 111(b) and 111(d) of the CAA, proposes a stringency level of 150 Mg NMOC. This option assumes that a 75 Mg rule is the base and looks at the incremental effect of a 50 Mg rule. Implementation of the rule will be administrative, under the existing authority and programs of the CAA.

MMTs of reductions: 4.6 MMT
Costs: ?

ME2 Landfill outreach program.

The Landfill Rule being promulgated by the EPA will affect only a fraction of the 6,000 landfills in the U.S. The outreach program will overcome the barriers to profitable landfill methane recovery at these landfills through coordination with landfill owners/operators, utilities, state regulators and others. The outreach program would require administrative action with a low level of new funding.

MMTs of reductions: 5.3-7.6 MMT
Costs: Minimal ?

ME4 Voluntary program to reduce methane emissions from livestock manure (AgSTAR).

AgSTAR is a voluntary pollution prevention program with the livestock industry to promote methane recovery from primary manure treatment lagoons for use as an on-farm energy source. Similar to the Green Lights Program, AgSTAR will require low-level government funding for the operation of the program.

MMTs of reductions: 2.6-4.2 MMT
Costs: ?

ME7 Refine milk marketing system.

The milk pricing system should be refined to better match production incentives with consumer demand. By modifying the feeding rations to reduce emphasis on fat, synthesis methane emissions can be reduced. The implementation is administrative, with new funding.

MMTs of reductions: 1 MMT
Costs: \$20K ?

ME9 Voluntary program to reduce methane emissions from natural gas operations (Natural Gas Star).

Natural Gas Star is a public/private partnership which prevents methane emissions by introducing and promoting cost effective technologies and practices in the gas industry. The primary focus is to keep the gas in the system.

MMTs of reductions: 3.6-6.6 MMT NB: Already in baseline
Costs: ?

ME10 Green Nylon Program.

Some nylon production emits nitrous oxide to the atmosphere. Technology exists and additional technology are being developed to reduce these emissions. Green Nylon is a voluntary program with nylon producers to speed the process.

MMTs of reductions: 3-6 MMT
Costs: ?

ME11 Voluntary program with aluminum companies.

Another option is a voluntary program with aluminum production companies to reduce emissions of CF_4 and C_2F_6 from aluminum smelting. A reduction in these emissions would also improve smelter efficiency.

MMTs of reductions: 3-6 MMT
Costs: Negligible ?

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REVISED BASELINE

July 6, 1993

Methane Emissions (MMTCE/yr)						
Source	1990		2000		2010	
	Low	High	Low	High	Low	High
Landfills	48.6	70.8	52.8	76.2	56.8	80.5
Energy Prod&Distr:						
Coal Mining	21.6	34.2	24.8	38.4	25.9	40.2
Natural Gas	13.1	25.6	13.8	26.4	16.3	31.9
Petroleum	0.6	3.7	0.7	4.2	0.8	4.7
Total	35.3	63.5	39.2	69.0	43.0	76.8
Combustion	1.8	10.2	1.8	10.2	1.8	10.2
Agriculture:						
Ruminants	27.6	41.4	30.0	47.4	28.8	49.2
Manure	10.2	21.6	10.8	33.6	11.4	36.0
Rice	0.6	4.2	0.6	4.2	0.6	4.2
Total	38.4	67.2	41.4	85.2	40.8	89.4
TOTAL EMISSIONS	124.1	211.7	135.2	240.6	142.4	256.9
Reductions from Existing Programs						
Source	1990		2000		2010	
	Low	High	Low	High	Low	High
Landfills:						
NMOC Rule (new analysis)	0.0	0.0	28.8	41.5	31.0	43.9
Energy Prod&Distr:						
Coal Mining						
Current Actions (VA)	0.0	0.0	1.2	1.2	1.2	1.2
Energy Policy Act	0.0	0.0	0.6	3.6	2.4	7.8
Natural Gas:						
Natural Gas Star	0.0	0.0	2.8	5.3	3.3	6.4
Combustion	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture:						
AgStar	0.0	0.0	0.5	1.0	0.5	1.6
TOTAL REDUCTIONS	0.0	0.0	33.8	52.6	38.3	60.9
TOTAL BASELINE EMISSIONS	124.1	211.7	101.4	188.0	104.1	196.0

ORIGINAL BASELINE

Methane Emissions (MMTCE/yr)						
Source	1990		2000		2010	
	Low	High	Low	High	Low	High
Landfills	48.6	70.8	52.8	76.2	56.8	80.5
Energy Prod&Distr:						
Coal Mining	21.6	34.2	24.8	38.4	25.9	40.2
Natural Gas	13.1	25.6	13.8	26.4	16.3	31.9
Petroleum	0.6	3.7	0.7	4.2	0.8	4.7
Total	35.3	63.5	39.2	69.0	43.0	76.8
Combustion	1.8	10.2	1.8	10.2	1.8	10.2
Agriculture:						
Ruminants	27.6	41.4	30.0	47.4	28.8	49.2
Manure	10.2	21.6	10.8	33.6	11.4	36.0
Rice	0.6	4.2	0.6	4.2	0.6	4.2
Total	38.4	67.2	41.4	85.2	40.8	89.4
TOTAL EMISSIONS	124.1	211.7	135.2	240.6	142.4	256.9
Reductions from Existing Programs						
Source	1990		2000		2010	
	Low	High	Low	High	Low	High
Landfills:						
NMOC Rule (old analysis)	0.0	0.0	25.2	36.6	27.0	38.4
Energy Prod&Distr:						
Coal Mining						
Current Actions (VA)	0.0	0.0	1.2	1.2	1.2	1.2
Energy Policy Act	0.0	0.0	0.6	4.8	2.4	9.0
Natural Gas:						
Natural Gas Star	0.0	0.0	3.6	6.6	3.9	8.1
Combustion	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture:						
AgStar	0.0	0.0	2.4	6.6	2.4	7.2
TOTAL REDUCTIONS	0.0	0.0	33.0	55.8	36.9	63.9
TOTAL BASELINE EMISSIONS	124.1	211.7	102.2	184.8	105.5	193.0

JUL - 2 1993

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OTHER GREENHOUSE GASES
HFC and PFC EMISSIONS

BACKGROUND

In 1990, HFCs (hydrofluorocarbons) and PFCs (perfluorocarbons) were not used widely as commercial chemicals, but there were two main sources of emissions:

HFC-23	By-product from HCFC-22 production (2% of production)
CF ₄ , C ₂ F ₆	By-product from Aluminum smelting

All three of these compounds are very long lived gases and are expected to have high GWP's.

The main use of HFCs are as replacements for the ozone depleting CFCs and HCFCs, being phased out under the Montreal Protocol and Clean Air Act Amendments of 1990. HFCs are being evaluated and introduced on the market as refrigerants, solvents, fire extinguishing agents, sterilizers and as foam blowing agents.

HFC-23 is currently a by-product emitted during HCFC-22 production. Commercial markets are being explored for HFC-23 as a halon replacement and a specialized refrigerant. Even after the phase out of HCFC-22 to protect the ozone layer, production of HCFC-22 will still continue as a polymer precursor, and therefore, there will still be emissions of HFC-23.

The attached list of atmospheric lifetimes and estimated GWP's have been taken from the 1992 IPCC report and a 1993 Science article by Susan Solomon. It is evident that the HFCs have varying atmospheric lifetimes and GWPs. For chemicals without GWP's, surrogate estimates are used based on comparable measured or expected atmospheric lifetimes.

The intentional manufacture of PFCs are expected to increase as they are introduced as alternatives to CFCs and HCFCs and additives in foam insulation processes.

PRELIMINARY BASELINE EMISSION CALCULATIONS

Preliminary estimates of HFC and PFC emissions are shown for 1990, 2000 and 2010 in the attached tables. The estimates in this analysis represent the "emissions" in those years, not the "consumption".

During the June Workshops, the DuPont Co. provided HFC emission estimates of 44 MMTCE based on their expected market size of the HFCs. The DuPont HFC estimates reflect consumption=emission (see attached).

EPA 1990 HFC/PFC Emissions =	19 MMTCE
EPA 2000 HFC/PFC Emissions =	42 MMTCE
GAP	= 23 MMTCE

By 2010, the growth of HFC and PFC will grow by 60% over 2000 to 67 MMTCE.

METHODOLOGY

The estimates were developed using a set of spreadsheets that estimate HFC and PFC emissions based on:

1. Vintaging Model results related to the stock of equipment in each end use, chemical use per piece of equipment, equipment lifetimes and emission rates from each piece of equipment, and
2. Substitution scenarios that describe the chemicals that will replace CFCs, halons, and HCFCs when they are phased out under the Copenhagen Amendments to the Montreal Protocol. The scenarios are based on estimated market penetration and the number of years it may take to fully implement a substitute.

KEY ASSUMPTIONS

1. HFC-23 was assumed to be emitted as a by-product of HCFC-22 production. Its emission rate was assumed to be 2 percent of total captive and non-captive HCFC-22 production.
2. HFCs are assumed to be recycled after 1995 in all refrigeration, air conditioning and halon end uses. For the refrigeration sector, the recycling rates are assumed to be the same as those for CFCs and HCFCs.
3. The average leak rate for chillers was assumed to be approximately 5% per year (down from the current 10-15%).
4. A range of emission estimates have been estimated for automobile air conditioning, based on the assumption that they require between 0.16-0.19 kilograms of HFC-134a per year to maintain their operation.
This analysis shows the estimate for 0.16 kg/year/vehicle.
5. The 1990 estimate for HFC-152a is attributed to its use as a component of a refrigerant blend (R500) used historically in dehumidifiers.
6. GWP's for HFC-227ea, HFC-356, HFC-S (a proposed HFC solvent with a 50-70 year life), and the PFCs have not yet been estimated. The GWP's used for this analysis are estimates based on existing GWP's.

ENERGY IMPACTS

This analysis does not include any impact (positive or negative) the chosen alternative has on the energy efficiency of the system or product.

KEY UNCERTAINTIES

The estimates presented are preliminary, based on various assumptions. The key uncertainties are:

1. The chosen alternatives, the substitution rate, the market penetration, and years to maximum penetration of chemicals that in some cases are not yet even on the market.
2. Leak rates and recycling rates for new equipment which in this case are based on expected system improvements.
3. The total percentage of HFC-23 from HCFC-22 production and the estimated market for HCFC-22 should be reviewed.
4. The GWP's for chemicals where there are no measurements.

**PRELIMINARY BASELINE ESTIMATES
HFCS AND PFCS
1990**

CHEMICAL	QUANTITY MILLION KG	GWP=1KG CO2 100 year	CO2 EQUIVAL	MMTCE	ATM LIFE (YEAR)
HFC-23	3	10,000	30	8.1	
HFC-134A	0.5	1200	.6	0.16	15.6
HFC-152A	3.0	150	.45	0.12	1.8
SUBTOTAL HFCS				8.4	
CF4/C2F6 ALUMINUM				10.2	
TOTAL				18.6	

**PRELIMINARY BASELINE ESTIMATES
HFCs AND PFCs
2000**

CHEMICAL	QUANTITY MILLION KG	GWP=1KG CO2 100 YEAR	CO2 EQUIVAL	MMTCE	ATM LIFE (YEAR)
HFC-23	3.5	10,000	35	9.5	
HFC-32	0.2	600	0.12	.03	~6
HFC-125	4.34	2500	10.85	2.9	40.5
HFC-134A	26.82	1200	32.18	8.7	15.6
HFC-143A	0.31	2900	.9	0.24	64.2
HFC-152A	0.18	150	.03	0.01	1.8
HFC-227EA	3.68	2900*	10.6	2.86	31
HFC-S	7.89	2900**	22.9	6.2	50-70
HFC-356	0	600**			~6
SUBTOTAL HFCs			112.58	30.4	
PFC-410	0.12	3400***	.41	0.11	2600
PFC-614	0.05	3400***	.17	0.05	3100
PFC-F	1.61	3400***	5.5	1.5	
CF4/C2F6 ALUMINUM		5100/ 10,000		10.2	< 50,000
TOTAL				42.26	

* GWP may change. Some estimates show it may be 2000.

** GWP's have not yet been calculated for these chemicals. The GWP's listed are estimates based on other chemicals.

*** This is an estimated 100 year GWP using CFC-11 as a surrogate. This class of chemical is extremely persistent and the entire global warming effect is not captured in a 100 year GWP value.

**OTHER GASES BASELINE ESTIMATES
HFCs AND PFCs
2010**

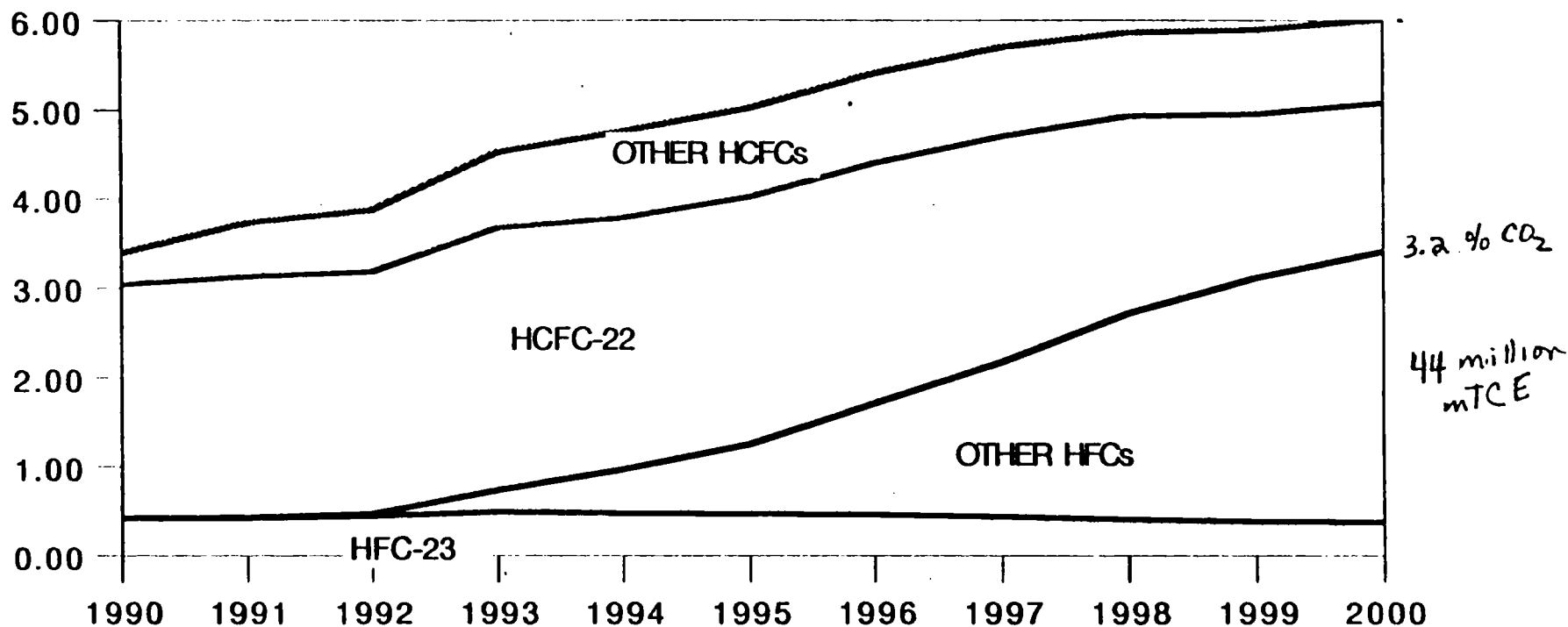
CHEMICAL	QUANTITY MILLION KG	GWP=1KG CO2	CO2 EQUIVAL	MMTCE	ATM LIFE (YEAR)
HFC-23	3.8	10,000	38	10.3	
HFC-32	0.78	600	0.5	0.1	~6
HFC-125	10.3	2500	25.8	7	40.5
HFC-134A	62.2	1200	74.6	20	15.6
HFC-143A	1.04	2900	3	0.8	64.2
HFC-152A	2.22	150	0.3	.6	1.8
HFC-227EA	8.96	2900*	26	7	31
HFC-S	8.71	2900**	25.3	6.8	50-70
HFC-356	13.6	600**	8.2	2.2	~6
SUBTOTAL HFCs			201.7	54.5	
PFC-410	0.24	3400***	.8	0.2	2,600
PFC-614	0.05	3400***	.17	.04	3,100
PFC-F	1.72	3400***	5.8	1.6	
CF4/C2F6 ALUMINUM		5100/ 10,000		10.2	~50,000
TOTAL				66.5	

* GWP may change. Some estimates show it may be 2000.

** GWP's have not yet been calculated for these chemicals. The GWP's listed are estimates based on other chemicals.

*** This is an estimated 100 year GWP using CFC-11 as a surrogate. This class of chemical is extremely persistent and the entire global warming effect is not captured in a 100 year GWP value.

U.S GLOBAL WARMING CONTRIBUTION (PERCENTAGE OF CO2)



ASSUMES KG OF HFC-23 = 0.02*HCFC-22, 100 YEAR ITH GWP,
EMISSIONS AT TIME OF CONSUMPTION; CFC CONTRIBUTION IN 1990 = 21.8%

500 million mT CO₂ eq. (USNAP 1992).

Source: DuPont 6/93

Submitted to Workshop on Methane & Other Gases,

11-1

Table A2.1: Numerical estimates of the "Direct" GWP and the sign of the "Indirect" effect of several gases. The lifetimes of various non-CO₂ species follow WMO (1992) and Ramanathan et al. (1985). The carbon cycle model employed follows IPCC (1990). The 20, 100 and 500-year time horizons denote the time elapsed after a pulse release of the gas in consideration. The radiative forcing values follow IPCC (1990) and Ramanathan et al. (1985). The following important points should be noted regarding the entries in the Table:

1. The lifetimes of the various species are not as precisely known as the Table indicates; they are used for the GWP calculations primarily to ensure consistency with the lifetime values in the references cited.
2. This assessment does not calculate the "Total" (direct + indirect) GWP as did IPCC (1990). Note that CO, NMHC and NO_x are all short-lived gases having a negligible direct GWP component.
3. The indirect GWPs are uncertain but could conceivably be comparable in magnitude to the direct GWPs. Only the signs of the indirect effects are estimated here, based on current understanding. The estimates of the indirect effects for the chlorine- and bromine-containing compounds are based on the weight of evidence related to the observed lower stratospheric ozone depletion (WMO, 1992).
4. IPCC (1990) contained a typographical error for the indirect effect of methane which led to the inference of an incorrect value for its direct GWP. Also in that report, the indirect effect of NO_x was probably overestimated by a large factor (Johnson et al., 1992).

Gas	Lifetime (years)	Direct Effect for Time Horizons of			Sign of "Indirect" Effect
		20 years	100 years	500 years	
CO ₂	*	1	1	1	none **
CH ₄	10.5	35	11	4	positive
N ₂ O	132	260	270	170	uncertain
CFC-11	55	4500	3400	1400	negative
CFC-12	116	7100	7100	4100	negative
CFC-13	400	11000	13000	15000	negative
CFC-14	>500	>3500	>4500	>5300	none ***
HCFC-22	15.8	4200	1600	540	negative
CFC-113	110	4600	4500	2500	negative
CFC-114	220	6100	7000	5800	negative
CFC-115	550	5500	7000	8500	negative
CFC-116	>500	>4800	>6200	>7200	none ***
HCFC-123	1.71	330	90	30	negative
HCFC-124	6.9	1500	440	150	negative
HFC-125	40.5	5200	3400	1200	none ***
HFC-134a	15.6	3100	1200	400	none ***
HCFC-141b	10.8	1800	580	200	negative
HCFC-142b	22.4	4000	1800	620	negative
HFC-143a	64.2	4700	3800	1600	none ***
HFC-152a	1.8	530	150	49	none ***
CCl ₄	47	1800	1300	480	negative
CH ₃ CCl ₃	6.1	360	100	34	negative
CF ₃ Br	77	5600	4900	2300	negative
CHCl ₃	0.7	92	25	9	negative
CH ₂ Cl ₂	0.6	54	15	5	negative
CO	months	-	-	-	positive
NMHC	days to months	-	-	-	positive
NO _x	days	-	-	-	uncertain

* The persistence of carbon dioxide has been estimated by explicitly integrating the box-diffusion model of Siegenthaler (1983); an approximate lifetime is 120 years.

** CO₂ is not involved in chemical reactions affecting the concentrations of the radiatively active species. However, it could affect the relevant chemical reactions through its influences on the atmospheric thermal structure.

*** No currently known or negligible indirect effect

Exhibit 2

Substitution Assumptions

End Use	Applies to New or Existing	Substitute	Maximum Market Penetration	Penetration Start Date	Years to Maximum Penetration
Foams					
Rigid PU Insulation	New	HCFC-141b	100%	1993	1
Rigid PU Insulation	New	HFC-134a	33%	2002	2
Rigid PU Insulation	New	HFC-356	33%	2002	2
Rigid PU Insulation	New	Hydrocarbons	34%	2002	2
Appliance	New	HCFC-141b	100%	1994	1
Appliance	New	HFC-134a	30%	2002	2
Appliance	New	HFC-356	30%	2002	2
Appliance	New	Hydrocarbons	30%	2002	2
Appliance	New	Alt. Technologies	10%	2002	2
Sprayed	New	HCFC-141b	100%	1993	1
Sprayed	New	HFC-134a	33%	2002	2
Sprayed	New	HFC-356	33%	2002	2
Sprayed	New	Hydrocarbons	34%	2002	2
EPS Insulation Board	New	HCFC-22/HCFC-142b	100%	1993	1
EPS Insulation Board	New	HFC-152a	50%	2010	2
EPS Insulation Board	New	Hydrocarbons	50%	2010	2
EPS Sheet	New	Hydrocarbons	100%	1993	2
Polyolefin Foam	New	HCFC-22/HCFC-142b	100%	1993	2
Polyolefin Foam	New	HFC-152a	33%	2010	2
Polyolefin Foam	New	HFC-134a	33%	2010	2
Polyolefin Foam	New	Hydrocarbons	34%	2010	2
Phenolic Insulation Board	New	HCFC-22/HCFC-142b	100%	1993	2
Flexible	New	Water blown	100%	1992	1
MACS					
	New	HFC-134a	100%	1993	3
	Existing	HFC-134a	15%	1996	5
Chillers					
CFC-11	New	HCFC-123	100%	1993	2
CFC-11 (Existing)	Existing	HCFC-123	80%	1993	3
CFC-12.CFC-500	New	HFC-134a	100%	1993	2
CFC-12.CFC-500	Existing	HFC-134a	80%	1993	2
HCFC-22	New	HFC-134a	100%	1993	15
CFC-114	New	HCFC-22	100%	1993	2
Retail Food/Cold Storage					
CFC-12	New	HFC-134a	100%	1994	2
CFC-12	Existing	HFC-134a	80%	1994	6
HCFC-22	New	HFC-143a/125	50%	1997	1
HCFC-22	New	HFC-143a/125	50%	1998	12
R-502	New	HCFC-22	50%	1993	1
R-502	New	HFC-143a/125	50%	1994	1
R-502	New	HFC-143a/125	100%	1998	1
R-502	Existing	HCFC-22/HFC-125	100%	1998	1

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Exhibit 2

Substitution Assumptions

End Use	Applies to New or Existing	Substitute	Maximum Market Penetration	Penetration Start Date	Years to Maximum Penetration
Process Refrigeration					
CFC-12, CFC-500, CFC-502	New	HFC-134a	80%	1993	2
Household Refrigeration					
	New	HFC-134a	100%	1993	2
Residential A/C					
HCFC-22 Window Units	New	HFC-32/125/134a	100%	1995	15
HCFC-22 Unitary A/C	New	HFC-32/125/134a	100%	1995	15
Solvents*					
Solvents	New	HFC-50	15%	1995	1
Solvents	New	HCFC-225	10%	1995	1
Solvents	New	Aqueous, Semi-Aqu.	75%	1993	1
Sterilants					
Sterilants	New	HCFC-124/ETO	20%	1993	2
Sterilants	New	HFC-125/ETO	20%	1994	2
Sterilants	New	HCFC-227ea/ETO	20%	1994	2
Sterilants	New	HCFC Blend A	20%	1994	2
Sterilants	New	CO2/ETO	20%	1994	2
Sterilants	Existing	HCFC-124	100%	1994	2
Aerosols					
HCFC-22.MCF	New	HFC-134a	15%	1994	1
	New	HFC-152a	5%	1994	1
	New	Hydrocarbons	80%	1994	1
Halons					
Flooding	New	NAF S III	5%	1995	5
Flooding	New	HFC-23	10%	1995	5
Flooding	New	HFC-227ea	15%	1995	5
Flooding	New	PFC-410	10%	1995	5
Flooding	New	Not-in-Kind	100%	1993	2
Streaming	New	Halotron I	5%	1995	5
Streaming	New	PFC-614	3%	1995	5
Streaming	New	Not-in-Kind	100%	1993	2

* The substitution scenario for solvents presents the likely scenario from 1995 onwards. Prior to that date HCFC-141b will capture approximately 5 percent of the market.

JUN 25 1991
DRAFT

Summary of Policy Options:

1. HFC-23 Emission Reduction Program (<5 MMTCE reduction)
2. Strengthen Section 608 of Clean Air Act- Emission Reduction (1-2 MMTCE)
3. Product Stewardship for Long Lived Chemicals (1 MMTCE)
4. Strengthen Section 612 of Clean Air Act-
Narrow use approvals under SNAP (set conditions on use)
(4-5 MMTCE)
5. Aluminum Program to Reduce (5 MMTCE)

GWP

To: JES
From: Ray

Morgenstern
260 4332

PCC WP III

June 30, 1993 12:20

Talking Points for Conversation with Dick Morgenstern

**re: US suggestions for IPCC Working Group 3 authors--
EPA participation**

- EPA participation in ERNRE very useful--Joel Scheraga and Neil Leary [under Dennis Tirpak, who reports to Morgenstern]
- IPCC meeting in Montreal ran well and got Working Group 3 off to a good start, emphasizing science.
- Drafting list of suggested authors--**recent snag needs attention.**

Informal task group led by Ray Squitieri, with NSF (Dan Newlon), NOAA (Sally Kane), DOE (John Houghton), State (Lysbeth Rickerman), Jonathan Wiener, plus EPA (Joel Scheraga)

Seemed to be reaching closure until last Thursday.

EPA appears to have dropped out of the process:

Joel **not returning calls or faxes** from Ray on Thursday, Friday, Sunday, Monday--**total of 10 calls and faxes**; failed to attend meetings Friday and Monday; did not keep scheduled phone appointments several times, **including this morning at 11:30**, according to Ray

- What Ray and the other group members understand to be EPA's concerns

--EPA wants Scheraga, Bob Shackelton, and perhaps other EPA staffers nominated as contributing authors.

Answer: Having a few from agencies could make the product more policy-relevant than it otherwise might be.

But ... Concerns all along about naming the **best technical people** to do the work. Not many government staffers meet that test. John Reilly of USDA is one who does meet the test, and he has been on the list without objection from anyone. Concerns about sending the wrong signal to other governments about loading our list with our own government people. Concerns about other agencies (Agriculture, Interior, Energy, Commerce, etc.) demanding equal representation.

[Joe: Scheraga would be acceptable if EPA will then go along

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Cherry)

with the rest of the process, but not as a down payment on further demands; Schackelton is not acceptable;

Bottom line: If Joel wants to be named to the list, he should come to the meetings and make the case to the others.

[Joe: State suggested Morgenstern as a lead author with you on the "Scope" chapter. This is certainly not acceptable. It does suggest that Morgenstern may be trying to form an alliance with State allowing State to retain more control of the IPCC WG3 process.]

--EPA wants Richard Richels removed from the list of suggested contributing authors, evidently because he comes from industry.

Answer: The other group members want him on the list. Commerce and Energy object to EPA's policy of excluding anyone from industry. **Richels should remain on the list.**

--EPA wants more "bottom up" analysts in the chapter on cost estimates.

Answer: the **new list has five bottom up analysts**, and only three "top down" analysts.

Note to JES: "Bottom up models are engineering-based models, as opposed to economic models such as Jorgenson's or Manne's, which are called "top down" models.

--EPA wants representatives of environmental NGOs on the list.

Answer: additions to new list include Robert Repetto of World Resources Institute and Bob Williams of Princeton, whose work is often cited by conservation and environmental groups. [Note: Herman Daly, the guru of "sustainable development" economics, now of the World Bank, may displace Repetto; Daly is regarded as farther from the economics mainstream, but perhaps more acceptable to environmental and sustainable development interests.]



DEPARTMENT OF THE TREASURY
WASHINGTON

FACSIMILE COVER SHEET
OFFICE OF ECONOMIC POLICY

DATE 6/30/93

NUMBER OF PAGES TO FOLLOW: 2

TO: Joseph E Stiglitz, CEA

ADDRESSEE'S FAX NUMBER: 38-6947

ADDRESSEE'S CONFIRMATION NUMBER: _____

FROM: Ray SOUTHERN

SENDER'S FAX NUMBER: (202) 622-1294

SENDER'S CONFIRMATION NUMBER: 622-2940

COMMENTS/SPECIAL INSTRUCTIONS:

MEMORANDUM TO RICHARD MORGENSTERN

FROM: JOSEPH E. STIGLITZ

SUBJECT: Recommendation of Authors for IPCC Working Group 3
Assessment Report

Ray Squitieri passed on to me a note from Joel Scheraga, received this afternoon, indicating EPA's concerns about the lack of government people on the list of proposed authors.

I agree that the inclusion of a few government authors^{more} would help the final document to be policy relevant. I also believe, as do the other members of Ray's task group and Bob Watson, that any government authors named to the list must have international stature. If the report is to have credibility it must be written by the best scientists. If the U.S. government fails to hold to this standard in submitting its list, then it will invite other governments to do the same. ^{among the contributing} authors

Moreover, even if the U.S. were able to nominate a ^{large} group of top-flight government experts, it would invite other governments to submit lists heavy with their own governments people--and other governments cannot match the U.S. government's technical talent on the economics of climate change. ✓



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

OFFICE OF
POLICY, PLANNING AND EVALUATION

June 30, 1993

MEMORANDUM

TO: Ray Squitieri
FROM: Joel Scheraga *JS*
SUBJECT: IPCC Working Group III

Thanks for the most recent (June 28) list of proposed lead and contributing authors for IPCC WGIII. Since we are having a hard time connecting by phone, I wanted to pass along a little bit of feedback to you.

- As I indicated to you in my first memo of June 24, our upper management is currently reviewing the list of proposed authors. As soon as I hear anything about EPA concurrence/non-concurrence, I'll let you know. (A concurrence decision must come from upper management.)
- We remain concerned about the absence of government authors, and find the failure to include such individuals unsatisfactory. As I mentioned in my second memo of June 24, Bob Watson indicated to me that the nominations for contributing authors should be a good mix of government and non-government people.
- Until our upper management concurs with your proposed list, I cannot make any funding commitments to support these authors.

I will let you know as soon as I hear anything.

cc: Dick Morgenstern
Dennis Tirpak
Jane Leggett
Bob Watson

CC: JES

THE WHITE HOUSE

WASHINGTON

June 29, 1993

F
Cannon
(Chenille
Shaw)

MEMORANDUM TO THE INTERAGENCY ANALYSIS TEAM — Climate Change

FROM: Marc Chupka
Jonathan Wiener

SUBJECT: Meeting June 30

There will be a meeting of the IAT at 9:30 in Room 324 of the OEOP on Wednesday June 30. The topics will be further attention to baselines, initial screening of options, translating option descriptions into IDEAS modeling framework, and next steps.

- 1) Baseline issues:
 - a) Richard Howarth and Lee Shipper from LBL will be in town on June 30, and will give a brief presentation on industrial energy efficiency trends which may help us interpret the IDEAS baseline and may have some implications for the analysis of industrial energy demand policy options.
 - b) We must reach closure on other baseline issues -- emissions of CO₂ from transportation, baseline emissions for other greenhouse gases, and the estimation of the impact of voluntary efficiency improvements in the baseline.
- 2) The working groups will perform an initial triage of options -- non-starters, no-brainers, and tough choices. *This is merely a straw proposal that will help benchmark our deliberations* -- we can revisit all of the initial rankings, and consider additional options as they arise. However, we need to examine the list of likely options in order to determine whether or how these might be incorporated into the IDEAS modeling framework. This will test our ability to model options, turn around analysis, and interpret results.
- 3) We should begin to model the list of "no-brainers" from the working group chairs and OEP. This exercise will test our ability to take input from the working groups and help us identify areas for improving the flow of information. In the probable event that these options do not achieve the President's goal, we will get additional options from the "tough choices" list to integrate into policy packages.
- 4) Additional steps: the IAT should begin to consider cross-cutting policy options that do not fit into particular working groups (e.g. emission caps, taxes, emissions reporting).

June 29, 1993

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Jonathan Wiener

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*File Enron
(Climate Change)*

Agenda for Meeting with Canadian officials

Doug Russell (Env't Canada)
Alex Manson (Env't Canada)
Eric Haites (economist/consultant)
Embassy rep.

re: IPCC Working Group III (Economics of Climate Change)

1. Montreal meeting went very well, thanks to you
2. We are organizing US substantive input to WG 3. (Of course official communications will come through State Dept.)

-- how can we be of best help to you ?
(recall we passed suggested Outline in March)
3. Congratulations to Eric Haites on being the new head of the **"Technical Support Unit"** for WG 3

-- how will you organize your work?
-- contact with countries e.g. US ?
-- contact with WGs 1 & 2 ?
4. Do you have ideas for **authors** for the WG 3 report ? What names are being suggested ?

(if they ask for suggestions in an area, say:

-- here are a few of our preliminary ideas ...
(of course, we will complete our official submission next week, State will submit)
5. Do you have a vision of the WG 3 report ? What would its main points be?

(their likely suggestion:
- specific policies for countries to adopt
- resolve top-down vs. bottom-up cost studies

(our preferred approach:
- framework for thinking about the problem -- costs & benefits, valuation, uncertainty
- not specific policies -- countries object to IPCC dictating policy choices
- not just the cost side

DRAFT 6/16/93

Information flow between IAT and WGs

1. Information for Working Groups from IAT: remaining issues

CO2 baseline

Transportation sector projection

mpg, VMT, etc. in 2000, 2010

CH4 & N2O baselines

Uncertainty in 1990 base

Projection to 2010

CFCs, HCFCs, HFCs baselines

Relative GWPs of CFCs and their substitutes

Projections of quantities in use in 2000, 2010

Other gas baselines (CF4, etc.)

Energy Tax in Clinton baseline

Sinks baseline

2. Information IAT needs from Working Groups

Joint meeting with WG chairs 6/22/93

Items to emphasize from 5/28/93 memo

Realistic expectations of WG output

Assistance from IAT to WGs?

Timing of WG reports to IAT

Handwritten:
IAT
(Clinton
Change)

File

Joe - Here is a possible agenda for
today's 10Am meeting of the Climate IAT
- Jonathan

DRAFT 6/16/93

Information flow between IAT and WGs

1. Information for Working Groups from IAT: remaining issues

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Committee
(Climate
Change)

file Clinton op file

THE WHITE HOUSE
OFFICE ON ENVIRONMENTAL POLICY

FOR IMMEDIATE RELEASE

MONDAY, June 7, 1993

PUBLIC WORKSHOPS SET FOR CLIMATE CHANGE GROUP
Seeking Broad Participation as Policy is Developed
JUNE 10, 11 AT SHERATON WASHINGTON HOTEL

WASHINGTON -- Nearly 300 people representing a broad range of perspectives have been invited to participate in workshops June 10 and 11 focusing on innovative ideas to reduce greenhouse gas emissions to 1990 levels by the year 2000, meeting President Clinton's Earth Day directive.

The Interagency Climate Change Mitigation Group, created to craft policies to reduce U.S. greenhouse gas emissions, will host the June 10 and 11 workshops at the Sheraton Washington Hotel. Invitations to the workshops have been extended to experts from industry, state and local governments, labor, environmental organizations, and academia.

"We are interested in hearing from people with many different perspectives, and learning about innovative, new ideas that can help us craft a creative and cost-effective policy," said Kathleen McGinty, Director of the White House Office on Environmental Policy which is coordinating this effort.

The workshops open June 10 with a plenary session involving participants from the six working groups of the Interagency Climate Change Mitigation Group: Energy Supply; Energy Demand; Transportation; Methane and Other Greenhouse Gases; Greenhouse Gas Sinks; and International Joint Implementation. Senior Administration officials will describe the overall policy objectives and how the workshops will contribute information to developing policy. In the afternoon June 10, individual workshops will be conducted around the working groups. There will be 11 workshops during the two-day conference.

On June 11, workshop sessions will continue to explore issues raised during the plenary session.

The plenary session and all of the workshops are open to the public. For registration forms call: Tina McKinley (615) 576-3418.

Media interested in covering the event should contact Tina McKinley for more information at (615) 576-3418 or by fax at (615) 576-9383.

##

NOTE: A list of the working group chairs follows.

CLIMATE CHANGE WORKING GROUP CHAIRS

Working Group I: Energy Supply

Richard Rosenzweig
Chief of Staff for the Secretary
US Department of Energy

Working Group II: Energy Demand

Dirk Forrister
Special Assistant to the Secretary for Policy
US Department of Energy

Karl Hausker
Deputy Assistant Administrator
Office of Policy, Planning, and Evaluation
US Environmental Protection Agency

Working Group III: Transportation

Joseph Canny
Deputy Assistant Secretary for Policy and International Affairs
US Department of Transportation

Richard Morgenstern
Acting Assistant Administrator
Office of Policy, Planning, and Evaluation
US Environmental Protection Agency

Susan Tierney
Assistant Secretary for Policy
US Department of Energy

Working Group IV: Methane and Other Gases

Michael Shapiro
Acting Assistant Administrator for Air and Radiation
US Environmental Protection Agency
Office of Air and Radiation

Working Group V: Sinks

James Lyons
Assistant Secretary for Natural Resources and Environment
US Department of Agriculture

Working Group VI: Joint Implementation

Daniel Reifsnyder
Director
Office of Global Change
Bureau of Oceans and International Environmental/Scientific Affairs
US Department of State ##

SCHEDULE OF WORKSHOPS
June 10-11, Sheraton Washington Hotel

Energy Supply Working Group

Energy Supply Workshop

Energy Demand Working Group

Residential Energy Demand Workshop

Commercial Energy Demand Workshop

Industrial Energy Demand Workshop

Transportation Working Group

Auto/Light Truck Workshop

Commercial Transportation Workshop

Transportation Infrastructure Workshop

Methane and Other Greenhouse Gases Working Group

Methane Workshop

Other Greenhouse Gases Workshop

Greenhouse Gas Sinks Working Group

Sinks Workshop

Joint Implementation Working Group

Joint Implementation Workshop

For registration forms (Public and Press) call

Tina McKinley

Oak Ridge Institute for Science and Education

(615) 576-3418 (phone)

(615) 576-9383 (fax)

##

Greenhouse Gases

- * Emissions resulting from human activities are substantially increasing the atmospheric concentrations of greenhouse gases, especially carbon dioxide, methane and nitrous oxide. The primary anthropogenic sources are:

Carbon dioxide: combustion of fossil fuels, land-use changes and cement production.

Methane: coal mining, natural gas leakages, landfills, cattle, rice

Nitrous oxide: adipic acid (nylon) and nitric acid production

Recent Findings and Key Uncertainties:

The processes controlling the fluxes of carbon dioxide between the atmosphere and the oceanic and terrestrial ecosystems (i.e., the magnitude of the terrestrial and oceanic sinks) are not quantitatively understood. However, evidence is mounting that there is a significant terrestrial sink of carbon dioxide. This means that the net emissions from land-use change, and the relationship between emissions and atmospheric concentrations, are poorly quantified.

The magnitude of the individual sources of methane and nitrous oxide on a global scale are quite uncertain.

The rate of increase of atmospheric methane has slowed by about a factor of two over the last few years.

Greenhouse Gases (continued)

- * Other important greenhouse gases include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), fully fluorinated chemicals (e.g., CF_4), and upper tropospheric and lower stratospheric ozone.

CFCs and HCFCs: The net radiative effect of CFCs (and most likely HCFCs) is less than previously believed because the chlorine-induced loss of ozone in the lower stratosphere offsets the direct radiative forcing of the CFCs (and most likely HCFCs). The role of HCFCs in climate change is limited because their production and consumption are controlled under the Copenhagen amendments to the Montreal Protocol.

HFCs: These gases, which are partial substitutes for the CFCs, are quite strong greenhouse gases. HFCs are not controlled under the Montreal Protocol because they are not ozone depleting substances, hence there is potential for significant growth in production and consumption, i.e., emissions.

Fully Fluorinated Chemicals: While the current emission rates of these gases is relatively low, they have very long lifetimes.

Tropospheric ozone: Ozone in the upper troposphere is a powerful greenhouse gas, hence any increase in upper tropospheric ozone would amplify the enhanced greenhouse affect. However, the atmospheric trend data for both ozone and it's precursors is sparse and often of limited quality.

Atmospheric Aerosols

- * The cooling effect of aerosols resulting from sulfur emissions or from biomass burning may have directly and/or indirectly offset a significant part of the enhanced greenhouse warming in the northern hemisphere during the past several decades.
- * The impact of aerosols in the future will depend upon the magnitude and the regional distribution of emissions for sulfur gases, e.g., sulfur dioxide, and the extent of biomass burning.
- * The atmospheric lifetimes for aerosols and their precursors is very short (days to weeks) in contrast to the very long lifetimes (decades to centuries) of the key greenhouse gases. Therefore, their effect on global warming rapidly adjusts to increases or decreases in emissions.

Model Results

- * The sensitivity of global mean surface temperature to doubling of carbon dioxide is unlikely to lie outside the range 1.5 to 4.5 degrees centigrade.
- * Time-dependent simulations, with coupled ocean-atmosphere models, in which neither aerosol or ozone changes have been included, suggest a warming rate of about 0.3 degrees centigrade per decade for the central IPCC trace gas scenarios, e.g., IPCC 1990 scenario A.
- * Coupled ocean-atmosphere models are now capable of reproducing some features of atmospheric variability on intra-decadal time scales, i.e., a variability of a few tenths of a degree centigrade.
- * The large scale geographic patterns of warming predicted from transient coupled ocean-atmosphere models are similar to the patterns predicted from equilibrium models, except that the transient simulations show a reduced warming over the North Atlantic and the southern oceans near Antarctica.

Climate Observations

- * the global mean surface air temperature has increased by 0.3 to 0.6 degrees centigrade over the past 100 years.
- * the observed warming over parts of the northern hemisphere mid-latitude continents has been found to be largely characterized by increases in minimum (night-time) rather than maximum (day-time) temperatures.
- * global mean surface temperatures were anomalously high (highest on record) in the late 1980s and 1990 and 1991.
- * the volcanic eruption of Mt. Pinatubo in 1991 resulted in a transitory warming of the stratosphere and a cooling of the troposphere.
- * radiosonde data indicate that the lower troposphere has warmed over recent decades. Since meaningful trends cannot be assessed over periods as short as a decade, the widely reported disagreements between decadal trends of air temperatures from satellites and surface data cannot be confirmed because the trends are statistically indistinguishable.

Impacts of Climate Change

- * Climate change will have consequences for agriculture and forestry, natural terrestrial ecosystems, hydrology and water resources, human settlements, human health, air quality, oceans and coastal zones (sea level rise), seasonal snow cover, ice and permafrost, and the energy, transport, and industrial sectors.
- * The most significant potential impacts of climate change are likely to include:
 - a sea level increase of up to one meter by 2100
 - changes in regional patterns of precipitation and soil moisture, leading to changes in agricultural productivity
 - shifts in the productivity and boundaries of natural terrestrial ecosystems.

Conclusions

- * the size of the observed global warming is broadly consistent with predictions from climate models, but is also of the same size as natural climate variability. Thus the observed increase could be largely due to this natural variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming.
- * the consistency between observations of global mean temperature trends over the past century and model simulations of the warming due to greenhouse gases over the same period is improved if allowance is made for the increasing evidence of a relative cooling effect due to anthropogenic aerosols (from sulfur emissions and biomass burning) and stratospheric ozone depletion.
- * the estimated warming of about 0.3 degrees centigrade per decade, based on the central 1990 and 1992 IPCC emission scenarios, should be reduced somewhat, especially in the northern hemisphere, by an amount dependent upon the future magnitude and regional distribution of sulfur and biomass burning emissions.
- * there are many uncertainties in our predictions particularly with regard to the timing, magnitude and regional patterns of climate change. This is due to an incomplete understanding of:
 - the role of clouds
 - the role of the oceans
 - sources and sinks of greenhouse gases
 - land-surface hydrological processes
 - cryospheric processes
 - ecological processes

* the long atmospheric lifetimes of the greenhouse gases means that if climate change occurs with adverse environmental consequences the damage cannot be reversed for many decades or centuries even with major changes in greenhouse gas emissions.