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Global Change: Strategy Task Force Meeting - 11/26/90

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

NOVEMBER 30, 1990

MEMORANDUM FOR KEN YALE

FROM:

VICKIE V. SUTTON 

SUBJECT:

SEVEN AREAS OF PROPOSED ACTIONS FOR NEGOTIATING
SESSION

We cannot include in a memo to Sununu the status of these seven areas today, because the report from the State Department at next week's Strategy Task Force meeting may substantially date this information. Bob Reinstein related to me the following status report on the seven groups of tasks to be completed before February; however, he cautioned that they are in the process of "reworking" a memo which Chris Dawson asked HIS staff to put together in preparation for our staff meeting today, which was cancelled.

The tasks originally outlined following the summary of the seven items for comparison.

Negotiations on a Framework Convention on Climate Change
Proposed actions and Products:

7 AREAS OF TASKS:

1. CLIMATE ACTION PLAN

Complete before February. Consider "candidates" for inclusion in the "no regrets" list, e.g. Montreal Protocol

2. ECONOMIC FEASIBILITY

Economics Task Force is addressing this. Need a rough cut on these economics tasks by Mid-January. (As many tasks as can be completed.)

3. COMPREHENSIVE APPROACH

State and DOJ are drafting text for possible inclusion in a framework.

4. MONITORING & SCIENCE

CEES is addressing these issues.

5. LDC ISSUES

State is working on paper(s) addressing this issue, focusing on bilateral relations.

6. NEGOTIATING SUBGROUPS IN RELATION TO IPCC

State will come up with a paper before paper.

7. VERIFICATION MONITORING

Language is being developed. Depends on what is binding. However, language is needed for conflicts.

1. PARAMETERS

1-1. Development of appropriate definitions [Task Force on Climate Approaches]

2. ECONOMICS

NEED A ROUGH CUT ON THESE TASKS BY MID JANUARY

2-1. "The Economics of Long-Term Global Climate Change" report from the DPC GCWG Interagency Task Force on Economics. [INTERAGENCY TASK FORCE ON ECONOMICS]

2-2. Preliminary assessments of best available information on effectiveness and economic consequences of various response strategies [DOE, EPA, OMB, CEA]

2-3. Develop detailed analyses of the feasibility of meeting certain proposed targets in order to demonstrate the impracticability of these proposals. [DOE, EPA, CEA]

2-4. Calculate the impact on radiative forcing of emissions targets implemented by only a subset of countries (e.g., OECD members) [DOE, EPA AND CEA]

2-5. Evaluate the feasibility and economic consequences of emissions targets for the U.S. and other key countries. (Part of the effort will be to identify potential allies) [EPA, CEA, OMB AND DOE]

[SEE 10. ANNEXES AND PROTOCOLS FOR ECONOMICS IN THE CONVENTION]

3. NO REGRETS

COMPLETE BEFORE FEBRUARY

CONSIDER "CANDIDATES" TO BE INCLUDED IN NO REGRETS, I.E. MONTREAL PROTOCOL.

3-1. Determine what could be listed under a "no regrets" heading. [STATE IN COOPERATION WITH OTHER AGENCIES]

4. COMPREHENSIVE APPROACH

4-1. Develop options regarding to what extent (i.e., how much detail) the framework convention should "tilt" the protocol in the direction of a comprehensive approach. [STATE WORKING WITH THE TASK FORCE ON CLIMATE APPROACHES]

4-2. The Task Force on Comprehensive and Incentives Approaches to Climate is specifically monitoring this set of products in preparation of the framework convention in relation to the comprehensive/incentives approach: [STATE AND DOJ]

4-2-1. Drafting a U.S. version of a possible framework convention. [STATE AND DOJ]

DRAFTING ONLY ELEMENTS OF TEXT THEY WANT TO INSERT.

4-2-2. Develop an improved radiative forcing index. Sketch the design of a global change index. [CEES, EPA (ALBRITTON AND TIRPAK, ET. AL.)]

4-2-3. Design an international GHG monitoring system. [EPA, CES, DATA MANAGEMENT WORKGROUP, EPA, MARS]

4-2-4. Development of talking points including quantitative demonstrations that piecemeal proposals would have little environmental benefit, or actually be counterproductive. [DOJ]

4-2-5. Conduct quantitative analysis of the comprehensive and economic incentives approaches, and its variations by gas, strategy, sector, nation. [NORM HARTNESS, DOE]

4-2-6. List of the net index-weighted emissions change wrought by relevant U.S. actions, including "no regrets" measures. Prepare a similar list for other countries. [EPA]

4-2-7. Develop language for the framework convention to address the vision of decision making under uncertainty. [CEES AD HOC ECONOMICS TASK FORCE]

4-2-8. Assess other's proposals. [EPA, DOE, CEA]

5. FINANCIAL ASSISTANCE

5-1. Options paper on how to handle the possibility of differentiated treatment in the framework convention for developing countries with respect

to both general and specific obligations. [STATE]

5-2. Catalogue existing U.S. financial assistance related to climate change. [STATE]

5-3. Assessment of existing institutions and mechanisms related to financial assistance for climate change. [STATE]

5-4. Develop positions regarding technology development issues. [STATE, DOE, USDA, EPA'S INTERNATIONAL ENVIRONMENTAL TECHNOLOGY TRANSFER ADVISORY BOARD, DOC, USTR, AND OTHER RELEVANT AGENCIES]

6. INSTITUTIONS

6-1. Consider surveillance/verification/compliance functions that might accompany comprehensive/economic mechanisms to be included in the framework convention. Determine whether they should be included in the convention or subsequent document. [STATE AND THE TASK FORCE ON CLIMATE APPROACHES, in the long term: COMMERCE, USTR]

6-2. Review and analysis of existing institutions, identifying gaps, and considering the provision for the establishment of scientific or other bodies on a permanent or ad hoc basis to advise the parties on various technical matters. [STATE, TASK FORCE ON CLIMATE APPROACHES AND OTHER AGENCIES AS APPROPRIATE]

7. RESEARCH, SYSTEMATIC OBSERVATIONS AND ANALYSIS

SEPARATE FUND BEING CONSIDERED.

7-1. Develop proposals it considers the U.S. should make with respect to research and monitoring. [INTERAGENCY WORKING GROUP ON DATA MANAGEMENT FOR GLOBAL CHANGE]

7-2. Develop an updated list of research areas to include in the convention, perhaps in an annex. The list should include areas in which further research is needed to determine an appropriate response strategy toward greenhouse gases. [TASK GROUP ON CLIMATE APPROACHES]

8. INFORMATION EXCHANGE AND REPORTING

8-1. Determine the kinds of scientific and economic information should be exchanged and under what conditions. [STATE WITH APPROPRIATE AGENCIES]

8-2. Consider the merits of a fund dedicated solely to climate change research and any institutional auspices under which it would operate. Also determine what kinds of scientific and economic information should be exchanged and under what conditions. [STATE AND RELEVANT AGENCIES]

8-3. Consider the need for the elaboration of a comprehensive international research program in order to facilitate cooperation in the exchange of scientific, economic, and other information on climate change. [CEES should provide its view]

9. SETTLEMENT OF DISPUTES

9-1. Options paper discussing whether we should support stronger dispute settlement provisions. [STATE]

10. ANNEXES AND PROTOCOLS

10-1. Analyses to demonstrate the advantages of economic approaches and options for references in the convention to economic mechanisms. [TASK FORCE ON CLIMATE APPROACHES]

THE WHITE HOUSE
WASHINGTON

November 26, 1990

MEMORANDUM FOR THE GLOBAL CHANGE STRATEGY TASK FORCE

FROM: D. ALLAN BROMLEY *WAB*
SUBJECT: Global Change Strategy Task Force Meeting

The Global Change Strategy Task Force will meet Wednesday, November 28, 1990, at 4:00 p.m. in Room 324 of the Old Executive Office Building.

As planned, we will receive briefings on (1) the Comprehensive Approach by representatives from the Department of Justice and the Environmental Protection Agency and (2) status of preparations for the first negotiating session of the Framework Convention on Climate Change by Department of State. In addition, we will discuss major, outstanding issues which need resolution prior to the start of the negotiations.

Attachment

Ken Gale

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

November 27, 1990

MEMORANDUM FOR D. ALLAN BROMLEY

FROM: NANCY MAYNARD *NM*
SUBJECT: Status of Planning for Strategy Task Force Meeting

- (1) Memo confirming date, time, room number, and agenda for task force meeting was faxed yesterday to members outside EOB and hand delivered this morning to members inside EOB. (Attached)
- (2) This time, the meeting will be almost entirely devoted to the following briefings (as requested in previous meetings):
 - (a) Preparations for the First Negotiating Session of the Framework Convention - including both logistics and substantive work. (DOS)
 - (b) The Comprehensive Approach (DOJ and EPA)
- (3) Some of the people providing the briefings will be bringing background material for distribution at the meeting. There were no documents ready to be sent out prior to the meeting.
- (4) I will provide you with an annotated agenda with talking points early tomorrow morning.

THE WHITE HOUSE
WASHINGTON

GLOBAL CHANGE STRATEGY TASK FORCE

AGENDA

November 28, 1990

1. First Negotiating Session of the Framework Convention on Climate Change
 - o Preparations on Logistics Arrangements
 - o Preparations by PCC Working Group on Climate Change Subgroups
2. The Comprehensive Approach
3. Outstanding Issues for the Framework Convention
4. Other Business

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

GLOBAL CHANGE STRATEGY TASK FORCE MEETING

AGENDA

November 28, 1990

I. INTRODUCTION

Thanks for coming to the meeting - we have a full agenda of briefings so we will get started right away in order to finish by 5 as I know we all have other meetings.

As we work our way toward February and the First Negotiating Session of the Framework Convention, it is important that we review the progress being made under the various task groups working on background materials which will guide us in forming a solid position for the negotiations.

To that end, at today's meeting, we will be receiving several important briefings on a number of different topics.

(1) Bob Reinstein (DOS) will start with a brief update on the logistics of the meeting itself and then a progress report on the PCC Working Group on Climate Change Subgroup activities.

(2) Jonathan Weiner, on behalf of Dick Stewart (DOJ), will provide us with an in-depth briefing on the Comprehensive Approach

(3) EPA (Alex Cristofaro) will give us a summary of some recent EPA work which, uses the comprehensive approach to provide current and future estimates of U.S. emissions of greenhouse gases.

After these discussions, in the limited time left, we will then examine the issues we need to address within the context of the new information coming in from the various groups - With the intent of addressing them in detail at next week's meeting.

II. Bob Reinstein: Update on:

- . Logistics Arrangements for Framework Convention
- . Preparations by PCC Working Group on Climate Change Subgroups

III. Jonathan Weiner: Will describe:

.the basic concept of the comprehensive approach - its advantages, objections to it, research needed to support the approach, and options for including it into the framework convention.

IV. Alex Cristafaro: Will describe:

. results of a recent EPA study which, using the comprehensive approach and making certain assumptions about future U.S. environmental initiatives (such as the Clean Air Act), estimates current U.S. emissions of greenhouse gases and makes projections regarding U.S. emissions in the year 2000.

V. Issues to be addressed between now and Framework Convention:

(you could call on Bob Reinstein and Chris Dawson for DOS input)

- . Our overall strategy for the negotiations
- . Our strategy/plan for dealing with greenhouse gas emissions in the negotiations
- . "Special Negotiator" issue - (Secy of State appoints but group should discuss best strategy as input to DOS in this issue)
- . Developing countries - financial and tech transfer issues

I will have staff (NM) provide you with background in the next few days for the issues discussion next week.

THE WHITE HOUSE
WASHINGTON

GLOBAL CHANGE STRATEGY TASK FORCE

AGENDA

November 28, 1990

1. First Negotiating Session of the Framework Convention on Climate Change
 - o Preparations on Logistics Arrangements
 - o Preparations by PCC Working Group on Climate Change Subgroups
2. The Comprehensive Approach
3. Outstanding Issues for the Framework Convention
4. Other Business

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Intergovernmental Negotiating Committee
for Framework Convention on Climate Change - First Session
Washington, D.C. USA 4-14 February 1991

1. The meeting will take place at the Westfields International Conference Center, 14750 Conference Center Drive, Westfields, Virginia 22021, USA

Telephone: (703) 818-0300

Fax: (703) 818-3655

Pre-session documentation is being sent under separate cover.

2. Registration will take place at the Westfields Conference Center on Sunday, 3 February, from 1600 to 2000 and on Monday, 4 February, from 0800 to 1800. Delegates are urged to register on Sunday, if possible.
3. The U.S. Government will host a welcome reception from 1800 to 1930 on Sunday, 3 February 1991.
4. The session will begin promptly at 1000 on Monday, 4 February. Delegates are asked to be seated in the plenary hall by no later than 0945.
5. A special package rate for 3-14 February (inclusive) has been arranged through the Westfield's International Conference Center, where the negotiations will take place. The accommodations package is based on a special rate of \$130 per day (or part thereof), and includes room, all meals and access to extensive recreation facilities. On site hotel accommodations (310 rooms) are available at the Center and can be reserved on a first come, first served basis. Priority will be given to national delegations through 7 January. When the Conference Center is filled, Westfields will book accommodations as needed at a nearby corresponding hotel, which will have shuttle service to the Center.
6. Participants will be responsible for making their own lodging arrangements through the Westfields International Conference Center. National delegations may find it convenient to do so through their country's mission in Washington or New York.

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7. Participants are advised that there is no public transportation between the Conference Center and central Washington. Taxis and rental cars are expensive (taxi fare one way is approximately \$35.00) and time consuming, especially during rush hours. Delegates are strongly advised to make use of the especially advantageous arrangements made for the conference, as in paragraph 5 above.
8. Accompanying persons staying in the Conference hotels will pay the normal hotel rates.
9. Reservations from national delegations received by the Westfields International Conference Center before Monday, 7 January 1991, will receive priority treatment. (Please use Annex I - the combined hotel reservation and pre-registration form.)
10. WMO and UNEP will aim to ensure that applicants for funding, from developing countries, (on the basis of one delegate per country proposed by the country's Ministry of Foreign Affairs), will have travel and financial arrangements completed by the UNDP office in their country before departure, provided applications are received in Geneva or Nairobi before Monday, 7 January 1991. (Please apply using the form at Annex II.)
11. Participants are advised that the most convenient international arrival point in Washington is Dulles International Airport, located about 11 kilometers (approximately 15 minutes) from the Conference Center. A shuttle bus service between Dulles and the Conference Center can be arranged for approximately \$9.00 per person to meet national delegates and agreed observers arriving at Dulles. Those who wish to use this service should notify the Westfields International Conference Center - Conference Director (FCCC) - of their flight number and expected arrival time at least 48 hours in advance. (See telephone and fax numbers in paragraph 1 above.)

Taxis are also available between Dulles Airport and the Conference Center. Taxis run on a meter basis; the cost is approximately \$12-13.00 one way.

Bus service is available between Washington National Airport and Dulles International Airport. Washington Flyer buses leave National Airport seven days a week every hour on the hour between 0600 and 2200. The cost is \$12.00 one way or \$22.00 round trip. Travel time between National Airport and Dulles Airport is approximately 45 minutes. Tickets may be purchased at Washington National Airport at the Washington Flyer Information Desk located outside the main terminal near United Airlines.

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12. Participants are advised that hotels in the United States normally require guests to present a major credit card on registration or to pay in advance.
13. Mail for participants may be addressed to:

Dr./Mrs./Miss/Mr. _____
c/o Conference Director (FCCC),
Westfields International Conference Center,
14750 Conference Center Drive,
Westfields, Virginia 22021, USA
14. Banking and currency exchange facilities will be available at the Conference Center.
15. An airline and car rental desk will be available at the Conference Center for participants' use. A variety of tourist activities will be available on Saturday, 9 February, and Sunday, 10 February. Participants should make their bookings at the Conference Center's travel service support desk.
16. Participants are advised that the United States requires visas for visitors from most countries. Those not holding valid visas are encouraged to make application to the appropriate U.S. consulate as soon as possible.
17. The following climate information for Washington in February has kindly been provided by the US National Weather Service:

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First Negotiating Session on a Framework Convention on Climate Change, Washington, February, 1991

HOTEL RESERVATION AND PRE-REGISTRATION FOR THE MEETING

1. Please reserve me a room at one of the Conference Hotels.
2. I expect to arrive on _____ (day/month) and to
depart on _____ (day/month).
3. I understand that the cost for full board will be US \$130
for each 24 hour period or part thereof and that I shall be
responsible for payment to the hotel.
4. Country/organization: _____

Family name: _____

Other names: _____

Official title: _____

____ Head of Delegation
____ Alternate
____ Adviser
____ Observer
5. Official address: _____

6. Office telephone: _____
7. Telex number: _____
8. Fax number: _____

Signed _____ Date _____

When completed, please return this form to:

Westfields International Conference Center
14750 Conference Center Drive
Westfields, Virginia 22021, USA
Telephone: (703) 818-0300
Fax: (703) 818-3655

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Proposed Agenda

First Negotiating Session

Framework Convention on Climate Change

Washington, D.C.

February 4 - 14, 1991

Sunday, February 3

1600 Registration - until 2000

Monday, February 4

0800 Registration

1000 Welcome by Host Government Representative

1015 Remarks of Host Government Representative

1005 Remarks of WMO Secretary General Obasi

1045 Remarks of UNEP Executive Director Tolba

1125 Remarks of IPCC Chairman Bolin

1145 **BREAK**

1200 Election of Chair

1215 Adoption of Rules of Procedure

1300 **LUNCH**

1500 Appointment of Credentials Committee

1515 Adoption of Agenda

1530 Election of Bureau/Organization of Work

1830 Buses Depart for Reception

1900 USG Reception

2100 Buses Depart for Hotels

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Tuesday, Feb. 5

1000 Delegation Statements (max. 5 min. each)
1300 LUNCH
1500 Delegation Statements (max. 5 min. each)
1800 ADJOURN

Wednesday, Feb. 6

1000 Delegation Statements (max. 5 min. each)
1300 LUNCH
1500 Preparation of Legal Negotiating Text
1800 ADJOURN

Thursday, Feb. 7

1000 Preparation of Legal Negotiating Text
1300 LUNCH
1500 Preparation of Legal Negotiating Text

Friday, Feb. 8

1000 Preparation of Legal Negotiating Text
1300 LUNCH
1500 Preparation of Legal Negotiating Text
1800 ADJOURN

Saturday, Feb. 9 (Optional)

1000 Preparation of Legal Negotiating Text
1300 ADJOURN

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Monday, Feb. 11

1000 Preparation of Legal Negotiating Text
1300 LUNCH
1500 Preparation of Legal Negotiating Text
1800 ADJOURN

Tuesday, Feb. 12

1000 Preparation of Legal Negotiating Text
1300 LUNCH
1500 Simultaneous Meetings of Legal Drafting Group and
Plenary to Discuss Future Work
2000 Legal Drafting Group
2300 ADJOURN

Wednesday, Feb. 13

1000 Report of Credentials Committee
1015 Future Work (continued)
1200 Consideration of Draft Report
1300 LUNCH
1500 Review of Draft Legal Text
1800 ADJOURN
(Night Session Possibility)

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Thursday, Feb. 14

1000 Review of Draft Legal Text
1300 LUNCH
1430 Adoption of Final Report
1500 ADJOURN

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A COMPREHENSIVE APPROACH TO CLIMATE CHANGE

Briefing to the DPC Global Change Strategy Group

Presentation by the Department of Justice,
Environment & Natural Resources Division

November 28, 1990

- OFFICIAL USE ONLY -

"Comprehensive Approach" described

- o An approach or heuristic to guide consideration of climate change issues.
- o Considers all anthropogenic inputs: net emissions (sources less sinks) of relevant trace gases, weighted by the environmental impacts of each gas.
- o Considers the several trace gases of interest:
 - Carbon dioxide (CO₂)
 - Methane (CH₄)
 - Nitrous oxide (N₂O)
 - Chlorofluorocarbons (CFCs)
 - Hydrochlorofluorocarbons (HCFCs)
 - Tropospheric Ozone (O₃) and its precursors:
 - Nitrogen oxides (NO_x)
 - Carbon monoxide (CO)
 - Volatile organic compounds (VOCs)
- o Considers sources and sinks of these trace gases in every sector of human activity:
 - Energy generation
 - Transportation
 - Agriculture
 - Forestry and land clearing
 - Industry
- o Employs a measure, such as an index, of the comparative environmental impacts of the gases

Anthropogenic Sources & Sinks of Selected Gases

<u>Gas</u>	<u>Sources</u>	<u>Sinks</u>
Carbon dioxide (CO ₂)	Fossil fuel combustion Land clearing	Forests Grasses Soils Ocean biota & storage
Methane (CH ₄)	Enteric fermentation in livestock Rice cultivation Wetlands Landfills Natural gas drilling, venting, transmission Coal mining Biomass combustion	Atmospheric OH interaction Soil removal
Nitrous oxide (N ₂ O)	Agricultural fertilizers Land clearing	Soil removal
Halocarbons (CFCs and related)	Refrigerants Aerosol propellants Foam blowing agents Solvents and cleaning agents Fire retardants	
Tropospheric Ozone (O ₃)	Precursors: CH ₄ , CO, VOCs, in the presence of NO _x Transport of strat. O ₃ into troposphere	Halocarbon depletion
Carbon monoxide (CO)	Fossil fuel combustion Biomass combustion Precursors: CH ₄ , VOCs	Atmospheric OH interaction
Nitrogen Oxides (NO _x)	Fossil fuel combustion Biomass combustion Agriculture	
Volatile Organic Compounds (VOCs)	Fossil fuel combustion Biomass combustion Industry	Atmospheric OH interaction
Aerosols/sulfates (e.g. SO ₂)	Fossil fuel combustion	

Comparing trace gases

- o Need for a measure of relative impacts. A measure, or index, is needed to compare the environmental impacts of each trace gas. This measure ensures accounting for activities' overall impacts on the environment, while allowing decision makers the flexibility to fashion a mix of efforts directed at diverse gases.
- o Weighting can't be avoided. Any policy will employ some index to weight the gases, whether implicit or explicit. A CO₂-only policy implicitly weights the other gases at zero.
- o GWP. One such measure is the "Global Warming Potential" (GWP) index, presented in the IPCC Report. The GWP measures the relative radiative forcing of each gas over time -- its potential to warm the atmosphere.

Gas	Instantaneous radiative forcing per kg	Atmospheric residence years (estimated)	Relative radiative forcing potential over years		
			20	100	500
CO ₂	1	120	1	1	1
CH ₄	58	10	63	21	9
N ₂ O	206	150	270	290	190
CFC-11	3970	60	4500	3500	1500
CFC-12	5750	130	7100	7300	4500

(Source: IPCC Scientific Assessment, tables 2.3 and 2.8.)

- o Some uncertainties remain in the GWP values, relating principally to the residence times of gases such as CO₂ and N₂O. They do not warrant abandoning the index.
- o Time and discounting need further discussion.
- o Other comparative measures might also be developed. For example, a "global change index" could incorporate other salient global impacts of the gases in addition to their radiative forcing. These other global impacts include beneficial plant enrichment from CO₂, and adverse stratospheric ozone depletion from CFCs and some of their substitutes. Ignoring these impacts could lead to perverse results, such as a limit on warming that induces other adverse environmental consequences. Yet a multiple attribute index would require a challenging analytic exercise, and its development should initially proceed as a complement not a rival to a radiative forcing index.

Comprehensive approach has multiple applications

- o Research. Designing research strategies to generate the most valuable information, by focusing attention on the climate variables of concern for which information is lacking.
- o Technology evaluation. Calculating the effects on net emissions of new technologies and practices. Possible uses in foreign technology assistance, federal R&D funding, assessments of technology choices encouraged by other regulatory programs.
- o Inventories. Calculating current net emissions of relevant trace gases, by nation and sector.
- o Report cards. Calculating the likely effects on net emissions of current policy actions.
- o Policy choices. Calculating the effects on net emissions of potential policy actions proposed by others or considered by the U.S.
- o Policy design. Defining any agreed response measures in terms of a comprehensive approach, accounting for and allowing flexibility among all relevant gases, sources and sinks.

"How to" and "how much"

- o In general, the comprehensive approach addresses "how to," that is, the design of cost-effective responses (including research, technology development, limitations, etc.). It does not directly address the question of "how much" response to potential climate change is desirable; that is the province of overall cost-benefit analysis, which considers the aggregate costs and benefits of change and of actions to respond.
- o The comprehensive approach does shed light on some approaches to the question of "how much," by ensuring attention to the arguably limited environmental benefits and high economic costs of piecemeal policy measures.

Advantages of a Comprehensive Approach to Policy Design

- A. The dominant tenor of climate policy discourse has been piecemeal, addressing each trace gas and each sector separately. Most policy proposals, and most data collection efforts, have focused on energy sector CO2 emissions.

- B. Comprehensive approach offers environmental advantages
 - o Piecemeal policies have proved environmentally ineffective or even counterproductive. The history of environmental policy has been piecemeal efforts aimed at air, water, and land emissions separately, leading to cross-media shifts in residuals.

 - o Administration efforts to employ better approaches:
 - multimedia approach to solid and hazardous emissions
 - multipollutant approach to air emissions
 - multimedia enforcement actions
 - comprehensive approach to climate context

- o Shifting residuals. Piecemeal approaches in the climate area could lead to counterproductive cross-gas tradeoffs. Narrow focus on one trace gas could induce shifts in emissions to unregulated gases and sectors.

Examples:

(1) Piecemeal policy aimed at CO₂ alone could induce fuel-switching from coal or oil to natural gas, with attendant reduced CO₂ emissions from combustion, but increased CH₄ output from transmission leakage.

Methane offset from fuel-switching to Natural Gas:

	Typical grams of CO ₂ emitted per MJ (in Sweden)	CH ₄ leakage rate that offsets 100% of CO ₂ savings
Coal	92	6%
Oil	78	4%
Nat. Gas	56	--

(Calculated from Rodhe, Science 8 June 1990, using Rodhe's GWP figure of CH₄ = 10 GWP per mole CO₂ over 100 year integration period.)

Current average Natural Gas transmission CH₄ leakage rates:

USA:	1%
Australia:	3%
USSR:	5-10% ?

(2) Piecemeal focus on limiting agricultural CH₄ could induce use of nitrogenous fertilizers that reduce CH₄ emissions per yield but raise N₂O emissions.

(3) Piecemeal focus on transport emissions might induce shifts to energy sector (e.g. if electric vehicles are powered by coal-fired boilers) or to agriculture sector (e.g. if biomass for alternative fuels is cultivated with nitrogen fertilizers).

- o Comprehensive approach ensures that such shifts are accounted for by decisionmakers.
- o Side benefits. By focusing on "net" emissions, the comprehensive approach fosters sink protection and expansion, such as afforestation and protection of phytoplankton. Benefits include biodiversity, reduced soil erosion, protected food webs.

C. Comprehensive approach offers economic and social advantages

- o Piecemeal approach is economically inefficient. Piecemeal policy would preclude alternatives that achieve the same environmental outcome at less cost. For example, a policy aimed only at energy sector CO₂ would bar less costly abatement options such as afforestation, CH₄ reductions, attention to CFC-substitutes, or N₂O reductions.
- o Flexibility reduces costs. The costs of different options will vary across nations, so to minimize costs each ought to have the flexibility to build its least-cost policy mix among the gases and sectors.
(Even if a multi-gas inventory would rank some nations higher in net emissions than they would under a single-gas accounting, all nations could gain as the marginal cost of abatement is reduced through greater flexibility.)
- o Burden sharing. A comprehensive approach provides a more "level playing field" across nations, in contrast to a piecemeal approach which effectively singles out nations with one pattern of economic and social activity. Offers the possibility of smoother, and more sober, international cooperation.

Potential objections to a comprehensive approach

- o Data and monitoring of sources and sinks are inadequate
 - Build better data and monitoring
 - Employ carefully chosen proxies or surrogates for difficult-to-measure emissions
 - Design incentives for monitoring improvements, such as offering emissions credit to those who demonstrate better monitoring techniques.
- o GWP Index is uncertain
 - Boulder workshop suggests fundamentals well accepted
 - Work toward improvements
 - Absolute precision may not be required initially; changes in index numbers could be made at wide intervals and/or prospectively
- o Other discrete actions will have already been taken, e.g. forestry agreement, CFCs, VOCs
 - Integration of prior and current actions into comprehensive approach will be necessary
- o CFCs should not be included in comprehensive basket
 - Comprehensive approach would not allow violation of the Montreal Protocol
 - CFCs are a major share of radiative forcing, and their elimination should be recognized
 - Some nations are doing more to reduce global CFCs than others, and their contribution should be recognized
 - Faster reductions, or reductions in other substances not controlled, or in other nations, could earn credit; this would provide helpful incentives in support of the Montreal Protocol
 - CFC substitutes may be quite important to radiative forcing

Research needed in the short term to support the comprehensive approach. The "Interim Report" of the Task Force on Comprehensive and Incentives Approaches identified tasks needed in the next three months, including:

- (1) Index. Develop an improved radiative forcing index and outline a plan for further improvements. Incorporate new research results. Draft a proposal for a standing international expert group, to be established in the framework convention, that would develop the index further and would shepherd it toward accuracy, international consensus, and continuing reassessment in light of new research. Draft talking points on time horizons. Outline a global change index, incorporating salient environmental effects in addition to radiative forcing; provide a rough quantitative estimate of its measure.
- (2) Emissions monitoring. Draft a proposal for international emissions monitoring network(s) to cover all gases, sources and sinks. Identify specific techniques to be used (e.g. satellites, ground stations). Highlight gaps in knowledge and disputes over methods. Develop proxies or surrogates where needed.
- (3) Documenting environmental advantages of a comprehensive approach. Formulate "crisp retorts" or "zingers" to deflate piecemeal proposals, showing they would have little environmental benefit, or actually be counterproductive. Calculate effects of cross-nation, cross-gas, cross-sector shifts. Collect empirical examples of the environmental backfiring of piecemeal strategies applied to other environmental problems.
- (4) Documenting economic advantages of a comprehensive approach. Develop quantitative estimates of the marginal cost of abatement of different gases in different selected nations.
- (5) Report card. Update the comprehensive "report card" or "budget" of net index-weighted emissions changes achieved by climate-relevant actions taken for other reasons. Repeat analysis for selected foreign nations.
- (6) Updated discussion papers on comprehensive and economic incentives approaches. Write updated and improved paper(s) explaining the comprehensive and incentives approaches, giving empirical examples, and discussing practical advantages and challenges to their use in the climate context. Develop plans for future seminars.

Options for Including a Comprehensive Approach in the Convention

- (1) Monitoring. Comprehensive source and sink monitoring: cooperative international networks addressing all relevant trace gases. Create institutions for data sharing, harmonizing methodologies, R&D on new techniques.
- (2) International inventories. Build the capacity to estimate international net emissions of relevant trace gases: baseline levels and changes due to policy actions. National reporting, workshops to compare numbers and methods.
- (3) Index. Cooperative development and refinement of an index. Create institutional expert body to conduct regular reassessments and keep policy makers informed of research developments.
- (4) Framing policy. Ensure that any limitations obligations (if any, whether now or in the future) are defined in terms of a comprehensive approach. This could be required, or at least endorsed, in the convention.
- (5) Advance assurance. Give advance assurance that current actions will receive "credit" against any future limitations obligations, in accordance with a comprehensive approach.

Pros: Helps avoid disincentives to taking actions justified on other grounds; nations may hold such actions in abeyance lest they lose credit for them. Provides an institutional means to integrate discrete initiatives (e.g. CFCs, forestry, VOCs, and any national actions such as CAA, tree planting, energy efficiency). Ensures that a comprehensive approach to such credit will be used.

Cons: Requires debate over baseline.
- (6) Technology evaluation. Employ a comprehensive approach to assess any technology transfer activities.

Options for Laying the Basis for International Trading in the Convention

- (a) REIOs. Broaden the notion of "regional economic integration organization" (REIO) to allow any group of nations to work together. The term REIO is employed in the Montreal Protocol to allow regional groups like the EC to form a group-wide CFC emissions bubble. It could be broadened to allow joint undertakings by less formalized groups of states, and by non-contiguous states.
- (b) Joint cooperation. Include language acknowledging that any obligations can be met through "joint cooperative arrangements." Applies to technology development, emissions limitations, other obligations.
- (c) Registry. Develop an international information center on trades. The center could initially gather information and provide advice on how to arrange and implement effective trades. It could start with information on, e.g., debt-for-nature swaps and EC bubble activities. It could grow to become a trading registry if full-scale international trading developed.
- (d) Financial and technology transfers. Incorporate emissions credits into international technology transfer and financial assistance arrangements. Funds and technology transferred by donor countries, directly or through a global environmental funding facility, could earn credits for the donors corresponding to the net emissions change (calculated in terms of a comprehensive approach) achieved by the transfer. The donor could then submit the credit in compliance with any international limits on emissions that might later be agreed.

SOURCES OF GREENHOUSE GAS EMISSIONS ESTIMATES

The following appendix documents the sources of the emissions estimates for each of the greenhouse gases, as well as important underlying assumptions. Documentation is presented for: (i) the 1987 "base case," (ii) emissions in 2000 without current environmental commitments, and (iii) emissions in 2000 with current environmental commitments.

CO₂:

Estimates of CO₂ emissions for 1987 and 2000 (without current environmental commitments) were derived from figures provided by the U.S. Department of Energy (DOE) to the Energy and Industry Subgroup (EIS) of the Response Strategies Working Group of the Intergovernmental Panel on Climate Change (IPCC).

CO₂ emissions reductions in the year 2000 were estimated by DOE for the following current environmental commitments:

- o **DOE Energy Efficiency Initiatives**
- o **DOE Appliance Standards**
- o **DOE Renewable Initiatives**
- o **Proposed Clean Air Act Legislation and DOE Transportation Fuels Program**

A detailed discussion of each of these initiatives follows:

I. DOE Energy Efficiency Initiatives (102 million tons CO₂)

- **More Efficient Lighting in Federal Buildings (5 million tons CO₂)**

It is assumed that federal agencies fully comply with the relevant Executive Order by 2000. Electricity savings would be 0.05 quad.

- **More Efficient Lighting in Commercial Buildings (9 million tons CO₂)**

It is assumed that approximately one-half of buildings convert to high efficiency lighting with an average savings of 25 percent of electrical demand for lighting. Electricity savings are 0.125 quad.

- **Promotion of State Efforts to Institute Utility Integrated Resource Planning for End-use Energy Efficiency (33 million tons CO₂)**

This and CO₂ reductions from the Clean Air Amendments are linked. Many states are emphasizing Integrated Resource Planning, although methods of analysis and implementation plans are not fully developed for all states. Due to the impetus for Clean Air Act legislation, the need for coal/fossil fuel generation may be reduced by 10-15 percent due to demand reduction. Supporting DOE programs would primarily include methods development and promotional options. Hence, reductions by the year 2000 would probably be lower than would otherwise be achieved. A 7.5 percent reduction in added demand is assumed, resulting in an electricity savings of 0.48 quad.

- **Adoption of DOE Interim Building Standards by the States (30 million tons CO₂)**

The DOE program includes dissemination of information and provision of voluntary guidelines. States could transform the guidelines into enforceable standards. Federal buildings must meet new standards beginning in 1989. It is assumed that there would be a 50 percent acceptance rate for new non-Federal buildings and a 20 percent demand reduction per building. Savings would be .43 quads of electricity.

- **Expansion of the Energy Analysis and Diagnostic Centers to Increase Energy Audits (22 million tons CO₂)**

Program expansion would occur to 40 energy efficiency engineering centers by 2000, resulting in audits of 3 percent of eligible industrial facilities by 2000. The estimate assumes implementation of 60 percent of audit recommendations, with a 15 percent improvement in energy efficiency. Total savings of all fuels would be .28 quads, including .05 quads of electricity.

- **Use of DOE Building Standards by HUD in Public Housing Assistance Programs (3 million tons CO₂)**

Although the program is still being designed, it is assumed that it will be successful in providing a required 25 percent efficiency increase in buildings that are refurbished. It is projected that 1.4 million units in the 7 major public assistance programs will be retrofitted by 2000, resulting in annual efficiency gains of 0.05 quads.

II. DOE Appliance Standards (16 million tons CO₂)

The new appliance standards refer to refrigerators, freezers, clothes washers, clothes dryers, and dishwashers. DOE appliance standards call for an increase in the efficiency of refrigerators and freezers by 25 percent by 1993. The standards applying to refrigerators and freezers are already in the law. It is assumed that 1993 and subsequent model year refrigerators and freezers meet the regulation exactly. The remaining standards are still being promulgated. All of the standards are due to take effect in 1993.

It is assumed that patterns of consumer purchases will be similar to today's buying and replacement patterns. Annual electricity savings due to units installed by the year 2000 would be 0.15 quad.

III. DOE Renewable Initiatives (15 million tons CO₂)

- **Expanding Hydropower Capacity (13 million tons CO₂)**

The DOE program involves working with permitting/development authorities to streamline present complex processes. At maximum levels, 20,000 Mw of capacity could be added by the year 2000. It is assumed that 25 percent of this could be realized by the year 2000, reducing fossil energy electricity requirements by .27 quads. (EPA further reduced this estimate by 50 percent.) Present capacity is 90,000 Mw.

- **Transfer of Photovoltaic Technology: (2 million tons CO₂)**

This estimate assumes that the U.S. initiative would be 675 Mw of installed capacity by 2000, or a savings of .03 quads of demand for fossil fuel electricity.

IV. Proposed Clean Air Act Legislation and DOE Transportation Fuels Program
(63 million tons CO₂)¹⁰

- **Conservation Due to Clean Air Act Provisions on Acid Rain Controls:**
(60 million tons CO₂)

Clean Air Act amendments place requirements for SO₂ reduction on present coal facilities but allow the facilities to determine how these reductions will be met. New facilities must obtain offsetting emissions allowances. One method to reduce emissions allowance purchase requirements would be to reduce end-use demand supplied by older coal-fired plants (for largest SO₂ reductions). EPA has estimated that this reduction could be as great as 10 percent of present coal-fired generation. Because of the linkage with state efforts to institute Utility Integrated Resource Planning for end-use energy efficiency, the estimate here is cut to 5 percent of present coal-fired generation, with an annual CO₂ reduction of 60 million tons.

- **Increased Use of Biofuels for Transportation**
(1 million tons CO₂)

Preliminary estimates assume 10 percent ethanol fuel for 13 percent of gasoline used in year 2000. It is also assumed that the ethanol is made from a biomass feedstock that is replaced or recycled. This represents 50 percent of the expected oxygenated fuel required by the Clean Air Act.

¹⁰ This does not include reductions of 51 million metric tonnes due to decreases in NO_x (19.6 million tonnes), CO (7.4), and VOCs (23.7).

- **Increased Use of Natural Gas in Central Fleets Due to Clean Air Act (2 million tons CO₂)**

One percent of the Nation's use of gasoline would be replaced by compressed natural gas, providing a 20 percent decrease in CO₂ for that amount.

METHANE:

Estimates of methane (CH₄) emissions for 1987 were derived from figures provided by DOE to the EIS of the IPCC Response Strategies Working Group. Estimates of emissions for 2000 (without current environmental commitments) were derived from the IPCC EIS and the Agricultural Working Group. For both 1987 and 2000, the estimates were adjusted upward by 6 million tonnes by EPA to reflect its landfill estimates.

Estimates of methane emission reductions in the year 2000 were obtained from EPA's Office of Air Quality Planning and Standards (OAQPS). The estimates reflect methane reductions that arise due to a 250 Mg/yr landfill standard.

VOCs:

The estimate of 1987 VOC emissions were provided to OAQPS by E.H. Pechan & Associates and derived from the ERCAM-VOC model. The estimate uses the 1985 NAPAP emissions inventory as a base and (i) adjusts auto emissions using EPA's MOBILE4 model, and (ii) includes estimates of emissions from hazardous waste treatment storage.

VOC emissions for the year 2000 (without current environmental commitments) are assumed to remain at 1987 levels. This presumption was made in order to account for future implementation of the current Clean Air Act.

VOC emission reductions in the year 2000 were derived by EPA/OAQPS based on ERCAM-VOC model runs. The model runs assumed the provisions of the Senate version of the Clean Air Act.

NO_x:

1987 emission estimates for NO_x were obtained from EPA (1989). Emissions in the year 2000 (without current environmental commitments) were assumed to remain at 1987 levels. Estimates of NO_x emissions reductions in 2000 were provided by OAQPS, and assumed implementation of the Senate version of the Clean Air Act.

CO:

1987 emission estimates for carbon monoxide (CO) were obtained from EPA (1989). Emissions in the year 2000 (without current environmental commitments) were assumed to remain at 1987 levels. Estimates of CO emissions reductions in 2000 were provided by the EPA Office of Mobile Sources (OMS), and assumed implementation of the Senate version of the Clean Air Act.

N₂O:

Estimates of N₂O emissions for 1987 were derived from figures provided by DOE to the EIS of the IPCC Response Strategies Working Group. Emissions in the year 2000 (without current environmental commitments) were assumed to remain at 1987 levels. Emissions in the year 2000 with current environmental commitments were also assumed to remain constant at 1987 levels.

CFCs:

EPA emissions estimates for 1987, 2000 (without current commitments), and 2000 with current commitments were obtained from EPA's Office of Air and Radiation (OAR). OAR estimates assumed that new production of CFCs declines over time, the stock of CFCs rises, and the number of CFC substitutes increases.

GREENHOUSE GAS EMISSIONS TRENDS AND POLICY OPTIONS

GREENHOUSE GAS INVENTORY

0 GREENHOUSE GASES:

CARBON DIOXIDE (CO_2)

METHANE (CH_4)

CHLOROFLUOROCARBONS (CFCs)

NITROUS OXIDES (N_2O)

TROPOSPHERIC OZONE (O_3)

0 GASES THAT AFFECT CONCENTRATIONS OF GREENHOUSE GASES:

VOLATILE ORGANIC COMPOUNDS (VOCs)

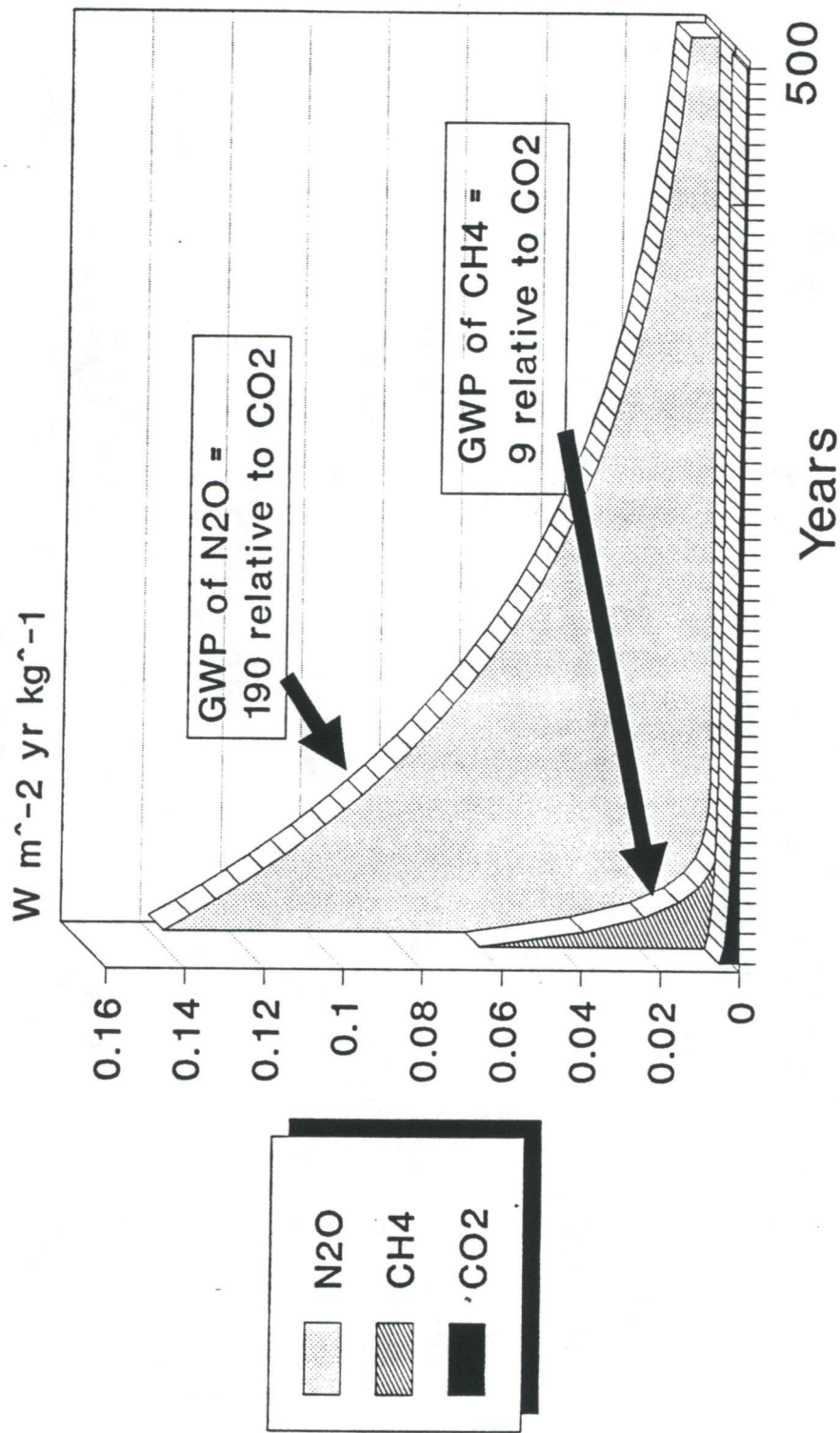
CARBON MONOXIDE (CO)

NITROGEN OXIDES (NO_x)

0 PROBLEM: NEED WAY TO TRANSLATE VARIOUS GASES INTO A COMMON CURRENCY

GHG Time Profiles

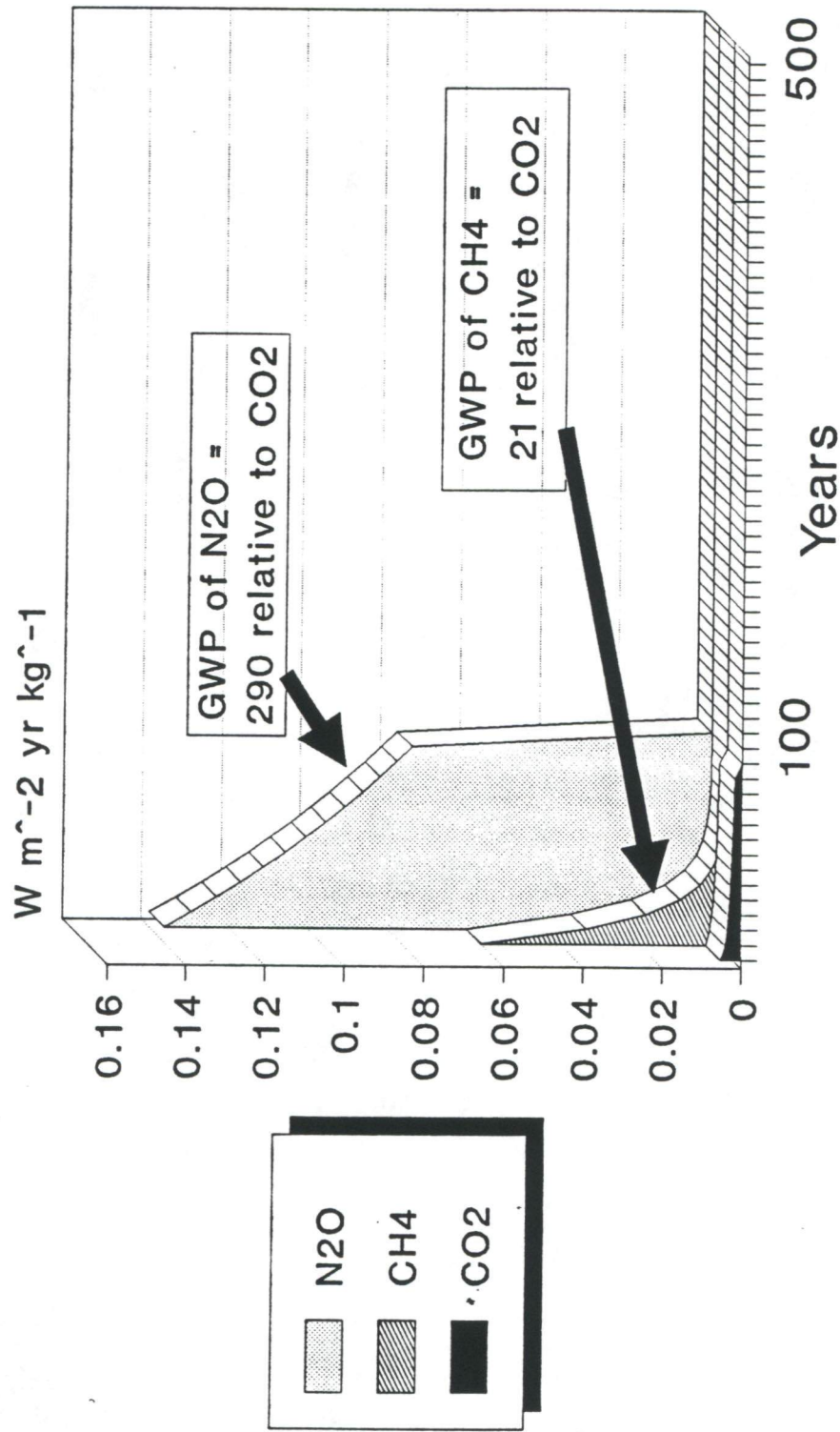
500 Years



Radiative forcing of a gas is expressed as a change in the flux of energy, i.e., watts per sq. meter per kg of gas.

GHG Time Profiles

100 Year



Radiative forcing of a gas is expressed as a change in the flux of energy, i.e., watts per sq. meter per kg of gas.

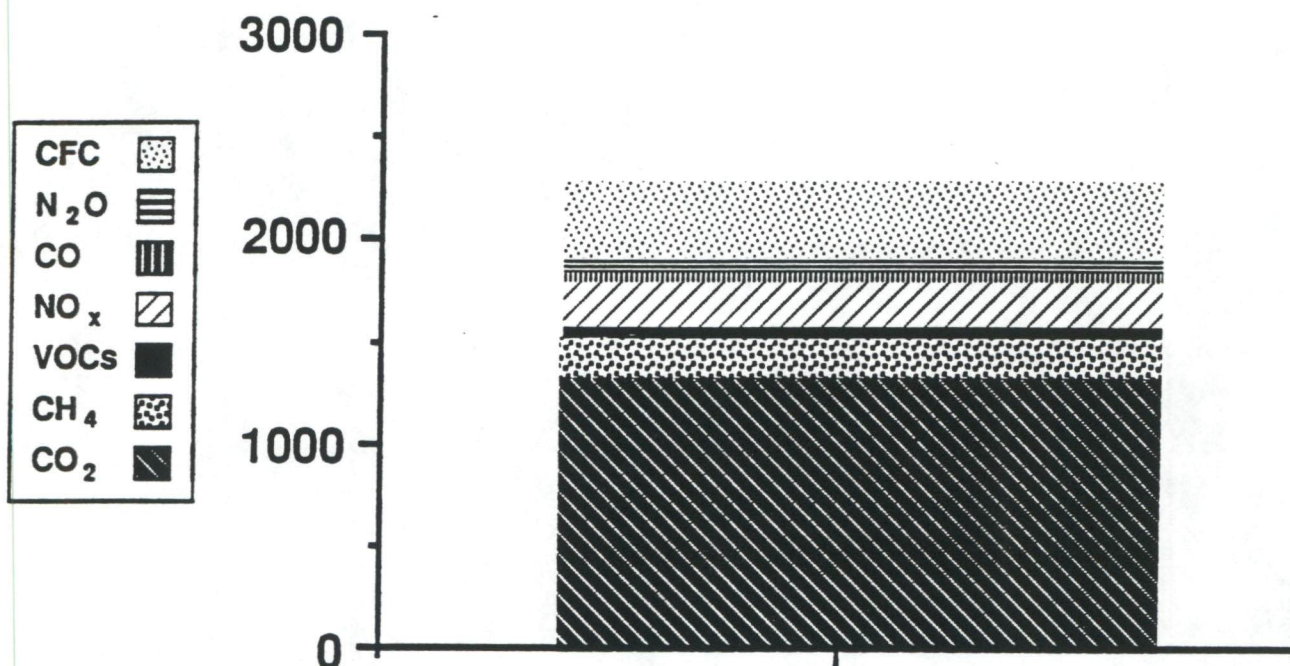
Trace Gas	Estimated Lifetime, years	Global Warming Potential		
		Integration Time Horizon, Years		
		20	100	500
Carbon Dioxide	*	1	1	1
Methane - inc indirect	10	63	21	9
Nitrous Oxide	150	270	290	190
CFC-11	60	4500	3500	1500
CFC-12	130	7100	7300	4500
HCFC-22	15	4100	1500	510
CFC-113	90	4500	4200	2100
CFC-114	200	6000	6900	5500
CFC-115	400	5500	6900	7400
HCFC-123	1.6	310	85	29
HCFC-124	6.6	1500	430	150
HFC-125	28	4700	2500	860
HFC-134a	16	3200	1200	420
HCFC-141b	8	1500	440	150
HCFC-142b	19	3700	1600	540
HFC-143a	41	4500	2900	1000
HFC-152a	1.7	510	140	47
CCl ₄	50	1900	1300	460
CH ₃ CCl ₃	6	350	100	34
CF ₃ Br	110	5800	5800	3200
INDIRECT EFFECTS				
Source Gas	Greenhouse Gas Impacted			
CH ₄	Tropospheric O ₃	24	8	3
CH ₄	CO ₂	3	3	3
CH ₄	Stratospheric H ₂ O	10	4	1
CO	Tropospheric O ₃	5	1	0
CO	CO ₂	2	2	2
NO _x	Tropospheric O ₃	150	40	14
NMHC	Tropospheric O ₃	28	8	3
NMHC	CO ₂	3	3	3

Current Emissions

1987

(100 Year GWP Factors)

Carbon Equivalents – Millions of Tonnes



	1987
CO ₂	1310
CH ₄	235
VOCs	72
NO _x	218
CO	52
N ₂ O	74
CFC	367
Total	2328

**EMISSIONS REDUCTIONS EXPECTED IN THE YEAR 2000
DUE TO CURRENT ENVIRONMENTAL COMMITMENTS
AND OTHER INITIATIVES ASSUMED IN THE ANALYSIS**

<u>CURRENT COMMITMENTS</u>	<u>MILLIONS OF TONNES REDUCED (Carbon Equivalents) 2000⁴</u>
o TREE INITIATIVE	~9
o DOE ENERGY EFFICIENCY INITIATIVES	28
o DOE APPLIANCE STANDARDS	4
o DOE RENEWABLE INITIATIVES	4
o CLEAN AIR ACT	17
o LANDFILL REGULATION	44
o CFC PHASEOUT & MONTREAL PROTOCOL	551

⁴ Assumes a 100 year time horizon in GWP calculations.

**DOE-RELATED CO₂ EMISSIONS REDUCTIONS
USED IN EPA'S GHG EMISSIONS INVENTORY**

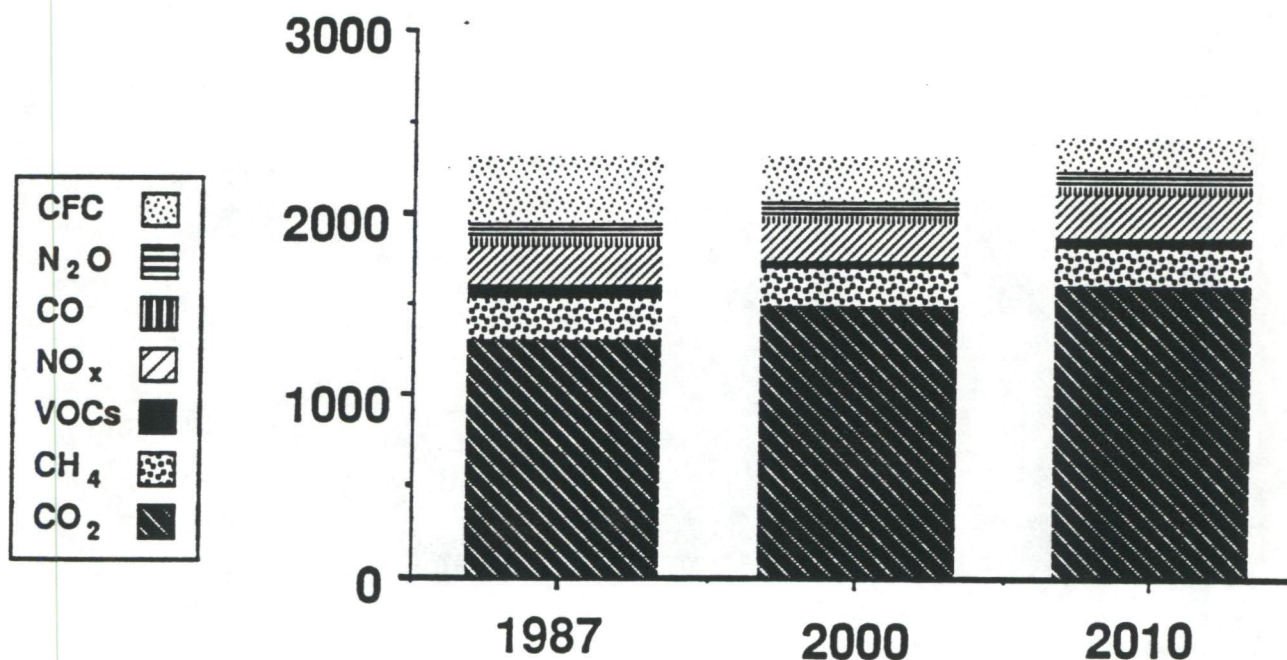
<u>ACTION/PROGRAM</u>	<u>2000</u>	
	<u>CO₂</u>	<u>Carbon</u>
DOE Appliance Standards (Refrigerators, Washers, Dryers, Dishwashers)	16.0	4.4
DOE Efficiency Initiatives	102.0	27.8
Federal Buildings Lighting	5.0	1.4
Commercial Buildings Lighting	9.0	2.5
Promote State LCUP	33.0	9.0
State Adoption of Interim Building Standards	30.0	8.2
Energy Analysis and Diagnostic Centers	22.0	6.0
HUD Adoption of DOE Building Standards	3.0	0.8
DOE Renewable Initiatives	15.0	4.1
Expanded Hydro Power	13.0	3.5
Photovoltaic Technology Transfer	2.0	0.5
Clean Air Act	63.0	17.2*
Acid Rain	60.0	16.4
Transportation Biofuels and Natural Gas Use	3.0	0.8
GRAND TOTAL	196.0	53.5

* Does not include reductions of 51 million metric tonnes due to decreases in NO_x (19.6 million tonnes), CO (7.4), and VOCs (23.7).

Emissions

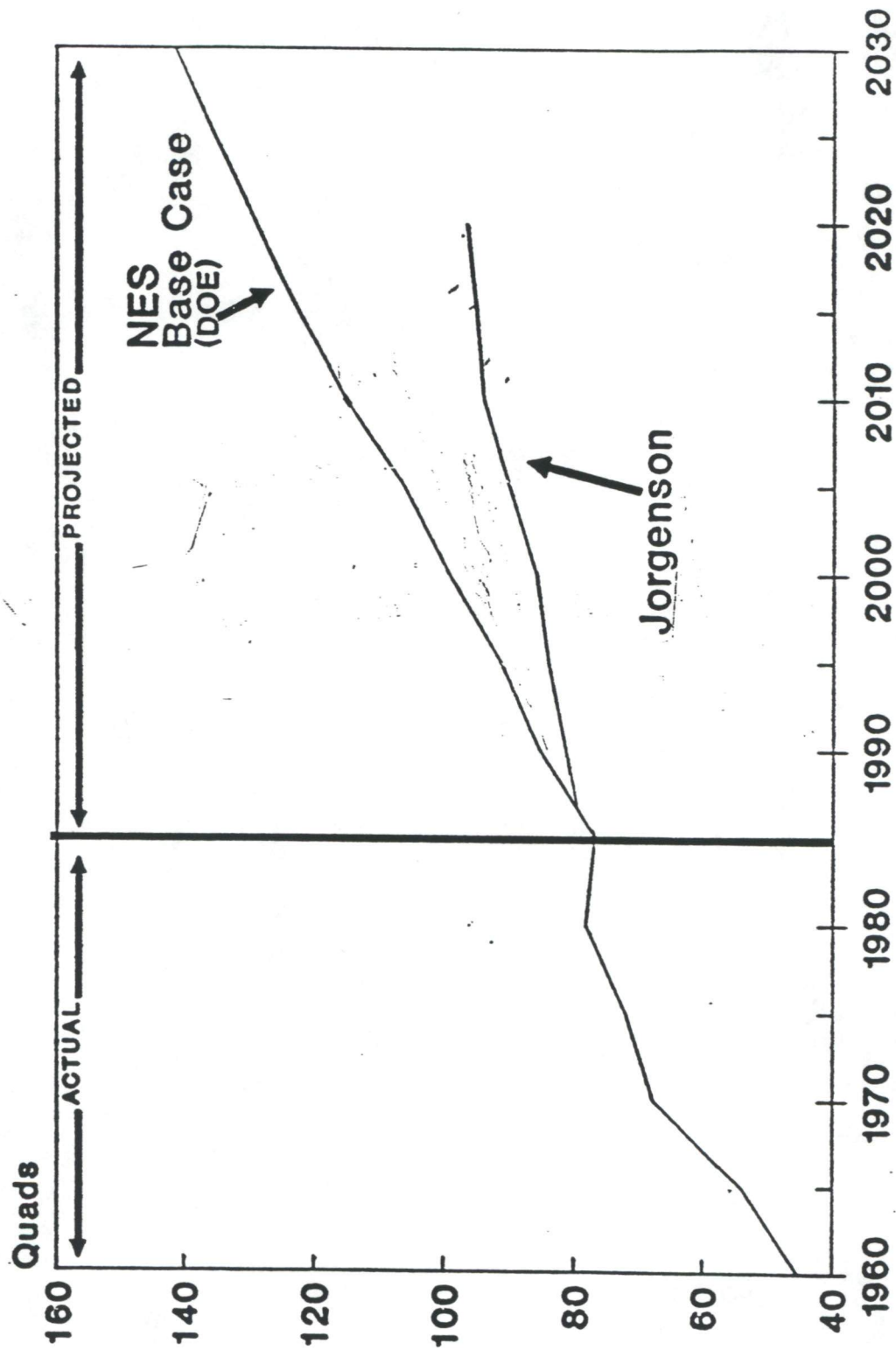
(With Current Commitments)
(100 Year GWP Factors)

Carbon Equivalents – Millions of Tonnes

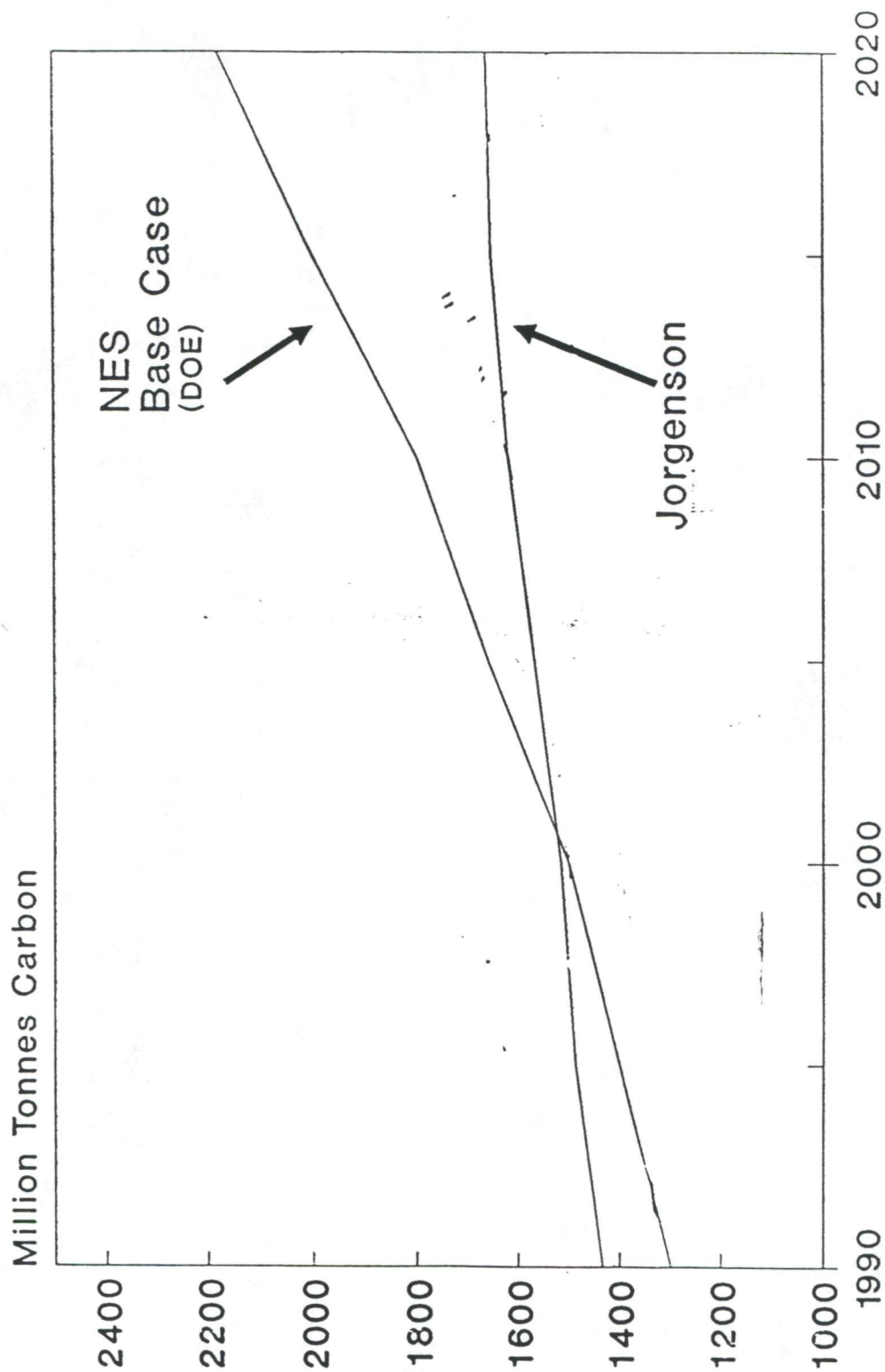


	1987	2000	2010
CO ₂	1310	1503	1627
CH ₄	235	208	212
VOCs	72	48	50
NO _x	218	199	235
CO	52	45	46
N ₂ O	74	74	74
CFC	367	256	188
Total	2328	2332	2430

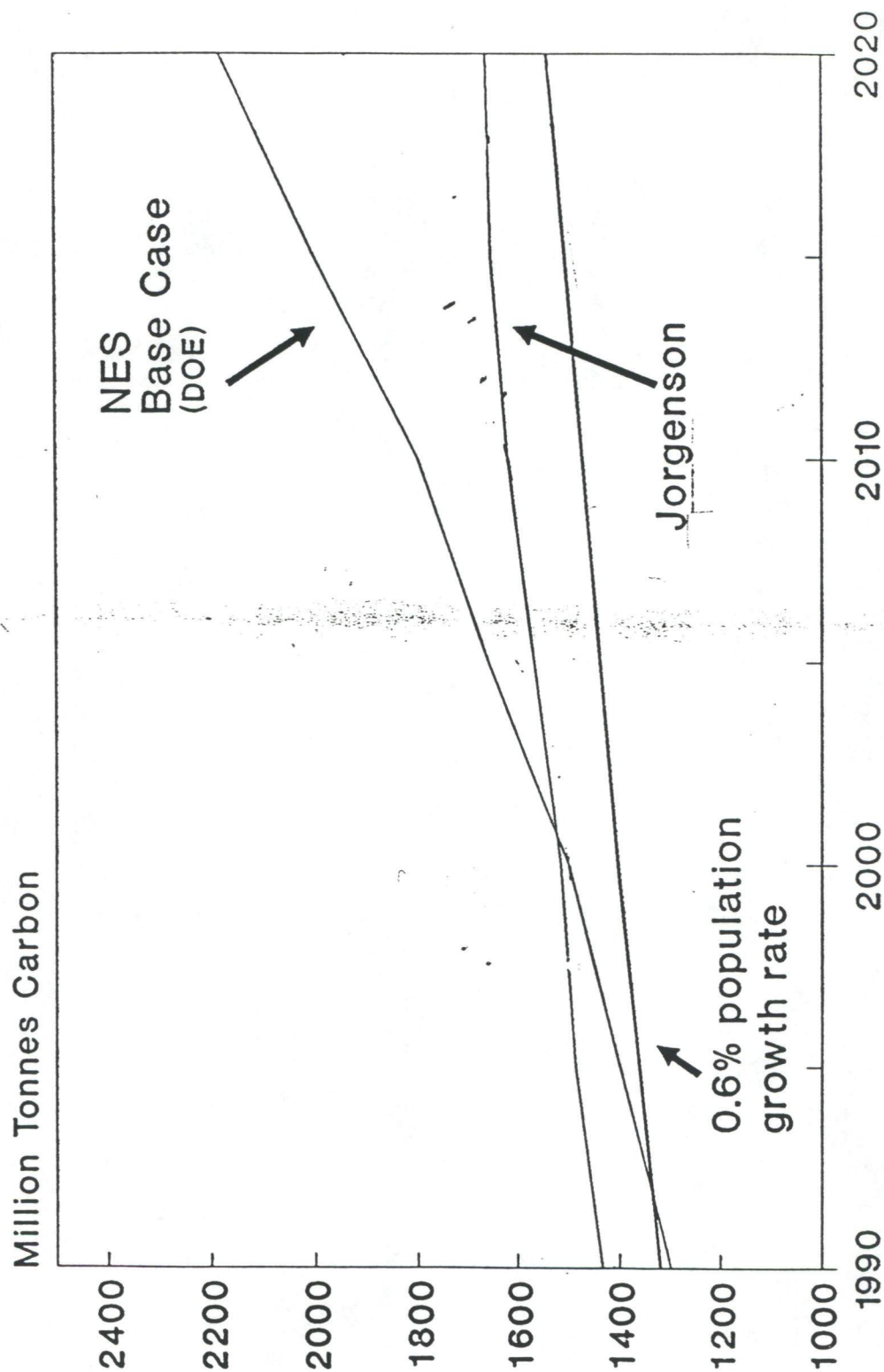
U.S. Primary Energy Consumption



U.S. CO2 Emissions



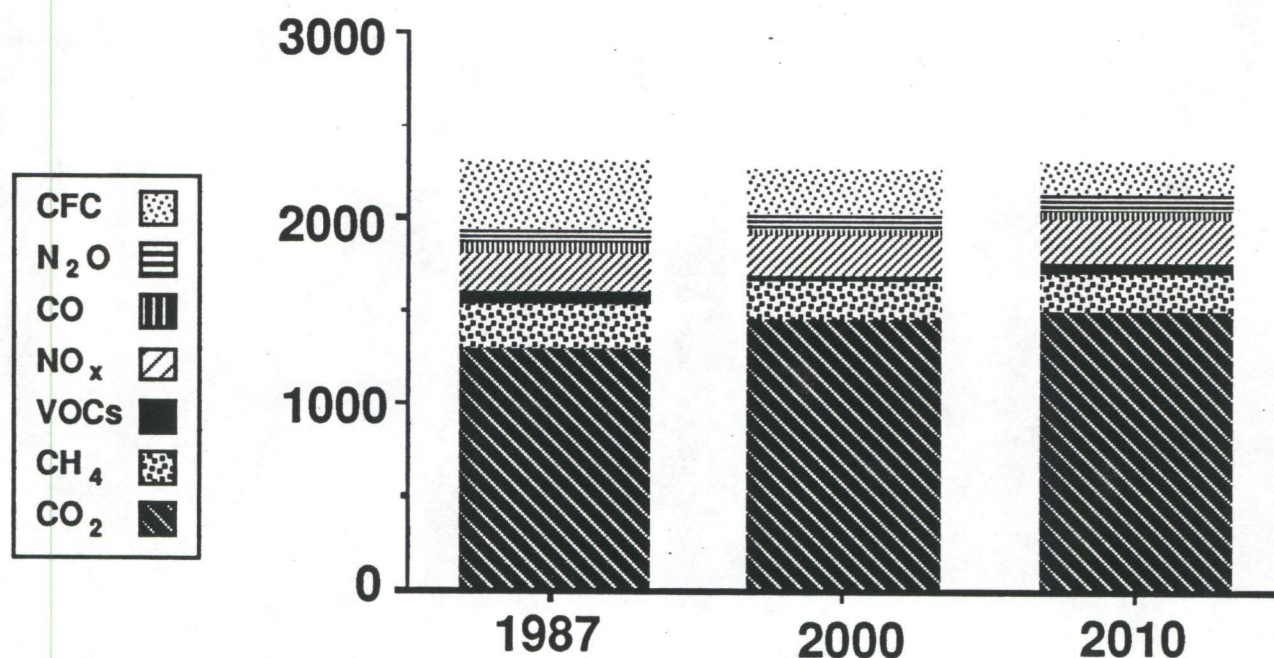
U.S. CO₂ Emissions



Emissions

(With Current Commitments)
(100 Year GWP Factors)

Carbon Equivalents – Millions of Tonnes



	1987	2000	2010
CO ₂	1310	1453*	1498*
CH ₄	235	208	212
VOCs	72	48	50
NO _x	218	199	235
CO	52	45	46
N ₂ O	74	74	74
CFC	367	256	188
Total	2328	2283	2303

* CO₂ estimates derived from baseline emissions projections in Jorgenson and Wilcoxon (1990)