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GCC [Global Climate Change] Briefing 8/1997

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draft talking points /close-hold/ just-idle-musings(really) JF

Global climate change is a serious danger.

Two **"no regrets" considerations:** A program to address GCC by policies to reduce GHG emissions looks far more attractive in a cost-benefit sense if one adds in two other possible effects of the those policies:

- (1) a reduction in local pollution, congestion, and other national **externalities**
- (2) the potential to generate a lot of **revenue**, which could then be used to eliminate reduce distortions, e.g., deficit reduction, pro-investment tax cuts, reduction of the social security payroll tax, etc.

It would be far more effective and far less costly to implement with **all countries** participating and with international trading. In particular, we are unlikely substantially to control emissions, without the LDCs.

A likely characterization of the negotiations is that **positions are mutually exclusive:** we will not ratify a treaty that does not include the LDCs in a serious way, while the LDCs will not agree to a treaty that does include them in a serious way.

There might be arguments for **proceeding even without LDCs** anyway:

- 1) Set an example to which they would eventually accede
- 2) We still get the benefits of reducing national pollution and congestion
- 3) We still get the opportunity to recycle revenue in a pro-investment manner

It would be far more efficient economically to **proceed slowly**, taking only moderate steps over the next 20 years, pre-announcing more drastic steps in the longer term.

- (1) Over 40 years, most of the capital stock turns over anyway. Scrapping existing machines is very expensive.
- (2) Technology can accomplish more with a long lead time.
- (3) We may have a lot more information in 20 years.

A very strong argument for **early** strong action is that it is not at all politically credible to pre-announce policy changes far off into the future.

**Technology** will be a major part of the solution, along with an increase in energy prices.

The **dangers of wishful thinking:** without a noticeable increase in the price of energy, government announcements, or expenditures on R&D or technology dissemination (while perhaps worthwhile), can do very little toward the envisioned reductions in GHGs. **It would be a mistake to announce an ambitious program if there is not the political will to adopt the corresponding requisite policies.**

aug. 7, 1997

## GCC

### Items to bring up in principals/principles meeting with Treasury

#### **Targets and timetables:**

Develop evidence against radical options:

- Optimal path for 2100 concentration targets (from Manne-Richels, G-cubed?...)
- Cost benefit ratio for "1990 levels by 2010" (from Nordhaus?)
- Analogy with 1970s oil shocks
- Other

Formulate language for possible moderate option in treaty, e.g., "eliminate emissions growth by 2010-2020, and reduce below 1990 levels by a later date."

Formulate possible language for an escape clause, e.g., setting a ceiling on price of carbon.

The dangers of Wishful Thinking (high AEEI)

- Critique 5-labs study
- Historical relationship between price and EEI

#### **Implementation**

Do not wait until we have a treaty (or until negotiations break down) to spell out domestic implementation (e.g., tradable permits). Reasons:

- internal deliberations: it is good to face the implications before making an int. commitment
- public dynamics: although the result would be a controversial national debate,
  - that debate has to take place anyway
  - announcing the measures and having the debate early would deflate pressure from both environmentalists and r.o.w., thereby allowing US to hold more reasonable positions in Kyoto.

An argument against grandfathering emissions permits: the incidence doesn't fall entirely, or even primarily, on the coal and oil companies where the permit requirements would (most efficiently) be imposed. We should estimate where incidence does fall.

Should revenues be used to finance entitlements in 21st century? There is a lock-in argument in favor. We should compute likely amount and path of revenue.

#### **International dimension**

Formulate proposal for serious LDC participation (making "evolution" more concrete, while recognizing that there may in fact be no common ground between Congress and rest of world): e.g., a formula that specifies emissions requirements as a function of GDP/capita.

# Big decisions to be made

GCC



Int. neg.

"Targets + timetable"

- More aggressive, or less?

[From Paris to C.O.P., have to decide what pass, elevation, & what before planning annual action (C.O.P.)]

Level off, with reduction contingent on - confirming evidence  
- LDC commitment.

LDC participation ("evolution")

What's a sensible LR formula?

• More firm, or less?

Is... for or against?

Other conditions

int. trading

banking & borrowing

multi-year ave. ...

Next ~~step~~ step if neg. fall apart

vs. fundamental new proposal (e.g., relaxing "no common measure")  
vs. just continue  
vs. suspend

Domestic implementation.

• Declare early, or delay?

T or tradeable permit?

Rebate/grandfather or BD reduction/auction?

incidence  $\Rightarrow$  grandfathering does not neutralize impact.  
can create big windfalls.

Do something

~~Passed~~ unilaterally even if negotiations falter

Implement same policy

other unilateral action

What are differences  
between auction & T?

- price vs. q
- tr. costs/enforcement
- political
- "reluctance to trade"?

(What is SO<sub>2</sub> record?)

LDC compel new

5-10% review



Jason Shogren

06/23/97 11:40:57 AM



Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP, Alicia H. Munnell/CEA/EOP, Janet L. Yellen/CEA/EOP

cc:

Subject: draft outline 2

**Outline: An economic assessment of US global climate change policy**

--draft--

23 June 97

|                                                       | <u>Pages</u> |
|-------------------------------------------------------|--------------|
| 1. Introduction                                       | 1            |
| 2. Economic structure of global climate change policy | 10           |
| a. Overall policy goals                               |              |
| b. Emission budgets                                   |              |
| c. Capital stock turnover and credible commitment     |              |
| d. Flexibility                                        |              |
| Domestic emission trading                             |              |
| International emission trading                        |              |
| Joint implementation                                  |              |
| e. Revenue recycling                                  |              |
| f. Developing countries                               |              |
| g. Trade flows                                        |              |
| h. Technological change                               |              |
| i. Evaluation of current gcc literature               |              |
| j. Transaction costs and imperfect regulatory regimes |              |
| 3. Economic impacts of proposed policy options        | 5            |
| a. Policy options                                     |              |
| b. GDP and consumption                                |              |
| c. Investment and trade                               |              |
| d. Employment, industrial, and regional impacts       |              |
| e. Other                                              |              |
| 4. Sensitivity analysis                               | 3            |
| a. Technological change                               |              |
| b. Revenue recycling                                  |              |
| c. Price elasticities                                 |              |
| 5. Trade-off analysis for negotiations                | 2            |
| a. Budget-flexibility trade-off                       |              |
| b. Flexibility-revenue recycling trade-off            |              |
| c. Technology-flexibility                             |              |

6. Qualifications and limitations
7. Conclusions and future directions

2

1

Draft

close hold

GCC brief



JF Aug. 4, 1997

## I. Targets and timetables

### A. The economically optimal path for a given concentration target

1. The importance of allowing time for turnover of capital stock + for development of technology
2. Estimates from Manne and Richels: emissions peak in 2050; Nordhaus; others?

### 3. The role of uncertainty

- a. Another reason to go slow: resolution of uncertainty
- b. A reason to go faster: risk-aversion, particularly ~~rediscontinuity~~

4. The main argument for going faster: A plan to wait until 2050 is not politically credible. Firms will not begin to make the adjustments envisioned in the models until some serious policy measures are taken.

### B. Alternative definitions of "stabilization"

1. Reducing emissions growth
2. Eliminating emissions growth
3. Returning emissions to levels from a past benchmark
  - a. The argument for 1990

### 4. Reducing emissions below 1990 levels

### 5. Concentrations

6. "Eliminate emissions growth by 2010-2020, and reduce below 1990 levels

thereafter"

### C. Intertemporal ("when") flexibility

1. Multi-year averages for targets
2. Multiple periods for ~~targets~~ targets
3. Banking
4. Borrowing escape clause
5. Proposals for a safety-valve on price
6. Proposals to make targets contingent on:
  - a. climate conditions or forecasts
  - b. growth of output or population
  - c. participation of LDCs

### D. Negotiating with other countries for Kyoto

1. Their positions on targets, timetables and flexibility
2. What can we expect to get? How firmly do we hold to our line?

## II. Domestic Implementation

### A. The advantages of market-based solutions

### B. Tradeable permits

1. Where is the permit requirement imposed?
  - a. Well-head and mine-mouth?

*[Handwritten signature]*

- b. Power generators, buildings, and vehicles?
  - 2. To whom are they allocated?
    - a. Grandfathering
      - (1) The illusion of neutral distribution
      - (2) Incidence
    - b. Advantages of auctioning over grandfathering
      - (1) The case for auctions (standard economist's argument; reduced bureaucracy; past successes: spectrum)
      - (2) Uses for revenue (whether auction or T)
        - (a) For deficit reduction/21st-century entitlement deficits
        - (b) For tax cuts
          - i) Pro-capital, e.g., corporate (reduces GDP costs, but regressive)
          - ii) ~~Income tax~~
          - iii) ~~Progressive~~ <sup>income tax</sup> payroll tax (↓)
      - (c) For politically-facilitating redistribution
        - i) Adversely-affected firms (e.g., coal)
        - ii) Adversely-affected workers (e.g., coal)
        - iii) Other (e.g., key states)

#### C. T vs. auctioning

1. Politics of T?
2. Price vs. quantity, under uncertainty
3. Enforcement
4. Transactions costs
5. "Reluctance to trade" [What is SO2 record?]

#### D. Blend

1. Grandfather a fraction of permits
2. The argument for phasing out grandfather rights over time

#### E. How big would the effects be?

1. How high would the price have to go?
  - a. IAT results
  - b. Other results
2. What would be the <sup>total</sup> cost?
  - a. In lost output?
  - b. In lost consumption?
3. The precedent of the 1970s oil shocks

#### F. Technology

1. What changes in technology and use could we expect?
  - a. truly autonomous ("business as usual")
    - (1) the shift from manufacturing to services
    - (2) other technical change
  - b. from price change
    - (1) conservation, and adoption of known technologies

4. Who would be most adversely affected?

record

(2) <sup>likely</sup> effects on true technological change, <sup>estimated</sup> from the historical

- c. from government R&D and dissemination programs
- d. from announcement effect

## 2. The dangers of Wishful Thinking

- a. Do money-saving technologies exist, and why aren't they adopted

now?

- (1) <sup>high</sup> Discount rates and risk-aversion
- (2) The usefulness of government programs
- (3) The effect of price

## G. Possible U.S. actions before a treaty is ratified

### 1. When should the nature of U.S. measures be decided/declared?

- a. Before Kyoto ?
- b. During ?
- c. After ?

### 2. What if there is no agreement in Kyoto?

- a. Next step in international negotiations

- (1) Suspend
- (2) Continue
- (3) Fundamental rethinking of framework

(a) Consider abandoning "no common measures"

(b) The other issues

i) Nordhaus proposal

ii) McKibbin Wilcoxen proposal

- b. Possible US actions in the interim

- (1) Unilateral

(a) Same as proposed, or a milder version

i) Price measures

ii) Technology programs

(b) Cap and trade CO2 for utilities

(a) ~~Ban energy subsidies~~

- (2) With a subset of other countries

### 3. The argument for deciding/declaring implementation before necessary

a. Internal deliberations: it is good to face the implications before making an international commitment

b. Public dynamics: The information that the Administration was considering serious [price-raising] measures would accelerate a controversial national debate; but

- (1) that debate has to take place eventually anyway

(2) announcing the measures and having the debate early would add credibility to U.S. stance, deflating pressure from both environmentalists and rest of world, thereby allowing US to hold to the more reasonable positions in Kyoto negotiations.

Domestic Externalities

policy  
argument..

### III. International Dimension

#### A. Allocation

#### B. International trading

1. Former Soviet Union
2. How big would international transfers be?
  - a. For other countries
  - b. For the US. (Does the US buy or sell permits?)
3. How much does trading among Annex I countries reduce the cost?
  - a. Worldwide
  - b. For U.S.
4. Technical details (trading by governments only?)

#### C. Monitoring and Enforcement

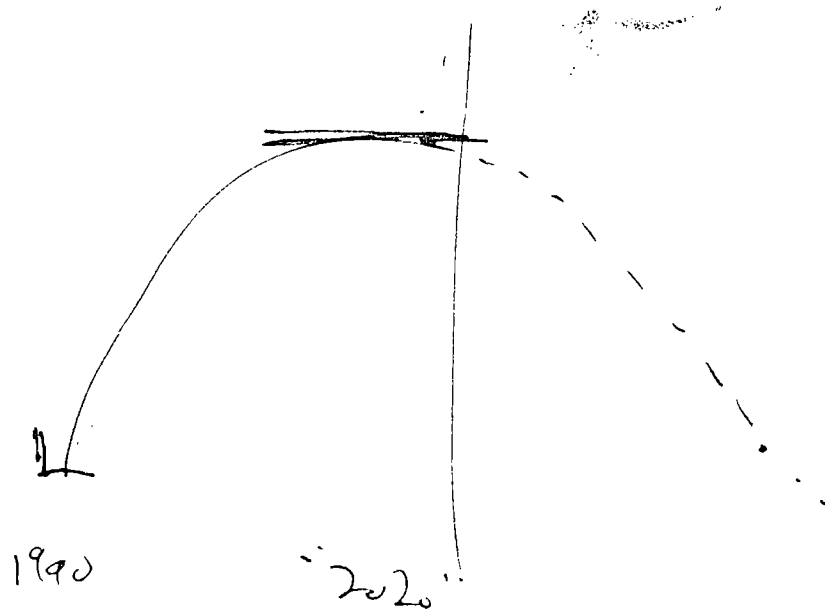
#### D. Participation of Developing Countries

1. What is efficient?
2. What is fair?
3. What is in the US interest?
4. Possible formulas to make "evolution" more concrete
5. JI
  - a. Defined with LDC targets/participation in tradable system
  - b. defined without LDC targets (e.g., agreement not to build a coal-fired plant)
  - c. defined as subsidy for renewables technology
  - d. US policy toward N

- 
- E. Implications for US "Competitiveness" if LDCs ~~missing~~ *don't agree to limits*
1. Loss of foreign demand for US energy-intensive exports
  2. Fall in demand for import-competing e-intensive goods
  3. Decrease in US oil imports and in world price of oil
  4. Other offsets (expansion of non-e-intensive manuf.s?)

#### F. Implications for the US Trade Deficit

1. Trade balance vs. current account balance
  - a. likely to move in opposite directions (transfer problem)
2. Likely size and magnitude of international capital flows



"2010" arbitrary  
concentrations.

no scientific basis for 1990 e by 2010



## 0 T + time tables

1990 by 2010

optimal path  
cons.

cap. stock

illucy. utility industry

vs. credibility  
polit. ec.

Nordhaus, Repetto

~~0~~

## 0 Domestic implement

permits: auctn vs giveaway / q factor  
Auctn vs tax EPA

techn.

info/reg

lucy trading

## 0 LDC partic.

JL

Russia participat

"competitiveness" TD

Table 10.1. Integrated assessment models

| Model                                                                                                  | Modellers                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AS/ExM<br>(Adaptive Strategies/Exploratory Model)                                                      | R. Lempert, S. Popper (Rand);<br>M. Schlesinger (U. of Illinois)                                                                                                                                                                                                  |
| AIM<br>(Asian-Pacific Integrated Model)                                                                | T. Morita, M. Kainuma (National Inst. for Environmental<br>Studies, Japan); Y. Matsuoka (Kyoto U.)                                                                                                                                                                |
| CETA<br>(Carbon Emissions Trajectory Assessment)                                                       | S. Peck (Electric Power Research Institute)<br>T. Teisberg (Teisberg Assoc.)                                                                                                                                                                                      |
| Connecticut<br>(also known as the Yohe model)                                                          | G. Yohe (Wesleyan University)                                                                                                                                                                                                                                     |
| CRAPS<br>(Climate Research And Policy Synthesis model)                                                 | J. Hammitt (Harvard U.);<br>A. Jain, D. Wuebbles (U. of Illinois)                                                                                                                                                                                                 |
| CSERGE<br>(Centre for Social and Economic Research on the Global Environment)                          | D. Maddison (University College of London)                                                                                                                                                                                                                        |
| DICE<br>(Dynamic Integrated Climate and Economy model)                                                 | W. Nordhaus (Yale U.)                                                                                                                                                                                                                                             |
| FUND<br>(The Climate Framework for Uncertainty, Negotiation, and Distribution)                         | R.S.J. Tol (Vrije Universiteit Amsterdam)                                                                                                                                                                                                                         |
| DIAM<br>(Dynamics of Inertia and Adaptability Model)                                                   | M. Grubb (Royal Institute of International Affairs),<br>M.H. Dong, T. Chapuis (Centre Internationale de<br>recherche sur l'environnement et développement)<br>H. Dowlatabadi, G. Morgan (Carnegie-Mellon U.)                                                      |
| ICAM-2<br>(Integrated Climate Assessment Model)                                                        | L. Schrattenholzer, Arnulf Grubler (IIASA)                                                                                                                                                                                                                        |
| IIASA<br>(International Institute for Applied Systems Analysis)                                        |                                                                                                                                                                                                                                                                   |
| IMAGE 2.0<br>(Integrated Model to Assess the Greenhouse Effect)                                        | J. Alcamo, M. Krol (Rijksinstituut voor Volksgezondheid<br>Milieuhygiene, Netherlands)                                                                                                                                                                            |
| MARIA<br>(Multiregional Approach for Resource and Industry Allocation)                                 | S. Mori (Sci. U. of Tokyo)                                                                                                                                                                                                                                        |
| MERGE 2.0<br>(Model for Evaluating Regional and Global Effects of GHG Reductions Policies)             | Alan Manne (Stanford U.), Robert Mendelsohn<br>(Yale U.), R. Richels (Electric Power Research Institute)                                                                                                                                                          |
| MiniCAM<br>(Mini Global Change Assessment Model)                                                       | J. Edmonds (Pacific Northwest Lab), R. Richels<br>(Electric Power Research Institute), T. Wigley (Univer-<br>sity Consortium for Atmospheric Research (UCAR))                                                                                                     |
| MIT<br>(Massachusetts Institute of Technology)                                                         | H. Jacoby, R. Prinn, Z. Yang (Massachusetts Institute<br>of Technology)                                                                                                                                                                                           |
| PAGE<br>(Policy Analysis of the Greenhouse Effect)                                                     | C. Hope (Cambridge U.); J. Anderson, P. Wenman<br>(Environmental Resources Management)                                                                                                                                                                            |
| PEF<br>(Policy Evaluation Framework)                                                                   | J. Scheraga, S. Herrod (EPA);<br>R. Stafford, N. Chan (Decision Focus Inc.)                                                                                                                                                                                       |
| ProCAM<br>(Process Oriented Global Change Assessment Model)                                            | J. Edmonds, H. Pitcher, N. Rosenberg (Pacific<br>Northwest Lab); T. Wigley (UCAR)                                                                                                                                                                                 |
| RICE<br>(Regional DICE)                                                                                | W. Nordhaus (Yale U.); Z. Yang (MIT)                                                                                                                                                                                                                              |
| SLICE<br>(Stochastic Learning Integrated Climate Economy Model)                                        | C. Kolstad (U. of California, Santa Barbara)                                                                                                                                                                                                                      |
| TARGETS<br>(Tool to Assess Regional and Global Environmental and<br>Health Targets for Sustainability) | J. Rotmans, M.B.A. van Asselt, A. Beusen, M.G.J. den<br>Elzen, M. Janssen, H.B.M. Hilderink, A.Y. Hoekstra,<br>H.W. Koster, W.J.M. Martens, L.W. Niessen,<br>B. Strengers, H.J.M. de Vries (Rijksinstituut voor<br>Volksgezondheid en Milieuhygiene, Netherlands) |

Table 10.2. Development Status of Integrated Assessment Models (June 1995)

| Model       | Status                                                                | Reference                                                    |
|-------------|-----------------------------------------------------------------------|--------------------------------------------------------------|
| AS/ExM      | Preliminary version operational                                       | Lempert <i>et al.</i> (1994, 1995)                           |
| AIM         | Operational                                                           | Morita <i>et al.</i> (1994); Matsuoka <i>et al.</i> (1995)   |
| CETA        | Operational, with regional and uncertainty variants                   | Peck and Teisberg (1992, 1993, 1994, 1995)                   |
| Connecticut | Operational                                                           | Yohe (1995a,b); Yohe and Wallace (1995)                      |
| CRAPS       | Preliminary version operational                                       | Hammitt (1995a,b); Jain <i>et al.</i> (1994)                 |
| CSERGE      | Preliminary version operational                                       | Maddison (1995)                                              |
| DICE        | Operational, with regional and uncertainty variants under development | Nordhaus (1994)                                              |
| FUND        | Operational                                                           | Tol <i>et al.</i> (1995)                                     |
| DIAM        | Analytic version operational                                          | Grubb <i>et al.</i> (1993, 1995)                             |
|             | Numeric version operational                                           | Chapuis <i>et al.</i> (1995)                                 |
| ICAM-2      | ICAM-1 operational; ICAM-2 operational                                | Dowlatabadi and Morgan (1993); Dowlatabadi (1995)            |
| IIASA       | Energy, economy, and agriculture modules operational                  | WEC/IIASA (1995)                                             |
| IMAGE 2.0   | Operational                                                           | Alcamo (1994)                                                |
| MARIA       | Operational                                                           | Mori (1995a,b)                                               |
| MERGE 2.0   | Operational, with uncertainty variant under development               | Manne <i>et al.</i> (1993)                                   |
| MiniCAM     | Operational                                                           | Edmonds <i>et al.</i> (1994a,b); Wigley <i>et al.</i> (1993) |
| MIT         | Various stages of module testing                                      | MIT (1994)                                                   |
| PAGE        | Operational                                                           | Commission of the European Communities (1992)                |
| PEF         | Prototype operational, enhanced version under development             | Cohan <i>et al.</i> (1994)                                   |
| ProCAM      | Most modules in testing phase                                         | Edmonds <i>et al.</i> (1994a,b)                              |
| RICE        | Operational                                                           | Nordhaus and Yang (1995)                                     |
| SLICE       | Operational                                                           | Kolstad (1993, 1994a,b,c)                                    |
| TARGETS     | Targets 1.0 operational                                               | Rotmans <i>et al.</i> (1995)                                 |

tion that policymakers feel more comfortable trading off natural and physical impacts than dollars. In addition, the targets can be set to avoid certain types of risks, perhaps according to the precautionary principle. On the other hand, there is no guarantee that the marginal cost of implementing the mitigation and adaptation measures resulting from the individual targets will equal the marginal benefit (if that can be assessed) of the impacts avoided. Furthermore, because of the large size of these models, only limited amounts of sensitivity analysis can be performed, and more explicit representations of uncertainty (and risk aversion) have generally not been possible, except for the ICAM-2 model (Dowlatabadi, 1995) and the TARGETS model (Van Asselt and Rotmans, 1995).

Reflecting the high level of uncertainty about the future evolution of socioeconomic and natural systems, some analysts have put the analysis of climate change into explicit

plex) deterministic models can be run to investigate specific scenarios further. Table 10.4 places the models listed in Table 10.3 into the two primary categories and relevant subcategories discussed above.

### 10.5 First Results from Integrated Assessment Models

Most integrated assessment models of climate change have been constructed since 1992. By the end of 1994, however, results from a number of these models had already been published. This section gives an overview of these results, highlighting the insights that seem most relevant to the current debate on appropriate global change policies. The variety of different approaches employed to study the climate change issue makes comparison and reconciliation difficult.

In what follows, we group the available model results into

Table 10.3. Summary characteristics of Integrated Assessment Models

| Model       | Forcings      | Scenarios     |
|-------------|---------------|---------------|
| AS/ExM      | 0             | 0             |
| AIM         | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| CETA        | 0, 1          | 0, 1, 2, 3, 4 |
| Connecticut | 0             | 0, 1, 2, 3, 4 |
| CRAPS       | 0             | 0, 1, 2, 3, 4 |
| CSERGE      | 0             | 0, 1, 2, 3, 4 |
| DICE        | 0             | 0, 1, 2, 3, 4 |
| FUND        | 0, 1          | 0, 1, 2, 3, 4 |
| DIAM        | 0             | 0, 1, 2, 3, 4 |
| ICAM-2      | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| IIASA       | 0             | 0, 1, 2, 3, 4 |
| IMAGE 2.0   | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| MARIA       | 0             | 0, 1, 2, 3, 4 |
| MERGE 2.0   | 0, 1          | 0, 1, 2, 3, 4 |
| MiniCAM     | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| MIT         | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| PAGE        | 0, 1          | 0, 1, 2, 3, 4 |
| PEF         | 0, 1          | 0, 1, 2, 3, 4 |
| ProCAM      | 0, 1, 2, 3    | 0, 1, 2, 3, 4 |
| RICE        | 0             | 0, 1, 2, 3, 4 |
| SLICE       | 0             | 0, 1, 2, 3, 4 |
| TARGETS     | 0, 1, 2, 3, 4 | 0, 1, 2, 3, 4 |

<sup>a</sup>TARGETS includes ozone depletion

<sup>b</sup>In AIM, FUND, IMAGE, PAGE, and ProCAM, the carbon tax is specified in the model.

sions, the damages resulting from the control rate," stated in terms of the percentage of the carbon tax required in each year to bring emissions to the levels specified in the model. Policy evaluation models, c

Table 10.3. Summary characterization of integrated assessment models

| Model       | Forcings                                                                     | Geographic Specificity                                         | Socioeconomic Dynamics                                                                | Geophysical Simulation <sup>a</sup>                                                                        | Impact Assessment <sup>b</sup>                                                                     | Treatment of Uncertainty                                                                    | Treatment of Decision Making                                              |
|-------------|------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|             | 0. CO <sub>2</sub><br>1. other GHG<br>2. aerosols<br>3. land use<br>4. other | 0. global<br>1. continental<br>2. countries<br>3. grids/basins | 0. exogenous<br>1. economics<br>2. technology choice<br>3. land use<br>4. demographic | 0. Global $\Delta T$<br>1. 1-D $\Delta T$ , $\Delta P$<br>2. 2-D $\Delta T$ , $\Delta P$<br>3. 2-D Climate | 0. $\Delta T$<br>1. $\Delta$ sea level<br>2. agriculture<br>3. ecosystems<br>4. health<br>5. water | 0. None<br>1. Uncertainty<br>2. Variability<br>3. Stochasticity<br>4. Cultural Perspectives | 0. optimization<br>1. simulation<br>2. simulation with adaptive decisions |
| AS/ExM      | 0                                                                            | 0                                                              | 0                                                                                     | 0                                                                                                          | 0                                                                                                  | 1                                                                                           | 2                                                                         |
| AIM         | 0,1,2,3                                                                      | 2,3                                                            | 1,2,3,4                                                                               | 1,2                                                                                                        | 0,1,2,3,5                                                                                          | 0                                                                                           | 1                                                                         |
| CETA        | 0,1                                                                          | 0                                                              | 1,2                                                                                   | 0                                                                                                          | 0                                                                                                  | 0 or 1                                                                                      | 0                                                                         |
| Connecticut | 0                                                                            | 0                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 1                                                                                           | 0                                                                         |
| CRAPS       | 0                                                                            | 0                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 1                                                                                           | 2                                                                         |
| CSERGE      | 0                                                                            | 0                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 1                                                                                           | 0                                                                         |
| DICE        | 0                                                                            | 0                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 0 or 1                                                                                      | 0                                                                         |
| FUND        | 0,1                                                                          | 1                                                              | 1,4                                                                                   | 0                                                                                                          | 0,1,2,3,4                                                                                          | 0 or 1                                                                                      | 0                                                                         |
| DIAM        | 0                                                                            | 0                                                              | 1,2                                                                                   | 0                                                                                                          | 0                                                                                                  | 0 or 1                                                                                      | 0                                                                         |
| ICAM-2      | 0,1,2,3                                                                      | 1,2                                                            | 1,3,4                                                                                 | 1,2                                                                                                        | 0,1,3                                                                                              | 1,2,3                                                                                       | 1,2                                                                       |
| IIASA       | 0                                                                            | 0                                                              | 1                                                                                     | 1                                                                                                          | 2                                                                                                  | 0                                                                                           | 0                                                                         |
| IMAGE 2.0   | 0,1,2,3                                                                      | 3                                                              | 0,2,3                                                                                 | 2                                                                                                          | 1,2,3                                                                                              | 1                                                                                           | 1                                                                         |
| MARIA       | 0                                                                            | 0,1                                                            | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 0                                                                                           | 0                                                                         |
| MERGE 2.0   | 0,1                                                                          | 1                                                              | 1,2                                                                                   | 0                                                                                                          | 0                                                                                                  | 0 or 1                                                                                      | 0                                                                         |
| MiniCAM     | 0,1,2,3                                                                      | 2,3                                                            | 1,2,3                                                                                 | 2                                                                                                          | 0                                                                                                  | 0                                                                                           | 1                                                                         |
| MIT         | 0,1,2,3                                                                      | 2,3                                                            | 1                                                                                     | 2,3                                                                                                        | 0,2,3                                                                                              | 1                                                                                           | 0,1                                                                       |
| PAGE        | 0,1                                                                          | 1,2                                                            | 1                                                                                     | 0                                                                                                          | 0,1,2,3,4                                                                                          | 2                                                                                           | 1                                                                         |
| PEF         | 0,1                                                                          | 1,2                                                            | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 2                                                                                           | 1                                                                         |
| ProCAM      | 0,1,2,3                                                                      | 2,3                                                            | 1,2,3,4                                                                               | 2                                                                                                          | 0,2,3,5                                                                                            | 1                                                                                           | 1                                                                         |
| RICE        | 0                                                                            | 1                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 0                                                                                           | 0                                                                         |
| SLICE       | 0                                                                            | 1                                                              | 1                                                                                     | 0                                                                                                          | 0                                                                                                  | 1                                                                                           | 2                                                                         |
| TARGETS     | 0,1,2,3,4                                                                    | 0                                                              | 1,2,3,4                                                                               | 2                                                                                                          | 1,2,3,4                                                                                            | 4                                                                                           | 1,2                                                                       |

<sup>a</sup>TARGETS includes ozone depletion, soil erosion, acid rain, and toxic and hazardous pollutant releases.

<sup>b</sup>In AIM, FUND, IMAGE, PAGE, and ProCAM, the impacts are calculated separately for each sector.

Source: Adapted from Rotmans et al. (1995).

sions, the damages resulting from climate change, the "control rate," stated in terms of the percentage reduction in greenhouse gas emissions in each year relative to level of emissions projected to occur in the absence of new policy initiatives, and the carbon tax required in each year to limit greenhouse emissions to the levels specified in the scenario under consideration. Policy evaluation models, on the other hand, tend to report physical changes in emissions, concentrations, temperature, and sea level, as well as changes in land use by activity (e.g., agriculture, forestry, etc.), and/or physical impacts like ecosystems at risk, coastal land area lost, fresh water requirements, and mortality rates.

#### 10.5.1 Results from policy evaluation models – contributions to the scientific debate

Policy evaluation models are rich in physical detail and have produced useful insights, for example, into the potential for reforestation as a consequence of interactions between demo-

graphics, agricultural productivity, and economic growth and into the relationship between climate change and the extent of potentially malarial regions (see Volume 2, Chapter 25).

##### 10.5.1.1 Balancing the carbon budget

To assess the impact of a number of feedback mechanisms within the global carbon cycle, an integrated assessment model has been used to balance the past and present carbon budget. They show that both a historical and a present carbon balance can be obtained in many different ways, resulting in different biospheric fluxes and, thus, in considerably different atmospheric projections. The CO<sub>2</sub>-fertilization feedback appears to determine the balance and to dominate the temperature-related feedbacks, whereas the feedback from net biological primary production seems to counterbalance the soil and respiration feedback effect. Future projections based on the IPCC's 1990 "business-as-usual" scenario show that the CO<sub>2</sub> concentrations calculated with the integrated assessment models are lower than the IPCC values, reaching a difference



UNDER SECRETARY OF STATE  
FOR GLOBAL AFFAIRS  
WASHINGTON, D.C. 20520-7250

To: Climate Lunch Group

From: Timothy Wirth

Attached is an excellent summary of  
Climate to date, done by Eileen Clausen  
in a farewell memo.

I urge you to read this - call me  
if questions or suggestions.

TW

July 19



COPY FOR YOUR  
INFORMATION

9712191 (rev.)

United States Department of State

Washington, D. C. 20520

Desk

INFORMATION MEMORANDUM

S/S

July 15, 1997

UNCLASSIFIED

TO: G - Mr. Wirth

FROM: OES - Eileen Claussen 

SUBJECT: My Thoughts on Climate Change

I thought it might be useful to lay out my thoughts on where things stand on the climate change issue internationally and domestically before I leave the Department. I will also make some suggestions on strategies to pursue in the months ahead.

INTERNATIONAL STATUS

We are at a virtual standstill in the international negotiations. There are nine large issues on the table, and an enormous amount of posturing on all sides. The United States lost a great deal of credibility in recent months as a result of our failure to propose specific targets or even to give an indication of what we might be able to accept.

1. Targets and Timetables

You know of the EU's proposal for a 15% reduction below 1990 levels in 2010. The EU also has a 2005 target (of 7.5% below 1990 levels) on the table. At the present time, there is no movement by others on a target. The U.S. has no target (although we have said that the EU targets are not possible for us), and neither does Japan, Canada, or others in Annex I. We have also been explicit about not accepting a target date of 2005, since it would be unlikely that we could ratify a treaty, obtain implementing legislation and promulgate the rules and regulations that would be required in time for a 2005 date. This issue is complicated by the EU position that it will not discuss other parts of the U.S. proposal until we put a target on the table.

UNCLASSIFIED

## 2. The EU Bubble

The EU target is based on the presumption that the EU is allowed to "bubble" its emissions; in other words, the EU, taken as a whole, will meet its overall target but individual countries may have different targets (i.e. Portugal may increase 40%, Germany may decrease 15% etc.). This is viewed as blatantly unfair by Japan, Australia, the U.S. and others. It is, in essence, a system of differentiated targets with internal trading within the EU. We have said that there are really three choices for how to deal with the EU. First, the EU could have one target, and be one party to the Convention, just like any other single country. Alternatively, it could have each EU member agree to the same target (the one we all agree to), and then the EU could trade emissions within itself so that each country was satisfied. This would be acceptable as long as every other country could also engage in trading. Finally, there is the EU proposal itself, where each country would agree to a different target, but that only the EU as a whole would have to meet the internationally agreed target. This last option, particularly if emissions trading is not allowed for all countries, is completely unacceptable. It is likely that the EU will suggest that they maintain their position on the bubble, but agree to emissions trading for everyone in Annex I in exchange.

## 3. Emissions Trading

We have put forward a proposal for emissions trading within Annex I, that is, among all countries that have binding targets. This proposal has received some support from Australia, Canada and New Zealand. It is viewed with suspicion by Japan, although they are unlikely to oppose it. The Russians are very supportive of this idea, since they would be the country most likely to have emissions to spare. This is the case because their emissions dropped substantially below 1990 levels during the early 1990s, and their economy remains in disarray. The EU claims it is too complicated to be agreed in Kyoto, and will not discuss it further until other targets are on the table. I suspect that the EU will eventually agree to this proposal although other issues will be raised. We have already heard comments to the effect that the purchase of Russian emission credits will not benefit the environment, allowing us, in effect, to purchase existing reductions rather than do our own. This is true, but is also an argument that could be used with the Germans, since their target is only possible because of the parallel situation in eastern Germany. It is possible that

emissions trading may end up by being limited in scope, allowing a country only to trade a portion of its emissions.

#### 4. Joint Implementation

The U.S. has traditionally been a strong supporter of joint implementation, but has been unable to gain many supporters for its proposal internationally. At the present time, we are supported by the Central American governments, Canada, Australia, New Zealand, Norway and possibly Peru. The EU has raised objections, at least for this round of the negotiations, and the Japanese appear ambivalent. The developing countries, with the exception of those listed above, remain opposed. Developing countries are now engaged with us in an experimental joint implementation stage (called activities implemented jointly) where no credits are assigned. They claim first, that they want the experimental phase to finish and be evaluated before reaching further agreement; second, that technology transfer is required by the Convention, and therefore should not involve the transfer of emissions credits; and finally, that if they are eventually going to be subject to targets, they would like cheap reduction options available to them, not to those who participate in joint implementation rather than taking reductions in their own countries. Other complicating factors have also been raised, including the difficulties of establishing a suitable baseline for a given project, how to determine what is truly "additional" about the project's emissions reductions, and how to divide those reduction credits among different countries.

#### 5. Policies and Measures

The Berlin Mandate discusses both targets and "policies and measures." The EU has been a strong supporter of harmonized and mandatory policies and measures, which could include everything from energy taxes to harmonized refrigerator efficiency standards. The Japanese seem perfectly willing to support the EU here, and the Canadians are ready to follow suit. Only the U.S. remains so strongly opposed to such measures, arguing that each country is fundamentally different, and that each country should have the freedom to decide on which policies and measures to use to implement its target. The compromise here may be a list of measures that individual countries could consider, although this will not be a compromise that will be reached easily.

## 6. Differentiation

Japan, Australia and Norway have argued that their circumstances are sufficiently different (Japan because it is so energy efficient, Australia and Norway because they are enormous fuel exporters), that there should not be a uniform target, but rather differentiated targets based on a set of criteria. This view is made more persuasive given the way in which the EU proposes to operate (i.e. differentiating within the EU). Strong opposition comes from the EU (which refuses to acknowledge its hypocrisy) and the U.S. We have argued against differentiation on the grounds that there is no consensus among any countries on a scheme that might be used, and also that, in light of the lack of support, it would not be possible to reach a conclusion in December in Kyoto. As a practical matter, we would fare poorly in any scheme - we are the largest emitter, we are among the most energy intensive (i.e. energy used per unit of GDP), and we are the largest per capita emitter, too. But it is not clear whether the countries who support this approach will simply "give it up" in Kyoto.

## 7. Compensation

The OPEC countries, who are not supportive of any agreement, have raised the issue of compensation. They believe that if a climate change treaty reduces oil imports from their countries, they should be compensated. While it would seem that this is a complete non-starter, other developing countries seem to be rallying to their side, and the EU has been acting like they think some compromise is possible here, at least in terms of an analysis on what our actions might do to their economies. While this proposal as drafted is unlikely to be successful, we are the most vociferous opposition.

## 8. Developing Country Actions

We have put forward a set of proposals that would apply to all developing countries, essentially "advancing" their existing commitments. In our text, we require that they take a series of actions, measure the effects of those actions, and report on what they have accomplished. While there are likely to be some changes to our language, the EU is generally supportive of our suggestions. I suspect that what the developing countries accept will be dependent on the target that developed countries negotiate.

## 9. Evolution

This is the most difficult and the most important of the U.S. proposals. We have argued that developing countries must agree in Kyoto to a subsequent negotiation in which they will assume binding targets and in which we will agree on a mechanism that allows for the "graduation" of countries from developing country status (and targets) to developed country status (and targets). We have no support for this concept, except for Canada, Australia and New Zealand. The EU believes it is too strong (and maybe, if weakened, could be part of a Kyoto mandate), the Japanese believe it could derail a successful conclusion in Kyoto, and the developing countries seem unready to accept it, even in cases where they understand its importance in solving the problem. We will have no chance of treaty ratification without such an agreement. In fact, Senate views on a treaty (represented by the Byrd amendment) would require more than the Administration has proposed -- including the acceptance of new commitments by the developing world. Such new commitments are clearly impossible under the Berlin mandate.

### DOMESTIC STATUS

The domestic situation we face is extremely difficult. Whatever momentum we may have had coming from the July 1996 meeting in Geneva has dissipated, and if we are to succeed, we must work hard to rebuild domestic support for our approach and probable proposed target.

#### 1. Industry

The industries that are most likely to be negatively affected by any climate change regime are very well organized and well funded. They have argued that significant cuts will cripple them, that developed country targets in the absence of developing country targets will disadvantage the U.S., and that the Administration is going to agree to a protocol without sufficient dialogue and support in the United States. Our failure to release the economic analysis we have done bolsters the first and last of these points, although if the data were released, the arguments would persist. On developing countries, their stance is designed to derail the negotiations, since the

Berlin Mandate explicitly precludes new commitments for developing countries. These industries also claim that there is no consensus on the science. They are, for the most part, members of the Global Climate Coalition, and include the coal industry, most of the oil industry, the railroads, and most of the electric utility industry.

There are two other industry constituencies that are important. The first of these is the group that would stand to gain from any climate change protocol, namely the renewable and solar energy industries, as well as those that promote the use of gas. They are not well organized, and have been a very weak voice supporting the Administration. Their group is the Business Council for a Sustainable Energy Future. Enron is the most influential member.

The third group is the International Climate Change Partnership. Most members are multinationals, and range from Carrier Corporation to British Petroleum to Dupont. These companies agree that the science is compelling, and that the framework we presented internationally (binding targets, flexibility, and developing country commitments) is a good one. However, they are disenchanted by our failure to share the economic analysis, and to further engage on the level of a target. The support of these companies is vital. But in order to it, their confidence needs to be rebuilt.

## 2. The Environmental Community

This community is also split on this issue. All environmental NGOs are concerned about the kind of target that the U.S. will propose. They have all supported targets beginning in 2005 (which the Administration has said is too early), and levels of reduction close to or resembling the EU. Some groups support trading and joint implementation (EDF in particular), while other have insisted on increased auto efficiency standards (the Sierra Club). If our target is too modest and does not go beyond stabilization, we will be heavily criticized by all.

## 3. The Congress

The most telling example of where we are in the Congress is the Byrd Resolution. This resolution, drafted by the coal industry, was a personal project of Senator Byrd, and now has more than 60 signatures. It stipulates that if developed countries have binding targets agreed in Kyoto, so must the developing world. Although this idea has

not been tested in the House, it is likely that we would see a similar line up. The reality is that there are too few Hill supporters of action on climate change to deal with this issue. The Administration has not engaged the Congress over the past six months, and we see little support emerging based on NGO lobbying. This has left the field completely open to the naysayers, and the result is pretty clear.

#### 4. Domestic Implementation of a Treaty

of the Senate. It will also require Congressional passage of implementing legislation and the promulgation of rules and regulations by the Executive Branch. Even if the ratification hurdle is passed, developing and passing implementing legislation will be extremely difficult. Like The Clean Air Act, there will be different regional and sectoral impacts from efforts to reduce greenhouse gases. Decisions on how to distribute the burden between the transportation sector, the utility sector, and the household and commercial sector will have to be made. Legislators will have to focus on what to do with the coal industry and coal miners, the industry and labor group that will be most affected. Finally, we will have to look at different implementing mechanisms. The notion that a domestic "cap and trade" program will be all that we need is short-sighted. While such a system will work well for utilities (1/3 of our carbon dioxide emissions), it is not clear how the system can be made to work for transportation, or for the other greenhouse gases (methane, nitrous oxide, etc.) that we will have to regulate.

#### THOUGHTS FOR A STRATEGY

The task facing the Administration and the international community is enormous, given the timetable for decision, the difficulty of the issues to be decided, and the politics associated with those issues. But certain items must be faced immediately:

##### 1. Building a Domestic Base

Nothing will substitute for an earnest dialogue, including a discussion of possible and realistic targets, timetables and impacts of those targets and timetables. This must be conducted at all levels, and with all

constituencies. It will only work if we are open, and share the results of our analyses, whether it is our economic analysis, or our analysis of long-term pathways leading to different atmospheric concentrations of greenhouse gases. The President must hold some meetings with selected CEOs (perhaps through the Business Roundtable) who are engaged in this issue, as well as with some Members of Congress. Others will also have to be heavily engaged. We will need to listen, as well as to share information and ideas. The only time frame that works is for this to occur over the summer.

Some groups will never be satisfied with a solution, since they wish only for there to be no solution. But there should be some members of all communities who could unite behind a realistic proposal. In particular, we need to build a core group from the Business Council, the ICCP, and those parts of EEI that are most forward looking. It may be possible to move the auto companies if they are assured that domestic implementation will not fall on them in the form of CAFE standards. Some oil companies, particularly those with heavy investment in alternative energy sources may also be willing to engage.

We will also have to try to see if there can be common ground between the Administration and organized labor. This will not be an easy task. The Mineworkers have been strong and vocal on this issue, and it is not clear that their views can be reconciled with ours. However, there are others within the AFL-CIO who are more positive (including the Steelworkers and the Oil, Chemical and Atomic Workers), and we should attempt to work with all of them together.

Similarly, we will have to work closely with those members of the environmental community who are prepared to accept a reasonable solution. EDF, NRDC and SWF are obvious candidates. But even with those who are unlikely to be sympathetic, a good dialogue that covers what is possible and what is not might blunt some of the expected criticism.

If the outreach effort culminates in a White House Conference, it is critical that everything be programmed well enough in advance to assure a positive result. A White House Conference that does not result in a shared consensus on the need for action, combined with an acceptance of the principles that will form the basis of our negotiating position would not be helpful.

## 2. Making our Way Through the International Maze

The end game, of course, is the international negotiation. Even if we are successful in building some support domestically, the critical question is whether a deal can be struck in Kyoto. Key players include the EU, Japan, China, Brazil, India and the OPEC countries. We will need to engage all of these countries (or groups of countries) separately from the negotiating fora. A meeting at a high level with the EU and Japan could be useful after the October negotiating session. It must be kept small, and should, in essence, be an attempt to see if a deal is possible. High level visits to Saudi Arabia, India, Brazil and China are also important, and should be conducted before November. Again, these should be designed to assess whether a deal could be reached in December.

No matter how good the preparation, reaching a satisfactory conclusion in Kyoto will be extremely difficult. It is worth some time and effort to determine what follow-on process would be desirable if a deal is not achieved. The key will be keeping the issue alive. Those who oppose any agreement should not come away from Kyoto thinking that they were victorious. Tough questions that we will need to face if no agreement is possible include: if the stumbling block is developing country actions, do we need a change of mandate? If the stumbling block is the strength of the reduction commitment, can we put forward a package that cuts more deeply, but over the long term? And if that is the solution, what interim steps can be agreed? If the issue is the flexibility provisions, particularly joint implementation, are there different options for working with developing countries that could be introduced? Finally, we will need to decide what the best timetable is for an agreement. Certainly, it would be best to reach an agreement in Kyoto. It is early in the Administration's second term, and bold steps are easier the farther they are from an election year. But if the projected schedule is closer to the year 2000, is that something we can live with?

cc:

CEQ - KMcGinty  
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