

Withdrawal/Redaction Sheet

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
001. email	Janet L. Yellen to Records Management at 14:11:34.00. Subject: Official USSS WAVES Request - Records Management Document. (partial) (1 page)	09/06/1997	b(6)
002. email	WAVES_CONF to Janet L. Yellen at 01:41:50.00. Subject: WAVES Confirmation. (partial) (1 page)	09/08/1997	b(7)(C), b(7)(E), b(7)(F), b(6)
003. email	WAVES_CONF to Janet L. Yellen at 01:41:52.00. Subject: WAVES Confirmation. (partial) (1 page)	09/08/1997	b(7)(C), b(7)(E), b(7)(F), b(6)
004. email	Janet L. Yellen to Jeremy B. Rudd at 13:05:40.00. Subject: [Redacted]. (1 page)	09/14/1997	b(6)
005. email	Jeremy B. Rudd to Janet L. Yellen at 14:00:12.00. Subject: [Redacted] (1 page)	09/15/1997	b(6)

COLLECTION:

Clinton Presidential Records
Automated Records Management System [Email]
CEA ([Yellen])
OA/Box Number: 950000

FOLDER TITLE:

[08/12/1997 - 09/16/1997]

2013-0723-F
ab1272

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:12-AUG-1997 11:05:00.00

SUBJECT:

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Here is the memorandum on labor market trends; I left a printed copy with Alice. I also left a packet of charts with her; these are paper clipped, and can be photocopied and used as handouts.

- Jeremy

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D87]MAIL41722432H.216 to ASCII,
The following is a HEX DUMP:

12 August 1997

TO: JANET YELLEN

FROM: STEVEN BRAUN
AMY FINKELSTEIN
MARIA HANRATTY
JEREMY RUDD

SUBJECT: Recent Labor Market Trends

This note presents some of the “conventional wisdom” about recent trends in the labor market, and summarizes what evidence we have regarding the nature and existence of these trends.

1. Part-time *versus* full-time work

To what extent has part-time work become more prevalent in recent years? Do part-time workers receive lower wages and enjoy lower benefits than full-time workers?

Contrary to popular belief, there has not been an increase recently in the percentage of the workforce that is employed part-time: The attached graph indicates that there has been no secular increase in the part-time employment share since 1980. (This contrasts with the 1960s and 1970s, which saw a steady rise in the part-time employment share.)

Two recent studies suggest that there is little statistically significant evidence that part-time workers are paid lower wages than otherwise-equivalent full-time workers.¹ Both studies indicate that the choice of part-time work is endogenous in the wage equation, most likely due to either worker- or job-specific effects, so previous estimates of the effect of part-time work on wages are biased downward. However, both studies agree that full-time workers have significantly higher pro-rated benefits (health and pension) than part-time workers. Whether this represents a serious economic disadvantage to part-time workers depends on what proportion receive benefits through another family member (*e.g.*, a spouse or parent); neither study presents any data on this issue.

¹ Blank, Rebecca (1990) ‘Are Part-Time Jobs Bad Jobs?’ in Gary Burtless (ed.) ‘A Future of Lousy Jobs?’ and Montgomery, Mark and James Cosgrove (1995) ‘Are Part-Time Women Paid Less?’ *Economic Inquiry*, January.

It is not clear to what extent workers are working part time by choice (the 1994 CPS change makes trends particularly hard to spot). Before the change, roughly two to three times as many workers were “part time for noneconomic reasons” as opposed to “part time for economic reasons” [see charts]; the latter category is usually associated with “involuntary” part-time employment.

On an international basis, the U.S. is on the low side of the OECD in terms of the fraction of total employment accounted for by part-time workers.

2. “Temporary” work

One oft-heard “fact” about the labor market is that temporary work--that is, short-term employment--is on the rise. Many of the criticisms levelled against part-time work--for example, that it provides low wages and benefits--are also levelled at temporary work.

First, it is difficult to define “temporary” work. One definition is literal--a temporary job is a job for which the prospect of a long-term employment relationship is nil. Another definition defines a temporary job as one produced by an “alternative work arrangement.” Individuals in alternative work arrangements include temp agency workers, on-call workers (*e.g.*, substitute teachers), independent contractors (which include self-employed workers who do not operate a business), and contract workers, who are hired by a firm to provide services in lieu of in-house employees. While the scant evidence we have indicates that there is some overlap between the two definitions, neither is a proper subset of the other.

Perhaps the only data we have on trends in temporary work is the share of employment accounted for by temp agencies; this has risen over the 1980s and 1990s, with an acceleration since 1991 [see chart]. Currently, this share is about two percent.

About the only other solid evidence we have on temporary work comes from a set of supplementary questions that were asked in the February 1995 CPS. Based on this data, it appears that:

- Contingent workers (a category which effectively includes those who do not expect their jobs to continue) represent roughly five percent of the labor force, while 10 percent of total employment is in the form of an alternative work arrangement.
- Contingent workers are more likely to receive lower wages than noncontingent workers, even after one controls for worker characteristics in a rough way (by comparing wages across demographic, educational, or occupational categories). Contingent workers are less likely to be eligible for and to receive health insurance: One-fifth have employer-provided health insurance (one-third are eligible), while about two-thirds of noncontingent workers receive health benefits from their employer (three-fourths are eligible). However, a large share (two-thirds) of contingent workers have health insurance from *some* source, most commonly through a family member’s insurance.

- It is harder to draw a single conclusion about wage and benefit differentials for workers in alternative work arrangements because of the large variation across the different types of arrangements. In general, these workers are less likely to be eligible for and receive health benefits. But in some cases, workers in alternative arrangements actually earn as much or more than workers in traditional arrangements, which is not surprising when we recall that certain types of self-employed workers are counted as being in alternative arrangements.

Note that we really don't know how much of this is voluntary. About half of all contingent workers, for example, were employed prior to becoming contingent workers. but relatively few of these workers--only about 17 percent--had lost their last job. Most either quit their last job or had previous temporary work which ended.

3. Job tenure

A point that is related to temporary work is job tenure. What do we know about the share of long-term employees in total employment?

A study by Henry Farber indicates that the fraction of employed reporting more than 10 years of tenure fell sharply from 1993 to 1996 (from 39 percent to 35 percent), after having remained roughly constant (at around 40 percent) from 1979 to 1993. (The decline was concentrated among men.) The sharp drop after 1993 is less apparent among workers reporting more than 20 of years tenure.

Note, however, that there is no evidence that this was the result of firms' trying to sack their long-term employees. In fact, the share of displaced men who were displaced from long-term employment relationships has actually fallen since 1979.

4. Labor's share and profits

Have firms been realizing higher profits at workers' expense?

Apparently not [see chart]. The share of employee compensation in GDP has been relatively constant during the 1980s and 1990s. Although the profit share has indeed risen during the 1990s, this is largely because the share of net interest payments in GDP has fallen.

5. Unionization and strike activity

To what extent is the UPS strike a test case for organized labor?

In 1996, the transportation industry was one of the most heavily unionized: 27 percent of employed workers in transportation belonged to unions, compared to a unionization rate of 10 percent for all private nonfarm workers. However, since the transportation industry is small, it

accounts for only a small fraction of total union membership (12 percent).

Is the strike symptomatic of a recent increase in union activity?

There is no evidence that unions have become more active recently. The share of the employed workforce in unions has declined steadily since the early 1950s [see chart]. This trend has continued throughout the period 1990-1996. In addition, the number of strikes in the 1990s has been very low by historical standards [see chart]. The data for the period January-April 1997 show a 50 percent decline in strikes relative to the same period in 1996.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:13-AUG-1997 11:52:30.00

SUBJECT: WH Conference on Climate Change

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Peter R. Orszag (CN=Peter R. Orszag/OU=OPD/O=EOP @ EOP [OPD])

READ:UNKNOWN

CC: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Jason Shogren (CN=Jason Shogren/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

The WH Climate Change Conference is scheduled for October 6. The CEA has been asked to work with the NEC in coming up with panelists for the domestic issues/economy panel and to identify the issues that should be discussed by these panelists.

The following is the tentative plan for the Conference:

Sunday, Oct. 5 --- Breakout sessions: Participants in conference will meet in small

groups with members of the Cabinet and Senior White House staff.

Monday, Oct. 6 --- Conference

AM:

- Science Presentation
- Panel on technology
- Panel on domestic issues/economy

LUNCH

PM:

- Panel on International issues
- VP closing ceremony
- WH Reception

**Clinton Presidential Records
Automated Records Management System
[EMAIL] and Tape Restoration Project [Email]**

This is not a presidential record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

This marker identifies a responsive email, already made available within another collection.

Collection: 2012-0743-F

Bucket: CEA

Creation Date: 08/14/1998

Subject: Q&As re: UPS strike at McCurry's daily press briefing

Creator: Michele Jolin CN=Michele Jolin/OU=CEA/O=EOP [CEA]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:14-AUG-1997 10:49:18.00

SUBJECT: economist candidates on GCC

TO: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Jason Shogren (CN=Jason Shogren/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Here is the WP61 file, which should be more readable than the last. It actually may be more suitable as our list of suggested "validators" than as our list of nominees for the October conference. But nobody need necessarily spend any more time on this for the moment, until we get more information via Michele.

JF===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D27]MAIL440114520.216 to ASCII,
The following is a HEX DUMP:

JF 8/14/97

Economist candidates to invite to Oct. White House conference on GCC

more senior experts on GCC some other eminent economists of 2300

lead signers of letter

Bill Nordhaus	Ken Arrow *
Dale Jorgenson	Paul Krugman
	Robert Solow *

other signers of letter

Richard Schmalensee	William Baumol, NYU
	Max Corden, SAIS
	Gerard Debreu, UCB *
	Frank Fisher, MIT
other eminent who didn't sign	Claudia Goldin, Harvard
Bill Cline, IIF	Ned Gramlich, U.Mich/ FRB nom.
Richard Cooper, Harvard	Lawrence Klein, U.Penn *
	Anne Krueger, Stanford
	Larry Katz, Harvard
	Robert Litan, Brookings
	Van Ooms, CED
	Jeff Sachs
	James Tobin *
	John Harsanyi *
	Wassily Leontief *
	Franco Modigliani *
	Stephen DeCanio
	Robert Repetto

experts in GCC
not quite as senior/big name

signed letter
Stavins

couldn't find name on list	former Admin
Goulder	Alan Blinder

Rutherford
McKibbin
Wilcoxon
Richels
Toman

Laura Tyson
Alicia Munnell
Ev Ehrlich
Joe Stiglitz

* Nobel Prize

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: hermalin@haas.berkeley.edu@INET@LNGTWY (hermalin@haas.berkeley.edu@INET@LNGTWY [UNKNOWN])

CREATION DATE/TIME:25-AUG-1997 14:00:30.00

SUBJECT: A research lunch?

TO: Janet L. Yellen@eop (Janet L. Yellen@eop [CEA])
READ:UNKNOWN

TEXT:
Dear Colleague:

A number of you have mentioned the possibility of a regularly scheduled research lunch for EAP modeled on the Finance group's biweekly research lunch. As I understand it, the Finance lunch is a sort of "Quaker meeting," in which whoever is seized by the desire to talk about his (it's the finance group remember) research in progress is free to proceed; although there is apparently some ability to schedule time in advance.

Would we in EAP like to establish something similar?

In replying (non-replies will be interpreted as apathetic lack of interest in these lunches), could you please comment on the following issues.

1. Do you favor something along these lines?
2. Given EAP's diverse research interests, should we have one lunch, or separate micro and macro lunches?
3. Frequency with which we should meet.
4. Desired day of week and time (we could also have research teas or sherry hours too, I suppose).
5. Who can attend? just EAP ladder faculty? EAP ladder faculty + affiliates? + visitors?

Thanks,

Your fearless leader

++++
Benjamin E. Hermalin
Harold Furst Associate Professor of Management Philosophy & Values
and Associate Professor of Economics

University of California
Walter A. Haas School of Business

545 Student Services Bldg. #1900
Berkeley, CA 94720-1900

ph: (510) 642-7575
fax: (510) 643-1420
e-mail: hermalin@haas.berkeley.edu
URL: <http://haas.berkeley.edu/~hermalin>

Offices: F675 Faculty Wing, Haas School
& 505 Evans Hall

===== ATTACHMENT 1 =====
ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

RFC-822-headers:

Received: from conversion.pmdf.eop.gov by PMDF.EOP.GOV (PMDF V5.0-4 #6879)
id <01IMUXNLRSGW009YRJ@PMDF.EOP.GOV> for YELLEN_J@a1.eop.gov; Mon,
25 Aug 1997 13:53:22 -0400 (EDT)

Received: from storm.eop.gov (storm.eop.gov)
by PMDF.EOP.GOV (PMDF V5.0-4 #6879) id <01IMUXNKG3N4007GPS@PMDF.EOP.GOV> for
YELLEN_J@a1.eop.gov; Mon, 25 Aug 1997 13:53:19 -0400 (EDT)

Received: from haas.berkeley.edu ([128.32.66.85])
by STORM.EOP.GOV (PMDF V5.1-7 #6879)
with ESMTP id <01IMUXNDVRA00032AI@STORM.EOP.GOV> for YELLEN_J@a1.eop.gov; Mon,

25 Aug 1997 13:53:14 -0400 (EDT)

Received: from haas.berkeley.edu
(haas-f675002.Haas.Berkeley.EDU [128.32.75.120])
by haas.berkeley.edu (8.7.6/8.6.12) with ESMTP id KAA04987; Mon,
25 Aug 1997 10:52:27 -0700 (PDT)

Organization: University of California
X-Mailer: Mozilla 4.02 [en] (WinNT; I)

===== END ATTACHMENT 1 =====

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Sally Katzen (CN=Sally Katzen/OU=OMB/O=EOP [OMB])

CREATION DATE/TIME:28-AUG-1997 17:10:16.00

SUBJECT: October 1997 Regulatory Plans

TO: Kathleen A. McGinty (CN=Kathleen A. McGinty/OU=CEQ/O=EOP @ EOP [CEQ])
READ:UNKNOWN

TO: Charles F. Ruff (CN=Charles F. Ruff/OU=WHO/O=EOP @ EOP [WHO])
READ:UNKNOWN

TO: Todd Stern (Todd Stern @ 456-2215 @ fax [WHO])
READ:UNKNOWN

TO: Marcia Hale (Marcia Hale @ 456-6220 @ fax [UNKNOWN])
READ:UNKNOWN

TO: John H. Gibbons (CN=John H. Gibbons/OU=OSTP/O=EOP @ EOP [OSTP])
READ:UNKNOWN

TO: Bruce Reed (Bruce Reed @ 456-2878 @ fax [OPD])
READ:UNKNOWN

TO: Gene Sperling (Gene Sperling @ 456-2878 @ fax [OPD])
READ:UNKNOWN

TO: Janet L. Yellen (Janet L. Yellen @ 395-6958 @ fax [CEA])
READ:UNKNOWN

TO: F.D. Raines (F.D. Raines @ 395-3888 @ fax [UNKNOWN])
READ:UNKNOWN

TO: Kathleen McGinty (Kathleen McGinty @ 456-2710 @ fax [CEQ])
READ:UNKNOWN

TO: Charles Ruff (Charles Ruff @ 456-6279 @ fax [WHO])
READ:UNKNOWN

TO: Ronald Klain (OVP) (Ronald Klain (OVP) @ 456-6212 @ fax [UNKNOWN])
READ:UNKNOWN

TO: Todd Stern (CN=Todd Stern/OU=WHO/O=EOP @ EOP [WHO])
READ:UNKNOWN

TO: John Gibbons (John Gibbons @ 456-6021 @ fax [OSTP])
READ:UNKNOWN

TO: Samuel Berger (NSC) (Samuel Berger (NSC) @ 456-2883 @ fax [UNKNOWN])
READ:UNKNOWN

TO: Bruce N. Reed (CN=Bruce N. Reed/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TO: Gene B. Sperling (CN=Gene B. Sperling/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Franklin D. Raines (CN=Franklin D. Raines/OU=OMB/O=EOP @ EOP [OMB])
READ:UNKNOWN

Donald R. Arbuckle (CN=Donald R. Arbuckle/OU=OMB/O=EOP [OMB])
READ:UNKNOWN

Joseph F. Lackey Jr. (CN=Joseph F. Lackey Jr./OU=OMB/O=EOP [OMB])
READ:UNKNOWN

TEXT:
MEMORANDUM FOR WHITE HOUSE REGULATORY ADVISORS

FROM: Sally Katzen

SUBJECT: October 1997 Regulatory Plans

Executive Order No. 12866 requires each agency to prepare a Regulatory Plan each year. The Plan is published in the Federal Register with the October edition of the &Unified Agenda of Federal Regulatory and Deregulatory Actions,⁸ and consists of descriptions of the &most important significant regulatory actions that the agency reasonably expects to issue in proposed or final form in that fiscal year or thereafter.⁸ In late September, the Vice President will be convening a meeting with you and agency heads to discuss the forthcoming Regulatory Plan.

Drafts of almost all agency Regulatory Plans have been submitted to the Office of Information and Regulatory Affairs. (Of the major agencies, we have not yet received draft Plans from HHS and Labor.)

If you would like to review any agency,s Plan, please call Joe Lackey (x54741) and he will provide you with a copy. If you should have any comments or edits on the content of the draft, please forward them to Joe by Friday, September 12th, or--if you would like to chat about any of the Plans--give me a call.

Thanks.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:29-AUG-1997 15:49:38.00

SUBJECT: Starting Dates

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TEXT:

The following staff are scheduled to start next week:

Adel Morris - Sept 2

Mark Hopkins (International Staff Economist) - Sept 3 or 4 (provided drug test clears)

Mark Raney (Micro Staff Economist) - Sept 3 or 4 (provided drug test clears)

And Becky is planning to start last week in Sept or first week in Oct.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:29-AUG-1997 16:25:41.00

SUBJECT: REMINDER -- ERP Chapters

TO: Zachary M. Candelario (CN=Zachary M. Candelario/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Thomas A. Rhoads (CN=Thomas A. Rhoads/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Susan P. Clements (CN=Susan P. Clements/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Steven N. Braun (CN=Steven N. Braun/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sarah J. Reber (CN=Sarah J. Reber/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sandra F. Daigle (CN=Sandra F. Daigle/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sanders D. Korenman (CN=Sanders D. Korenman/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Rosalind V. Rasin (CN=Rosalind V. Rasin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary Fibich (CN=Mary Fibich/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary E. Jones (CN=Mary E. Jones/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary A. Thomas (CN=Mary A. Thomas/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Maria J. Hanratty (CN=Maria J. Hanratty/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Lisa D. Branch (CN=Lisa D. Branch/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Linda A. Reilly (CN=Linda A. Reilly/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Lael Brainard (CN=Lael Brainard/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Kristen M. Scarafia (CN=Kristen M. Scarafia/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Keith O. Fuglie (CN=Keith O. Fuglie/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jon D. Haveman (CN=Jon D. Haveman/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: John D. Montgomery (CN=John D. Montgomery/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jason Shogren (CN=Jason Shogren/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Ha Yan Lee (CN=Ha Yan Lee/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Francine P. Obermiller (CN=Francine P. Obermiller/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Daniel K. Chang (CN=Daniel K. Chang/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Cristian J. Santesteban (CN=Cristian J. Santesteban/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Christopher D. Carroll (CN=Christopher D. Carroll/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Christel M. Sice (CN=Christel M. Sice/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Charles F. Stone (CN=Charles F. Stone/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Catherine H. Furlong (CN=Catherine H. Furlong/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Caroline Thompson (CN=Caroline Thompson/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Brian A. Amorosi (CN=Brian A. Amorosi/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Amy N. Finkelstein (CN=Amy N. Finkelstein/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Alice H. Williams (CN=Alice H. Williams/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Aaron S. Edlin (CN=Aaron S. Edlin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TEXT:

Just a reminder, first drafts of the ERP chapters are due 2 weeks from today -- that is, Friday, Sept. 12. We are planning to have cluster meetings next week. It'll give you a chance to raise any chapter-related questions or concerns with Janet or Jeff.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 2-SEP-1997 12:44:22.00

SUBJECT: RAs' responsibilities

TO: Zachary M. Candelario (CN=Zachary M. Candelario/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Thomas A. Rhoads (CN=Thomas A. Rhoads/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Susan P. Clements (CN=Susan P. Clements/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Steven N. Braun (CN=Steven N. Braun/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sarah J. Reber (CN=Sarah J. Reber/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sandra F. Daigle (CN=Sandra F. Daigle/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Sanders D. Korenman (CN=Sanders D. Korenman/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Rosalind V. Rasin (CN=Rosalind V. Rasin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary Fibich (CN=Mary Fibich/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary E. Jones (CN=Mary E. Jones/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mary A. Thomas (CN=Mary A. Thomas/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Mark N. Levine (CN=Mark N. Levine/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Maria J. Hanratty (CN=Maria J. Hanratty/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Lisa D. Branch (CN=Lisa D. Branch/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Linda A. Reilly (CN=Linda A. Reilly/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Lael Brainard (CN=Lael Brainard/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Kristen M. Scarafia (CN=Kristen M. Scarafia/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Keith O. Fuglie (CN=Keith O. Fuglie/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jon D. Haveman (CN=Jon D. Haveman/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: John D. Montgomery (CN=John D. Montgomery/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Jason Shogren (CN=Jason Shogren/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Ha Yan Lee (CN=Ha Yan Lee/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Francine P. Obermiller (CN=Francine P. Obermiller/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Elizabeth T. Burns (CN=Elizabeth T. Burns/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Daniel K. Chang (CN=Daniel K. Chang/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Cristian J. Santesteban (CN=Cristian J. Santesteban/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Christopher D. Carroll (CN=Christopher D. Carroll/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Christel M. Sice (CN=Christel M. Sice/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Charles F. Stone (CN=Charles F. Stone/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Catherine H. Furlong (CN=Catherine H. Furlong/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Caroline Thompson (CN=Caroline Thompson/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Carol L. Capece (CN=Carol L. Capece/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Brian A. Amorosi (CN=Brian A. Amorosi/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Amy N. Finkelstein (CN=Amy N. Finkelstein/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Alice H. Williams (CN=Alice H. Williams/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TO: Aaron S. Edlin (CN=Aaron S. Edlin/OU=CEA/O=EOP [CEA])
READ:UNKNOWN

TEXT:

To clarify the role of the CEA's RAs, the following are the primary responsibilities of the RAs (in order of priority):

Dan - WEB (especially international roundup)
other Senior Economists' projects

Zach - WEB (especially domestic roundup)
other Senior Economists' projects

Ha Yan -- projects of Steve Braun
projects of others in the Macro group
projects of other Senior Economists

If a Senior Economist needs help and the RAs are all busy, please contact me. I will find you someone to do the work. Also, please note that the RAs must devote most -- if not all -- of Thursday for the WEB. Please plan around that or talk to me before assigning them work.

Let me know if you have any questions.

mj

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 2-SEP-1997 15:25:24.00

SUBJECT: T&T paper

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

As promised.===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D69]MAIL41177544K.216 to ASCII,
The following is a HEX DUMP:

Targets and Timetables

A U.S. proposal for "targets and timetables" for reducing countries' emissions of greenhouse gases (GHG) must be made soon. No matter what the choice, the decision will inevitably be a tradeoff between costs and benefits. [The U.N. Framework Convention on Climate Change calls for cost-effective remedies to the problem.] A path of very aggressive reductions, relative to the business as usual path (BAU), is likely to entail higher economic costs, but also higher benefits in terms of averted GHG concentrations in the atmosphere and disruption to the climate. A less aggressive path is likely to entail lower economic costs, and lower climate benefits. The tradeoffs have to be made -- both with respect to the ultimate target and with respect to the timetable under which it is achieved. The subject of this paper is how to do them.

1. Why do economists estimate high costs to early reductions in emissions?

The large economic impact of aggressive action

The measures necessary to implement serious reductions in GHG emissions would inevitably have very major effects on the U.S. economy. Estimates suggest that to reduce 2010 emissions to the level of 1990, it would be necessary to increase the price of energy on the order of \$100 per ton of carbon.

This is a rough midpoint, around which there is a great range of uncertainty. The range of estimates in the IAT exercise was \$80-\$140, for the case without international trading. Some agencies believe that the necessary increase in price would be less than this, others that it would be more.¹ Prices would have to continue to increase after 2010, even if emissions were not brought down any further, because of the widening gap vis-a-vis the business-as-usual case. Energy modelers often make the assumption that, once the price of carbon goes high enough, some sort of "back-stop technology" will eventually be developed, thereby putting a limit on how the price ultimately goes.

The estimate of \$100/ton in 2010 represents an increase in the price of oil of \$11/barrel (52%), an increase in the price of gasoline of 26 cents/gallon, and an increase in the price of coal of 273%. One standard of comparison is the BTU tax that the Administration proposed in 1993. The increase now contemplated is 9 times larger. (This is for a weighted average of fuels. The multiple for coal is greater than this, and for oil is less.)

Analogy with the oil shocks of the 1970s

¹ The range of variation across models reported by the Energy Modeling Forum, based in Stanford, is at least as large. Gaskins and Weyant (1993) and EMF (1994).

Another standard of comparison is the oil shocks of the 1970s. The energy price increase now contemplated [an estimated 88 percent, for stabilization by 2010] is on the same order of magnitude as the 1973-74 and 1979-80 oil price increases combined. Again, this is for a weighted average of primary fuels. Fossil fuel prices net of inflation doubled between 1972 and 1975, and doubled again by 1981. Gasoline prices rose by 30 percent between 1972 and 1974 and by nearly another 50 percent from 1974 to 1981. Coal, as a substitute for oil, also experienced a price increase in the earlier episode, but by much less.

Those price increases, which are designated “supply shocks,” are widely believed to have led to high levels of inflation that were eventually reversed only by means of high interest rates and very large losses in output over time. More specifically, they are believed to have led directly to the recessions of 1974 and 1980. (Some economists also believe that the oil shocks may have played a role in the abrupt slowdown in the long-term trend of productivity growth evidenced in the U.S. and other industrialized countries after 1973; but that is much less certain.)

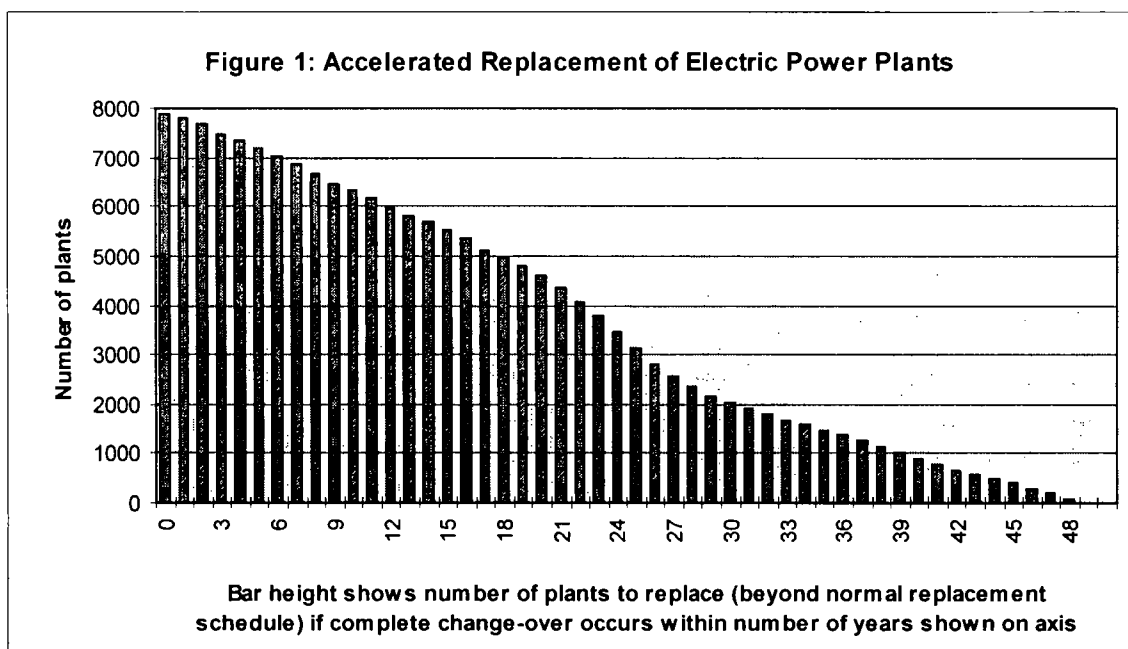
The large models that have been used to examine climate change policy tend to exclude supply-shock effects. [Only the DRI model is a macro model capable of addressing these effects; and it shows a loss of only 150,000 to 400,000 jobs in 2010.] The idea is that a path of gradual increases in energy prices that are announced well ahead of time will be fully built into the expectations of firms and workers. Thus they will be able to plan ahead and avoid serious microeconomic dislocation and macroeconomic disturbance. Still, if it is contemplated to introduce large increases in energy prices over a period as short as a single decade, it is worth remembering the experience of 1972-81. [Some further details are available in a separate memo.]

The role of turnover of the capital stock

Why do economic models consistently find that the cost of major reductions in emissions is much higher if they are implemented by 2010 than if they are stretched out for another decade or more? There are several arguments for waiting. They include (1) the time-value of money (resources not spent on emission reductions early on can be invested at a positive return, so as to purchase more emission reductions later), (2) allowing for uncertainty to be resolved, and (3) giving more lead time to develop and implement new technologies. (There are also a number of reasons for wanting to go fast, listed in bullet form in Section 2 below.) But the most important reason for waiting is to allow time for the capital stock to turn over.

The basic point is that it would be very expensive to scrap the entire capital stock, to replace it with more carbon-free plant and equipment, while it is still in the prime of its useful life. But 20 to 40 years out into the future, much of our existing plant and equipment will be ready for replacement anyway, whether because the plant and equipment have depreciated gradually or because they have more suddenly come to the end of their useful life.

The effect of the turnover of the capital stock is built into some of the models used to address climate change [e.g., Markal Macro; though not into most “bottom-up” engineering studies, like the Five-Labs study]. But it may be useful to look at a simple illustration of the point, for the case of the capital stock in power generation. Figure 1 shows the effects of an accelerated replacement schedule for all of the 7,900 electric power plants built during the last 50 years. Imagine, to take an extreme case, that all power plants had to be shut down within ten years (by 2007), and replaced with less-polluting technology. This would imply replacing 6,330 plants before the end of their normal lifespan, or 80 per cent of the total. Now imagine that all power

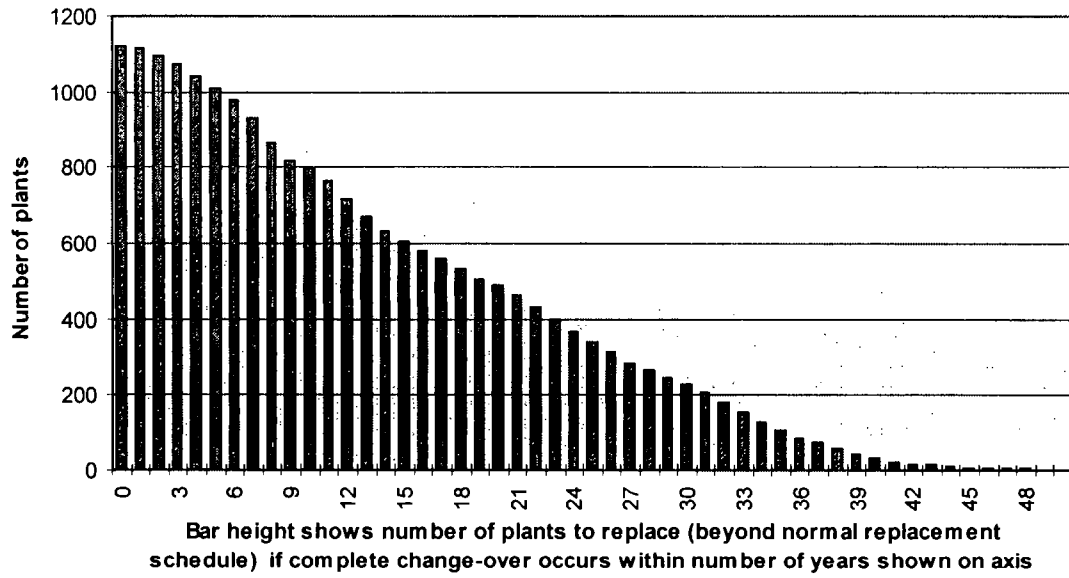


plants had to be replaced in 20 years. This would constitute an accelerated replacement of 4,600 plants, or 58 per cent of the total. If one could wait 30 years, the complete replacement would mean an accelerated replacement of 2,000 plants, 26 per cent of the total. If one waited fifty years, under the stylized assumption of a 50-year life there would be no additional cost to replacing them. [We have truncated the distribution at 50 years, the average lifespan of existing electric power plants. There are other plants that are still in use 60, 70, or even 90 years after they were built. But their numbers are small, and by the end of 50 years the cost of shutting them down would in any case be much-reduced.]

Figure 2a does the same exercise for the set of power plants that are coal-fired. This is the class of generators that produce the most carbon and that would thus have to be replaced even under a moderate plan to address climate change. If a complete change-over of coal plants were to be accomplished in 10 years, 799 of the 1,122 coal-fired plants (71 per cent) would have to be replaced before the end of their expected lifespan. If replacement occurs over 20 years, 488 plants would be affected, or 43 percent of the total. If one could wait 30 years, 227 plants would be closed prematurely, or 20 per cent of the total. Figure 2b repeats the exercise on the basis of coal plant capacity. Since newer plants tend to have larger capacity, the effects of a rapid replacement schedule are magnified. Closing all plants within 10 years implies that 289 million KW of capacity would be prematurely shut down, or 90 per cent of the total. If one could wait 20 years, 235 million KW of capacity would be affected, or 73 per cent. For 30 years, the capacity that would have to be replaced falls to 116 million KW, or 36 per cent of the total.

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

Figure 2a: Accelerated Replacement of Coal Plants

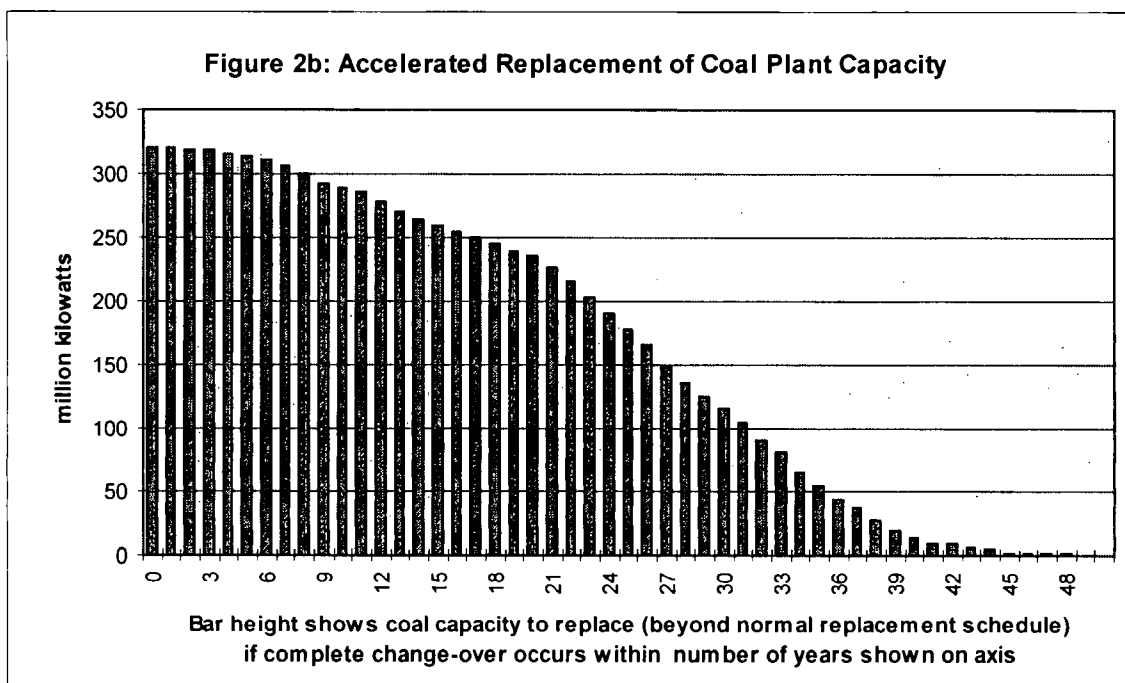


2. Cost-benefit analysis in the Integrated Assessment models

It is difficult to put economic costs and climate benefits into the same unified analytical framework. This is in part because the effects are so uncertain, especially with regard to climate, and in part because the climate effects take place on a very long time scale. So-called Integrated Assessment models attempt to put everything into one framework. They attempt to quantify the costs of climate change in the distant future, as well as the economic costs of programs to address emissions, and to compare the two.

By now many of these models exist. They tend all to give a similar result: a plan that optimally balances costs and benefits calls for relatively small actions at the beginning, with the result that GHG emissions continue to rise, although at a reduced pace, for at least a century. [a bit of elaboration on Nordhaus (1994), etc., e.g. from IPCC summary.] Findings by Peck-Tiesberg (1992), using the CETA model and the case of a non-linear damage function (allowing the damage to rise increasingly sharply with the temperature), call for emissions peaking in the 22nd century.

Some of the authors have characterized in a striking way the gap between the optimal paths that their models produce and the frequently heard proposal to return emissions to 1990 levels by 2010: In their models, the economic costs of such a strong early response are so great that, if that were the only alternative, we would be better off doing nothing at all [Jorgenson testimony? Can't



find it in there ____]. In other words, the economic costs of "1990 levels by 2010" outweigh the benefits.

Arguments for earlier action

This conclusion, and the methodology that produced it, have been criticized on a number of grounds.

- Some claim that it gives insufficient weight to the (small, but nonetheless alarming) probability of a discontinuously-large catastrophe, such as the melting of the West Antarctic ice sheet [which might raise ocean levels by __], a runaway greenhouse effect (e.g., from methane release), or structural changes in ocean currents such as the Gulf Stream. [references: Schelling AER ____; __]
- Some claim that it gives insufficient weight to the welfare of future generations that will bear the costs of climate change (that is, the discount rate is too high). [reference : Cline...]
- Some claim that it neglects basic uncertainty about all parameters -- the economic effects, the climate effects, and the discount rate necessary to compare the two. [ref.: Pizer..]
- Some claim that it omits a basic point about political credibility: an announcement by the world's governments that they are committing to a serious agreement -- but that stringent policy measures will not be taken until 50 [?] years or more into the future -- will not be credible, and understandably so. Only early concrete measures will send the signal necessary to move people's patterns of research, investment, and consumption onto the new path.

3. Estimates of least-cost paths to stabilize concentration levels

An alternative strategy is to reason that the probability of catastrophe may rise to unacceptable levels unless GHG concentrations are capped at some particular level. Such an approach has the disadvantage that the choice of any specific concentration level is arbitrary, and is inconsistent with the spirit of cost-benefit analysis. But it has the advantage of being analytically tractable.

Stabilization of concentrations at 550 ppmv

We will consider the question of the optimal path subject to the constraint that concentrations be stabilized at 550 ppmv (approximately double the pre-industrial level of 275 ppmv²). One might ask why we need accept a level of concentrations, and corresponding probability of catastrophe, as high as this. Indeed, why accept any probability of catastrophe? It is important to recognize that it is already too late to keep this probability at zero (even if one were to accept that it would have been worth the cost to do so, had we known at the beginning of the Industrial Revolution what we know now). Concentrations are already at 365 ppmv, and it is impossible to prevent them rising further in the short run; one would have to reduce emissions virtually to zero to do so.

It would be useful to quantify the implicit gap between this strategy and the strategies resulting from the unconstrained optimization by the Integrated Assessment models. The difference represents the role being accorded to the four bullet points above. In addition, some sensitivity analysis with respect to the level of the concentration constraint would be desirable.

² The concentration figure refers only to CO₂. Emission of other greenhouse gases will raise the warming potential, or carbon-equivalent, above this level.

Results for a less aggressive path

Wigley, Richels and Edmonds (1996) [WRE] examined alternative paths to reach 550 ppmv and other concentration levels. They considered a path where global emissions peaked in 2030 and did not return to 1990 levels until some date past 2100. Manne-Richels (1997) use the MERGE model to examine the implications of the WRE path in more detail. In their model, emissions from OECD countries as well as from other Annex I countries (most of the former Soviet Union and Eastern Europe) peak in the decade 2010-2020. (Annex I emissions do not return to their 1990 levels until sometime early in the decade 2030-2040. The price of crude oil peaks in 2040.) The reason that the peak in worldwide emissions lags two decades behind the peak in Annex I emissions is that the developing countries do not peak until 2050.

WRE argue that this path has much lower economic costs than proposed paths that are more aggressive in terms of timing, while producing the same terminal effects on concentration. The more aggressive path they examine is the IPCC Working Group path 1 [], which entails Annex I fossil fuel emissions peaking in 1990, and falling 24 percent worldwide below 1990 levels by 2010.³ (Of course, it is too late for this scenario to be realized. Below, we will also consider other alternative proposals that, while sufficiently ambitious as to be expensive to achieve, at least have the virtue of not having been ruled out by the passage of seven years during which emissions manifestly have not in fact begun to fall in the overwhelming majority of countries.)

The best single measure of aggregate economic costs is the present discounted value, i.e., the appropriate summation over time, of foregone consumption. The IPCC Working Group path shows a total consumption loss of \$8.6 trillion. (The number would be lower if international trading were allowed -- \$3.3 trillion. On the other hand, the cost would be higher if the developing countries do not agree to the targets envisioned. Indeed, if the developing countries do not participate at all, then the goal would be impossible to attain at any cost.) The more moderate WRE path toward the same concentration goal entails far smaller costs: a total cost of \$1.78 trillion. (With global trading, it is \$0.77 trillion. The difference illustrates the great benefits of "where flexibility," assuming that international trading can be successfully implemented.) Thus the saving from letting emissions continue to rise as late as 2010 is more than three-quarters of the cost.

WRE did not attempt to compute the least-cost path for reaching the same goal.

The least-cost mitigation path

³ Worldwide emissions are up 8 percent in 2010 [from 5.885 to 6.351]. These numbers come from 8/28 personal communication with Richels. (Earlier communication had worldwide emissions rising 13.64% by 2010 under the IPCC path [to 7.798 PgC]. Evidently the former statistic refers only to fossil fuel emissions and the latter to all carbon emissions.)

Manne and Richels (1997) is believed to be virtually the first paper to compute the path that minimizes costs (again, using the MERGE model), subject to the constraint of stabilizing concentrations at a level such as 550 ppmv.⁴ They must necessarily make some assumption about international burden-sharing. The particular question is as follows: how much can we insist that developing countries (who are poor, but in many cases rapidly growing) reduce their emissions, relative to their (low, but often rapidly growing) paths? For the case of 550 ppmv concentrations, they assume that non-Annex I countries can plausibly be expected to begin to limit emissions in 2030, and to complete a transition to a regime under which their per-capita emission rights are equal to those of the industrialized countries by 2050.⁵

The global numbers that Manne and Richels reported in their paper need to be broken down by region. In addition, we asked them to constrain the year 2000 emission levels to the BAU level, under the theory that a treaty that reduces emissions beginning in 1990 has already been ruled out by history, and that even a start in 1998 is so unlikely. Their model implies that the optimal path has emissions from OECD countries, as well as from other Annex I countries, peaking in the decade 2020-2030, a bit behind the WRE path. The peak of Annex I emissions is 29 percent above 1990 levels. [Source: personal communication from Richels, 8/21 and 8/28/97.] Emissions do not return to their 1990 levels until after 2050. Emissions from developing countries peak in 2050. As noted, the sum of the two, total worldwide emissions, also peaks in 2050. Worldwide emissions return to their 1990 levels shortly before the end of the 21st century. By mid-century, developing countries are such an important source of emissions that they dominate the global peaking date and the date of return to 1990 levels.

The optimal path shows the value of carbon emission rights starting at quite low levels after implementation in 2000, a mere \$2.00/ton in 2010, and rising only gradually through the first half of the 21st century. Only in the latter part of the century does it rise strongly, to \$128/ton. This is a sharp contrast to what happens if one imposes an arbitrary constraint on the level of emissions in 2010.⁶ If emissions are constrained to 10% above 1990 levels, the price jumps to \$15/ton in 2010, rising to \$28 by 2020. If the constraint is the much-discussed target of 1990 levels by 2010, the price rises more steeply, to \$37/ton in 2010 and \$70/ton in 2020. If the constraint is a still more

⁴ Also Manne and Richels (1995). Kosobud, et al (1994) examine alternative paths to achieve a given temperature target in 2100. All three papers find that a return to 1990 emission levels early in the 21st century is a needlessly costly way to attain the 2100 goals for concentration and climate.

⁵ Based on 1990 populations. We consider alternative scenarios in Appendix __. One alternative is that the developing countries do not participate at all. It would also be desirable to look at the implications of a plan under which a small number of middle-income countries (particularly Korea and Mexico) begin to limit emissions by 2010. Without China and India, however, the emissions of the middle-income countries are a small fraction of the world total, so that their involvement would be important only in order to point the way for other emerging economies, rather than to reduce emissions perceptibly in their own right.

⁶ This constraint is maintained through 2030, at which time the transition to full developing-country participation with equal per capital emission levels results in a reduction in Annex I countries.

ambitious target of cutting emissions 10%, the price goes to \$54/ton in 2010 and \$102 in 2020. Under these alternatives, if no constraints are imposed for the remainder of the century, other than the constraint of terminal concentrations at 550 ppmv, then the price of carbon {and the level of emissions?} snaps back almost to the same low level as under the optimal path. This reflects that the 2010 emission constraints -- any of the three possibilities -- are sharp deviations from the economically efficient least-cost path.

According to Manne and Richels, their optimal path costs \$0.545 trillion in terms of lost consumption (present discounted value), as compared to \$3.3 trillion under the IPCC Working Group path [and as compared to __ trillion under the "1990 in 2010" path]. Thus the optimal path generates savings of 83 percent from WG1 [and __ % from the 1990 in 2010 path]. (Most of this gain is also reflected in the WRE path, as described above. These paths allow emissions in 2000 to fall below BAU.) It is important to keep in mind that all these cost estimates are "best case" scenarios, in the sense that they assume efficient market implementation, international trading, and full international participation and enforcement. Actual costs could be much higher if less efficient command-and-control mechanisms of implementation are used, if there is not effective international trading, or if some countries do not accede to or abide by a treaty.

What if the developing countries do not agree to go along?

It is difficult to imagine that the industrialized countries will be able to extract commitments from developing countries much more serious than those assumed in the preceding section, the Manne-Richels burden-sharing schedule. What if, as is more likely, the commitments extracted from developing countries are less strong than this, rather than more? On the one hand, as a matter of arithmetic, meeting the 550ppmv concentration constraint would require more aggressive targets and timetables on the part of the Annex I countries, if indeed it would be possible at all. On the other hand, as a matter of politics, the absence of the developing countries would probably lead the peoples of the Annex I countries to choose a less aggressive path, even though it would produce a higher terminal concentration level.⁷ (An analytical balancing of costs and benefits would give the same answer -- a less aggressive path -- once the concentration constraint is relaxed.)

To consider the possibility that developing countries might decline to participate, or decide to participate only to a lesser degree than the Manne-Richels burden-sharing formula, we ask what would be the effects, both economic and climatological, if the Annex I countries remained on the same path (peaking in 2020-2030). The economic effects are not very different from the case where developing countries do participate. The world price of oil is presumably higher, because the developing countries do not curb their consumption. But the adverse economic effects on the Annex I countries is very small. The loss in welfare (present discounted value of consumption) is \$.795 trillion, not much worse than the \$.77 trillion cost that we saw when the developing countries were in. [This is the WRE path? Or the least-cost path?] Overall, concerns about adverse effects on the competitiveness of energy-intensive manufactures do not show up at the aggregate level...

The effects on concentrations of omitting the developing countries, however, are large.

⁷ Conversely, the developing countries are less likely to agree to participate if the Annex I countries have not already taken serious action.

Global emissions continue to grow at... Global concentrations go to __ in 2050 and __ in 2100.

Even if the Annex I countries choose an aggressive path of reducing emissions 10% below 1990 levels by 2010 (and stay at that level thereafter), the effect is to reduce global emissions only 7 % below BAU levels in the year 2100. This is less than a third of the emission reductions achieved when the developing countries participate [22%; conversation 8/28] This result illustrates the problem of free riding. The estimate does not include an allowance for "leakage" of carbon savings from participating to non-participating countries (e.g., reduced oil demand in the former, via a lower world price of oil, raises oil consumption in the latter). Once leakage effects are added to the free-riding problem, the difficulty of accomplishing meaningful reductions without the help of developing countries are even greater. The savings is only 5 percent in this case. In other words, of the 22 percent reductions achieved when the developing countries participate, 15 percentage points are lost to free-riding, and another 2 points to carbon leakage. [conversation 8/29.]

[The difference for concentrations can be crudely translated into an estimate of the effect on temperature in 2050 or 2100 by means of simple interpolation of IPCC estimates...]

4. What is the trade-off between the paths currently under discussion?

As we have seen, the Manne-Richels results suggest that the optimal path has Annex I emissions peaking in the decade 2020-2030 and returning to 1990 levels after 2050. The paths for emission reductions that have been discussed in the international negotiations are more aggressive. One that has been widely discussed in the U.S. is to return to 1990 levels in 2010. (Still more aggressive paths seek to cut emissions 10 percent or more below 1990 levels by 2010.) Intermediate paths are to return to 1990 levels by 2020, or to 10 percent above 1990 levels by 2010.

What are the additional economic costs, and climatological benefits, of moving from the optimal path to "1990 levels by 2010"? Table 4, "Climate and Economic Variables under Alternative Emissions Paths," is designed to answer this question. The economic costs of the more aggressive path can be measured in several ways. The price of gasoline in 2010 would rise by 26 cents a gallon and coal prices by 273 percent, as compared to only 3 cents per gallon on the less ambitious path, and an increase in coal prices of only 53 per cent. The total economic loss, in the present discounted value of foregone consumption, \$206 billion, as compared to only \$95 billion on the less ambitious path. [These figures cumulate lost consumption out only to 2050, and thus are not comparable with the figures cited in the preceding section.] What is accomplished by the more aggressive strategy? The date at which concentrations are doubled is postponed by a mere 3 years (beyond the nine-year postponement achieved by the less aggressive path). The estimated warming in 2100 (2.45 degrees under the business as usual case) is reduced by a mere .03 degrees.. While different observers will weight the economic costs and climate benefits in different ways, the percentage increase in costs from early action seems far greater than the percentage reduction in concentrations and warming. (This conclusion omits that concentrations continue to rise in subsequent centuries. It also leaves out the major argument for early action mentioned earlier: political credibility of an announced long-term plan.)

Table 4

Climate and Economic Variables under Alternative Emissions Paths *

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

		<u>Carbon Permit Price (\$ per ton)</u>				<u>Consumption *** (billions of \$)</u>
		<u>Domestic Trading</u>		<u>Annex I Trading</u>		
		<u>2010</u>	<u>2050</u>	<u>2010</u>	<u>2050</u>	
Business As Usual (BAU)		0.00		0.00		183,155
<i>Deviation from BAU:</i>						
Annex I Participation Only	1990 -10% beginning in 2010	+175	+924	+91	+238	-1630
	1990 beginning in 2010	+110	+582	+42	+149	-1126
	peak in 2015, 1990 in 2040	+0	+559	+0	+155	-498

Summary description

A plan to return carbon emissions to their 1990 levels by 2010 postpones by 12 years the date at which CO2 concentrations reach twice pre-industrial levels. Global warming would be reduced by 0.31 degrees by the year 2100 versus an estimated 2.45 degrees under BAU. Under this emissions path the value of the estimated foregone consumption is \$1.126 trillion.

A less ambitious path -- "eliminate emissions growth by 2010-2020" -- would postpone the doubling date by 3 years less, and would lead to another 0.03 degrees of warming. But, the economics would become much easier: The value of foregone consumption would be only \$498 billion.

* Preliminary CEA projections. The origin of these preliminary numbers is described on the accompanying page.

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

*** Domestic Trading Only. Annex I or worldwide Trading may substantially reduce these costs. Deviations are foregone consumption assuming a 3% discount rate.

August 29, 1997

Sources and Explanations

Sources

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

Participation Cases

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

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

Targets and Timetables

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

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

Trading Scenarios

Domestic Trading: Trading only within each country.

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

Price Assumptions

Carbon: U.S. permit prices for the three policy options are from SGM, which assumes that all revenues are returned to the economy through a lump-sum redistribution.

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

5. Escape clauses and other flexibility provisions

In addition to the question of the stringency of targets and timetables, there are a number of other important determinants of the economic costs of a program encompassed in the term “flexibility”. The U.S. has proposed both “when flexibility” and “where flexibility.”

Examples of “when flexibility” are our proposals for targets that are multi-year averages, for multiple target periods, and for banking and borrowing. An example of “where flexibility” is international trading, especially with the participation of developing countries. All of these proposals could substantially reduce the cost of a given level of emissions, and are crucial elements of our ability to attain moderate targets, let alone more ambitious targets. Costs would be far higher without them.

Another possibility that has recently received attention in the inter-agency process is to add one or more escape clauses. The main idea is to safeguard against unexpectedly large economic costs of emissions reductions. These are costs that could turn out to be unexpectedly large if the economic growth rate turned out higher than expected, or if unrealistic estimates regarding the ease of reducing emissions were built into treaty targets. One possible escape clause would focus on the price of energy per ton of carbon.

Nordhaus (1997) and McKibbin and Wilcoxon (1997) have proposed plans under which there is a cap on how much the price of carbon can rise. The proposal is that above a certain level, governments (or perhaps a supranational authority) could make available an indefinite quantity of emission permits at the predetermined price. While the academic proposals tend to call for common policies and measures to be negotiated worldwide, the idea could usefully be integrated into the U.S. proposal for targets and timetables regarding emission quantities, in the form of a conditional escape clause. The effect would be to convert the quantity limit into a price instrument under circumstances when the burden would otherwise be too burdensome.

Escape clauses could also serve other purposes as well. Possibilities include:

- An escape clause that would be triggered in the future if continued **scientific research** determined that the dangers from GHG concentrations and climate change were much less than previously feared. Presumably the treaty would be renegotiated in such a case anyway. But the arguments for putting this language in now are three: (1) to facilitate the change, should this come to pass, (2) so that we don’t look foolish in the eyes of history if this should come to pass, and most importantly, (3) to help allay the fears of today’s skeptics.
- An escape clause that would be triggered in the future if **developing country accession** turned out to be less than we expect after Kyoto.

- An escape clause that would be triggered by other Annex I countries' **failure to abide** by their commitments.

Each of these proposals, might be useful in avoiding economic costs that otherwise might be incurred needlessly.

6. Conclusions and Summary

[to be added]

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Jorgenson?

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RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: hermalin@haas.berkeley.edu@INET@LNGTWY (hermalin@haas.berkeley.edu@INET@LNGTWY [UNKNOWN])

CREATION DATE/TIME: 2-SEP-1997 16:36:51.00

SUBJECT: First EAP research lunch

TO: Janet L. Yellen@eop (Janet L. Yellen@eop [CEA])
READ:UNKNOWN

TEXT:

Dear Colleague:

I've scheduled the first EAP research lunch for Monday, Sept. 22, at noon, to be held in F678 (the 6th floor seminar room). This is a BYOF lunch (e.g., grab something from the cafe)--we can discuss catering/restaurants for future lunches.

The general opinion of the group was for (i) lunch; (ii) Mondays; and (iii) entire EAP. There was little opinion stated about people outside the EAP ladder faculty, so I've unilaterally decided to extend an invitation to our faculty affiliates and visitors.

The current plan is for a "Quaker-style" meeting; i.e., who ever is moved to talk about his/her research in progress first gets to talk (the "in progress" is important--the idea is to get feedback at early stages of research). If, by chance, you are moved to talk before the lunch and wish to avoid the queue, let me know and we can perhaps put together a schedule.

Regards,

Your Fearless Leader

+++++

Benjamin E. Hermalin
Harold Furst Associate Professor of Management Philosophy & Values
and Associate Professor of Economics

University of California
Walter A. Haas School of Business
545 Student Services Bldg. #1900
Berkeley, CA 94720-1900

ph: (510) 642-7575
fax: (510) 643-1420
e-mail: hermalin@haas.berkeley.edu
URL: <http://haas.berkeley.edu/~hermalin>

Offices: F675 Faculty Wing, Haas School

& 505 Evans Hall

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

PRINTER FONT 10_POINT_ROMAN

CURRENT PARTICIPANTS IN THE VOLUNTARY NATIONAL TESTS IN
4TH GRADE READING AND 8TH GRADE MATHEMATICS
STATES

Alaska
Kentucky
Maryland
Massachusetts
Michigan
North Carolina
West Virginia

LOCAL SCHOOL DISTRICTS

Atlanta, GA
Broward County (Ft. Lauderdale), FL
Chicago, IL
Cincinnati, OH
Detroit, MI
El Paso, TX
Fresno, CA
Houston, TX
Long Beach, CA
Los Angeles, CA
New York City, NY
Omaha, NE
Philadelphia, PA
San Antonio, TX
Seattle, WA

The Department of Defense schools will also participate.

Together, these states and school districts represent 20% of all 4th and 8th graders.

August 29, 1997

===== END ATTACHMENT 1 =====

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:01:26.00

SUBJECT: EMF-14 and MERGE

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
03:01 PM -----

Joseph E. Aldy
09/05/97 11:58:20 AM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: EMF-14 and MERGE

Jeff,

I just spoke with Richels. He said that John Weyant, Director of EMF, gave a presentation at the Oslo meeting on EMF-14. In this analysis, they used about 10 models to assess the economic impacts of the WRE and WGI paths. They found that MERGE fell in the middle of the model results. Richels thought it would be good to at least footnote this in the paper, since we might get some heat if we rely on just one model. I have left a message for Weyant indicating that we would like a copy of his presentation.

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:04:57.00

SUBJECT: Toman's write-up

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Re IA models

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97

03:04 PM -----

Joseph E. Aldy

09/04/97 04:00:15 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: Toman's write-up

Courtesy of Zach, here is Toman's IA write-up.

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D48]MAIL46915584M.216 to ASCII,

The following is a HEX DUMP:

2. Cost-benefit analysis in "Integrated Assessment" models

Integrated Assessment (IA) analyses try to bring together assessments of the physical, ecological, economic, and social impacts of climate change with assessments of policies for responding to climate change and their socioeconomic consequences. Generally speaking, the models can be described schematically as linking economic decisions in the energy (and agriculture) sectors that give rise to GHG emissions (and changes in carbon sequestration), models of atmospheric composition, climatic change, and changes in oceans, and models that describe the potential impacts of climate change on health, natural resources, coastal areas, and other factors of socioeconomic interest. Different components of various IA frameworks are represented in differing degrees of detail and sophistication. A few models contain the capacity to be used for a benefit-cost analysis, in which it is possible to evaluate changes in the long-term path of GHG emissions that maximizes the net benefits of GHG control (these benefits are the avoided damages of climate change less the costs of control). A larger number of IA models can evaluate the benefits and costs of specified policies but are unable to indicate what emissions reductions maximize net benefits. IA frameworks are inherently more "top-down" in their characterization of economic decisionmaking, though some models contain a fair amount of energy sector detail.

A very striking feature of IA models is that they tend to indicate the desirability – from the perspective of maximizing net benefits over time -- of emissions continuing to rise well into the next century, if not beyond. (For a recent comparison of IA model results, see Manne 1996. [JEFF: Do you want cites of individual models too?]) By 2100, the models indicate only small deviations downward from a business as usual (BAU) path (see also IPCC 1996b, Chapter 10). In some cases the emissions do stabilize toward the middle of the next century, but in other cases they continue rising (though more slowly than with business as usual) even beyond 2100. These emissions paths clearly imply increases in atmospheric concentrations of GHGs well beyond the kinds of targets that have been considered in current policy debates (e.g., 550 ppm). One important consequence is that the models indicate costs of near-term emissions stabilization well in excess of the avoided damage costs.

A number of criticisms have been levelled at these IA results. These criticisms include:

Failure to consider the possibility of unlikely but catastrophic events that could result from climate change (e.g., catastrophic sea level rise from melting of the Antarctic ice sheet, runaway global warming from frozen methane releases, or relocation of the Gulf Stream – see IPCC 1996a, Chapter 10).

Failure to give adequate consideration to the scale of potential damages, even in the absence of catastrophe. Cline (1992), for example, argues that damages are much higher than is incorporated in most IA models (see also IPCC 1996a, Chapter 6 for various estimates). One specific concern that has been raised is that the IA models do not account adequately for the costs of a less stable climatic and ecological systems in the face of GHG accumulations.

Failure to consider the adverse consequences of less aggressive abatement policies for future generations – in the context of IA models themselves, the criticism is that discounting of future generations' well-being is excessive. Cline (1992) also raises this concern, as does Howarth (199_).

Failure to consider how uncertainty about all these effects affects the "optimal" decision (Pizer 1997).

Failure to consider how lack of early action will jeopardize the achievement of any longer-term mitigation by signalling a lack of political will ([NEED CITE]), or how lack of early action will retard induced technical progress that is needed to make mitigation affordable (Grubb 1995).

Sensitivity analyses carried out with IA models suggest that at least some of these criticisms are not major concerns; others may be serious concerns, but empirical judgments are not possible given the current state of knowledge. The Manne (1996) survey referred to above considered scenarios in which the climate's sensitivity to accumulating GHGs was greater than is typically assumed, or the the damages are larger (by a factor of almost 8) for a given change in the atmosphere. In either case emissions should (from the perspective of maximizing net benefits) be lower, but the extra degree of emissions reductions required by 2010 is significant (on the order of 25 percent or more) only if climate damages are much higher than expected (the sensitivity of the atmosphere to GHG emissions seems much less important in these analyses). And even in this case, emissions still will be higher than 1990 levels unless the atmosphere and the ecological-economic systems both are quite sensitive. (Broadly similar conclusions follow if, instead of looking at higher damages, one looked at damages that grew proportionately faster as atmospheric GHG concentrations grew [CETA cite]). Thus, the IA models give little support for a policy of near-term emissions stabilization unless damages turn out to be much higher than at least some experts expect.

It is also true that the results of IA models are sensitive to the choice of discount rate used to compare consumption today and in the future. A very low discount rate will imply greater weight on damages accruing over time to future generations, and thus the need for a more aggressive abatement strategy. This tradeoff is influenced by the rate of economic growth, since growth will make future generations better off and thus better able to afford and respond to the damages of climate change (Schelling 1995). However, there are numerous economic and ethical controversies surrounding the appropriate way to discount future damages in IA models, and no clear consensus has emerged. One important point that is often ignored in this debate is how much *today's* generation is willing to sacrifice to provide for the increased protection of future generations through GHG abatement; this is a critical unknown since it is today's generation that must necessarily must decide to pay the bill. All that can be said analytically, therefore, is that intergenerational equity *might* be an argument for more aggressive abatement.

Uncertainty about future damages or other influences on the costs and benefits of abatement can make a difference. However, Pizer's (1997) analysis suggests that the most important source of uncertainty concerns the nature of our preferences for consumption and environmental protection. (Unlike the Manne (1996) analysis, Pizer considers the possibility that damages may be lower as well as larger.) A recent paper by Gjerde et al (1997)

considers the risk of a sudden loss of economic output and well-being on the scale of the Great Depression from climate change. While their analysis indicates more aggressive abatement than other IA analyses without this risk, the introduction of the risk has little relative effect on the desirable level of emissions reduction by 2010, and little effect for a number of years thereafter (unless the loss is much larger even than the Depression).

This leaves the issues of political credibility and induced technical change. As for the latter, it is true that sending a less strong signal to energy markets will slow up technical progress. However, there is great uncertainty about how much of a loss this would be in practice, and the loss would have to be greater than most models seem to indicate before the substantial costs of near-term stabilization could be justified. This does *not* mean, however, that *no* actions are justified on cost-benefit grounds to reduce emissions or stimulate technical progress. Aside from initial steps to curb emissions growth, which signal the need for technical change, longer-term measures to promote the development of new technology are warranted. Political credibility is a more complicated issue to which we return below.

3. Estimates of optimal paths to stabilize GHG concentration levels

Much of the debate about GHG stabilization takes as given that simply allowing emissions to continue to grow for a long period, albeit more slowly, puts the biosphere at too much risk and is not credible politically. An alternative strategy . . . [continue with current text]

Comments on political credibility to be inserted somewhere in the text

Political credibility arises frequently in the discussion of intertemporally flexible approaches to GHG mitigation. It is argued, that allowing emissions reductions to be deferred to a more distant future invites noncompliance with our domestic obligations, and risks sending a signal to countries not in line for immediate emissions targets that curbing emissions is not a serious matter. Several other points do not seem to surface in this debate and are important to put the issue in context.

- (1) A proposed agreement that demonstrably imposes much higher costs than an alternative more measured approach, and thereby invites substantial domestic political opposition, will also suffer from credibility problems both here and abroad.
- (2) The concern about emissions reductions agreements being shirked rather than postponed is a legitimate one, but there are a variety of ways it might be addressed. [Add options here — they should include performance bonds that require carbon debts to be paid back, and (less efficient but more straightforward) simply a backloading of emissions reductions goals in the targets/timetables. The latter may not be credible, but there is little that can be done if a country really sees the burden of successively greater emissions reductions as greater than the cost of noncompliance.]

(3) Demonstrating willingness to reduce our emissions may not make much difference to the willingness of other countries to reduce their emissions anyway, particularly in developing countries for whom climate change is a low-priority issue. It might be much more effective to take some of the substantial cost savings from shifting emissions reductions into the future and use them to help develop and diffuse low-emissions technologies that those countries will want to adopt for their own reasons.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 10:20:24.00

SUBJECT: Nordhaus memo

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Adele C. Morris (CN=Adele C. Morris/OU=OMB/O=EOP @ EOP [OMB])

READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

I am forwarding from Treasury a nice memo on Nordhaus. It includes a summary of the conclusions, critiques, and a table with the effect of the rate of time preference (3% vs. 1%).

JF

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97

10:18 AM -----

BENJAMIN.JONES @ MS01.DO.treas.sprint.com

09/05/97 05:26:00 PM

Record Type: Record

To: Jeffrey A. Frankel

cc:

Subject: Nordhaus memo

Date: 09/05/1997 05:27 pm (Friday)

From: Benjamin Jones

To: EX.MAIL."frankel_j@a1.eop.gov"

Subject: Nordhaus memo

David Wilcox told me that you were interested in seeing a copy of the attached memo. I hope it is informative.

Happy reading!

Ben

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D10]MAIL45518384J.216 to ASCII,
The following is a HEX DUMP:

MEMORANDUM

DRAFT

TO: Distribution

SUBJECT: Nordhaus's arguments against strict action.

Executive Summary and Key Findings

- Nordhaus finds that the optimal policy, given the current state of knowledge and ignoring uncertainty, is to do very little in the short term (a \$6/ton tax in 2005) and only marginally more in the long term. While his mild long-term policy suggestion helps to inform the basis of his short term recommendations, Nordhaus only intends to propose a short-term strategy and emphasizes that policies should change as we learn more.
- Recognizing wide-ranging uncertainties and the possibility of calamity, Nordhaus investigates optimal policy choices over a reasonable distribution of possible states of the world. He shows that while the median optimal carbon tax is on the order of \$6/ton in 2005, the mean optimal carbon tax is somewhat larger, at \$18/ton in 2005.
- His conclusions are viewed with skepticism by some critics, who believe some or all of the following: he overstates control costs, he understates control benefits, and his choice of a positive pure rate of time preference is indefensible. Others find his results and methodology more robust.

Introduction

In a 1994 book¹, Nordhaus calculates an optimal policy response to the problem of climate change. A distinguishing feature of this work is that it aims to uncover a truly optimal policy — that is, one that maximizes *net* benefit as opposed to one that merely minimizes the cost of achieving an *ad hoc* CO2 concentration target.

Basic Results

Ignoring uncertainty and with a best guess of costs and benefits (based on a wide purview of existing studies) Nordhaus finds that the optimal policy is to do close to nothing. With the optimal policy, carbon taxes rise from \$6 per ton in 2005 to \$20 per ton (1989 dollars) in 2100. Global average temperature under this policy increases 3.2°C — only 0.2°C less than in the baseline case. On net, the world economy under this scenario enjoys a small net benefit relative to the baseline case. See Table 1.

¹"Managing the Global Commons," which presents analysis based on Nordhaus's DICE model. It is the culmination of arguments made in earlier papers.

Restricting emissions of greenhouse gases to 1990 levels, on the other hand, inflicts relatively large net costs. Carbon taxes rise to \$400/ton in 2100, and the increase in global average temperature is limited to only 2.4°C — a full degree less than in the baseline.

Given that the optimal policy is much closer to doing nothing than to restricting to 1990 levels, it appears that literally doing nothing in the short term is superior to current proposals oriented on 1990 emissions levels.

Table 1²

	Global Net Benefit ³			Carbon Tax (\$/ton)		
	NPV (\$billions)	Annualized (\$billions)	NPV as % of PV of baseline output	2005	2055	2105
Optimal Policy (no uncertainty)	271	11	0.04	6	15	21
Restrict to 1990 levels	- 7,069	- 283	- 0.98	50	230	400
Stabilize at 1.5°C increase	- 40,980	- 1,639	- 5.94	200	700	800

It is worth emphasizing that Nordhaus's result is not simply a matter of delaying controls. While the typical *cost-minimization* exercise also shows that carbon emissions should be allowed to follow a near-baseline path at first, Nordhaus's result goes further: he finds that relatively little should be done even over the long term. In his optimal scenario, carbon concentrations are allowed to grow without apparent bound.

Incorporating uncertainty, Nordhaus's results change though the basic message of modest short-term measures does not.

- Nordhaus examines how the optimal policy changes when key parameter values vary from his best guess and finds that the mean optimal policy calls for higher carbon taxes than he finds for the best-guess case. The mean optimal policy calls for a carbon tax of \$18/ton in 2005 and \$53/ton in 2045.
- The “mean” result differs from the “best guess” result because the distribution of outcomes is skewed so that favorable climate change scenarios are similar to the best-guess case and occur with high probability while extremely unfavorable scenarios occur with low probability.

²Source for Tables 1 and 2: Nordhaus, “Managing the Global Commons”, 1994. These data come from the DICE model.

³Net benefits are measured relative to the base case of taking no action.

- Nordhaus finds that only 2% of possible scenarios -- the least favorable -- would call for a carbon tax in 1995 of over \$100/ton.

Basis for Results

Nordhaus's results derive from three key assumptions:

- that the *costs* of reducing carbon emissions are relatively high;
- that the *benefits* of carbon control (in the form of averted damages) are relatively low; and
- that the social rate of discount is greater than zero.

Critics have attacked Nordhaus on all three points, and it is worth examining each point in greater detail.

1. Costs

The cost of reducing carbon emissions is determined by the responsiveness of the economy to a given level of carbon-control effort. For example, if a \$10 carbon fee elicits a large response in terms of lower carbon emissions, the cost of carbon control will be low. Conversely, if a \$10 carbon fee elicits a small response, program cost will be high.

The impact on the economy of a carbon-control program in Nordhaus's model is determined by two key assumptions — one concerning the “static” response, given current technologies and carbon use, the other concerning the “dynamic” response, reflecting induced changes in carbon use and advances in technology.

- Nordhaus bases his assumption about static responses on existing empirical studies. His assumptions here are not particularly contentious.
- Nordhaus attempts to capture dynamic responses by assuming that technology will improve at about the same rate in the future as it has done in the past. Importantly, the trend rate of improvement is not allowed to vary depending on the price of carbon permits or the level of a carbon tax. Critics find fault with this approach, since his model thus assumes that carbon taxes will in no way accelerate the development of non-carbon technologies — in stark contrast to the “technologist” view.

Nordhaus notes that his results are sensitive to assumptions about technology, but he does not document the extent of that sensitivity in isolation from other uncertainties.

2. Benefits

The benefits of carbon control are determined by the magnitude of damages averted -- that is, damages that would have occurred in the absence of a control program. Nordhaus calculates that these damages would be relatively modest. For example, he estimates that a 3°C temperature increase results in only a 1.3 percent loss of output per year.

Some critics feel that damages averted will be greater than Nordhaus assumes. They note that SO₂ and particulate emissions will be reduced, biodiversity will be better maintained, and negative health effects will be avoided.

In a survey of experts, Nordhaus finds that the median cost prediction for a 3°C rise in temperature is 1.9 percent of output annually -- 40% higher than his own. The mean prediction is much higher, at 3.6 percent.

3. The social rate of discount

Given that costs are borne up front and benefits accrue mainly in the distant future, assumptions about the social rate of discount are crucial. Nordhaus assumes that the social rate of discount is 3 percent per year; this rate is sufficiently large as to significantly reduce the present value of the distant and already modest benefits.

Many critics (mainly non-economists) feel that a social rate of discount greater than zero is indefensible on ethical grounds. However, mainstream economists strongly endorse the approach to discounting which Nordhaus uses and find it difficult to understand very low rates of time preference in the context of observed behavior.

Nordhaus re-evaluates the optimal policy when the pure rate of time preference is only 1 percent and finds that the optimal carbon tax in this case is considerably greater (see Table 2).

Table 2

	Optimal Carbon Tax (\$/ton)		
Rate of Time Preference	1995	2045	2095
3%	5.3	13.7	21.0
1%	23.6	52.6	77.5

Conclusion

Nordhaus's analysis implies that little should be done either in the short term or in the long term. His results hinge on assumptions about technology improvements, appropriate discount rates, and the size of potential damages. Critics feel that Nordhaus may be:

- overestimating mitigation costs because he ignores the possible influence of higher energy prices in spurring the development of new technology; and
- underestimating damages from climate change.

While both would tend to cause Nordhaus to be too lax in his policy recommendations, it is not

clear that such criticisms can be sustained far enough to overturn Nordhaus's basic point that strict action is inappropriate in the short term. The discount rate issue, while crucial, is difficult to settle.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:00:41.00

SUBJECT: Gruber and 5 labs

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
03:00 PM -----

Joseph E. Aldy
09/05/97 03:17:12 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: Gruber and 5 labs

Jeff,

I just spoke with Jon about the 5 labs study. He agrees that we should stand by our guns on this one. He asked me to call Mark Mazur and tell him that the bottom line is that we (CEA and Treasury) will not sign off on the report so long as that chart and references to the costs stay in. I just left a message for Mark with his secretary. Jon said he would also call TJ and relay this to him. What happens if we don't sign off and they release the report as is?

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:03:12.00

SUBJECT: Richels new data

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
03:03 PM -----

Joseph E. Aldy
09/04/97 10:06:03 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: Richels new data

Jeff,

Attached is a WP file with section 3 of the T&T paper with Richels
comments and new data he sent to us today.

Joe

===== ATTACHMENT 1 =====
ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D21]MAIL47334584E.216 to ASCII,
The following is a HEX DUMP:

3. Estimates of least-cost paths to stabilize concentration levels

An alternative strategy is to reason that the probability of catastrophe may rise to unacceptable levels unless GHG concentrations are capped at some particular level. Such an approach has the disadvantage that the choice of any specific concentration level is arbitrary, and is inconsistent with the spirit of cost-benefit analysis. But it has the advantage of being analytically tractable.

Stabilization of concentrations at 550 ppmv

We will consider the question of the optimal path subject to the constraint that concentrations be stabilized at 550 ppmv (approximately double the pre-industrial level of 275 ppmv¹). One might ask why we need accept a level of concentrations, and corresponding probability of catastrophe, as high as this. Indeed, why accept any probability of catastrophe? It is important to recognize that it is already too late to keep this probability at zero (even if one were to accept that it would have been worth the cost to do so, had we known at the beginning of the Industrial Revolution what we know now). Concentrations are already at 365 ppmv, and it is impossible to prevent them rising further in the short run; one would have to reduce emissions virtually to zero to do so.

It would be useful to quantify the implicit gap between this strategy and the strategies resulting from the unconstrained optimization by the Integrated Assessment models. The difference represents the role being accorded to the four bullet points above. In addition, some sensitivity analysis with respect to the level of the concentration constraint would be desirable.

Results for a less aggressive path

Wigley, Richels and Edmonds (1996) [WRE] examined alternative paths to reach 550 ppmv and other concentration levels. They considered a path where global emissions peaked in 2030 and did not return to 1990 levels until some date past 2100. Manne-Richels (1997) use the MERGE model to examine the implications of the WRE path in more detail. In their model, emissions from OECD countries as well as from other Annex I countries (most of the former Soviet Union and Eastern Europe) peak in the decade 2010-2020. (Annex I emissions do not return to their 1990 levels until sometime early in the decade 2030-2040. The price of crude oil peaks in 2040.) The reason that the peak in worldwide emissions lags two decades behind the peak in Annex I emissions is that the developing countries do not peak until 2050.

¹ The concentration figure refers only to CO₂. Emission of other greenhouse gases will raise the warming potential, or carbon-equivalent, above this level.

WRE argue that this path has much lower economic costs than proposed paths that are more aggressive in terms of timing, while producing the same terminal effects on concentration. The more aggressive path they examine is the IPCC Working Group path 1 [WGI], which entails Annex I fossil fuel emissions peaking in 1990, and falling 24 percent worldwide below 1990 levels by 2010.² (Of course, it is too late for this scenario to be realized. Below, we will also consider other alternative proposals that, while sufficiently ambitious as to be expensive to achieve, at least have the virtue of not having been ruled out by the passage of seven years during which emissions manifestly have not in fact begun to fall in the overwhelming majority of countries.)

The best single measure of aggregate economic costs is the present discounted value, i.e., the appropriate summation over time, of foregone consumption. The IPCC Working Group path shows a total worldwide consumption loss of \$8.6 trillion. (The number would be lower if international trading were allowed -- \$3.3 trillion. On the other hand, the cost would be higher if the developing countries do not agree to the targets envisioned. Indeed, if the developing countries do not participate at all, then the goal would be impossible to attain at any cost.) The more moderate WRE path toward the same concentration goal entails far smaller costs: a total worldwide cost of \$1.57 trillion. (With global trading, it is \$0.77 trillion. The difference illustrates the great benefits of "where flexibility," assuming that international trading can be successfully implemented.) Thus the saving from letting emissions continue to rise as late as 2010 is more than three-quarters of the cost.

WRE did not attempt to compute the least-cost path for reaching the same goal.

The least-cost mitigation path

Manne and Richels (1997) is believed to be virtually the first paper to compute the path that minimizes costs (again, using the MERGE model), subject to the constraint of stabilizing concentrations at a level such as 550 ppmv.³ They must necessarily make some assumption about international burden-sharing. The particular question is as follows: how much can we insist that developing countries (who are poor, but in many cases rapidly growing) reduce their emissions, relative to their (low, but often rapidly growing) paths? For the case of 550 ppmv concentrations, they assume that non-Annex I countries can plausibly be expected to begin to limit emissions in 2030, and to complete a transition to a regime under which their per-capita emission rights are equal to those of the industrialized countries by 2050.⁴

² Worldwide emissions are up 8 percent in 2010 [from 5.885 to 6.351]. These numbers come from 8/28 personal communication with Richels. (Earlier communication had worldwide emissions rising 13.64% by 2010 under the IPCC path [to 7.798 PgC]. Evidently the former statistic refers only to fossil fuel emissions and the latter to all carbon emissions.)

³ Also Manne and Richels (1995). Kosobud, et al (1994) examine alternative paths to achieve a given temperature target in 2100. All three papers find that a return to 1990 emission levels early in the 21st century is a needlessly costly way to attain the 2100 goals for concentration and climate.

⁴ Based on 1990 populations. We consider alternative scenarios in Appendix __. One alternative is that the developing countries do not participate at all. It would also be desirable to look at the implications of a plan under which a small number of middle-income countries (particularly Korea and Mexico) begin to limit emissions by 2010. Without China and India, however, the emissions of the middle-income countries are a small fraction of the world total, so that their involvement would be important only in order to point the way for other emerging economies, rather than to reduce emissions perceptibly in their own right.

The global numbers that Manne and Richels reported in their paper need to be broken down by region. In addition, we asked them to constrain the year 2000 emission levels to the BAU level, under the theory that a treaty that reduces emissions beginning in 1990 has already been ruled out by history, and that even a start in 1998 is so unlikely. Their model implies that the least cost mitigation path has emissions from OECD countries, as well as from other Annex I countries, in general, peaking in the decade 2020-2030, a bit behind the WRE path. The peak of Annex I emissions is 29 percent above 1990 levels. [Source: personal communication from Richels, 8/21 and 8/28/97.] Emissions do not return to their 1990 levels until after 2050. Emissions from developing countries peak in 2050. As noted, the sum of the two, total worldwide emissions, also peaks in 2050. Worldwide emissions return to their 1990 levels shortly before the end of the 21st century. By mid-century, developing countries are such an important source of emissions that they dominate the global peaking date and the date of return to 1990 levels.

The least cost mitigation path generates quite low values for carbon emissions rights after implementation in 2000. In 2010, the permit price is \$2/ton and slowly rises to \$3/ton in 2020. Only in the latter part of the century does it rise significantly to \$156/ton in 2100. In contrast to the least cost path, the following table demonstrates the effect of constraining Annex I emissions relative to 1990 levels in 2010. The constraint is imposed over the period 2010-2030. After 2030, further reductions in Annex I emissions occur consistent with the burden sharing formula described earlier. The permit price estimates presuppose full global trading (where flexibility) but not intertemporal trading (when flexibility).

Change in emissions relative to 1990	Permit Price in 2010 (\$/ton)	Permit Price in 2020 (\$/ton)	Consumption Losses (trillions of dollars) ⁵		
			U.S. World	Annex I	
+10%	4	65	0.293	0.564	0.782
0%	67	88	0.303	0.619	0.939
-10%	120	112	0.429	1.054	1.276

It is important to keep in mind that the permit price estimates assume perfect global trading. Under this assumption, emission reductions occur where it is cheapest to do so regardless of geographic location. The following table permit prices in 2010 when Annex I emissions are constrained to 1990 levels under alternative assumptions about where flexibility.

U.S. Permit Prices in 2010, 1990 Level in 2010 Scenario

Where Flexibility	Global Trading	Annex I Only Trading	Domestic Only Trading
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⁵ The present discounted value of consumption assumes a 5% discount rate and a time horizon of 1990-2100.

Permit Price in 2010 (\$/ton)	67	132	204
----------------------------------	----	-----	-----

According to Manne and Richels, their least cost mitigation path costs the U.S. \$0.124 trillion in terms of lost consumption (present discounted value), as compared to \$1.28 trillion under the IPCC Working Group path and as compared to \$0.303 trillion under the "1990 in 2010" path. Thus the least cost mitigation path generates savings of 90 percent from WGI and 60 percent from the 1990 in 2010 path. (Most of this gain is also reflected in the WRE path, as described above.) It is important to keep in mind that all these cost estimates are "best case" scenarios, in the sense that they assume efficient market implementation, international trading, and full international participation and enforcement. Actual costs could be much higher if less efficient command-and-control mechanisms of implementation are used, if there is not effective international trading, or if some countries do not accede to or abide by a treaty.

What if the developing countries do not agree to go along?

It is difficult to imagine that the industrialized countries will be able to extract commitments from developing countries much more serious than those assumed in the preceding section, the Manne-Richels burden-sharing schedule. What if, as is more likely, the commitments extracted from developing countries are less strong than this, rather than more? On the one hand, as a matter of arithmetic, meeting the 550ppmv concentration constraint would require more aggressive targets and timetables on the part of the Annex I countries, if indeed it would be possible at all. On the other hand, as a matter of politics, the absence of the developing countries would probably lead the peoples of the Annex I countries to choose a less aggressive path, even though it would produce a higher terminal concentration level.⁶ (An analytical balancing of costs and benefits would give the same answer -- a less aggressive path -- once the concentration constraint is relaxed.)

To consider the possibility that developing countries might decline to participate, or decide to participate only to a lesser degree than the Manne-Richels burden-sharing formula, we ask what would be the effects, both economic and climatological, if the Annex I countries were constrained to the WRE path and developing countries do not participate (i.e., developing countries remain on their BAU path). The welfare losses (in terms of present discounted value) will depend upon whether there is trading in emission rights among Annex I countries. If Annex I trading occurs, then Annex I countries' losses increase from \$0.62 trillion to \$0.91 trillion, or 47%. If emission trading among Annex I countries does not occur, then losses rise to \$1.00 trillion, or 61%. For the U.S., in the absence of developing country participation, welfare losses rise from \$0.28 to \$0.36 trillion, or 29%, assuming Annex I trading. Without Annex I trading, U.S. losses rise to \$0.41 trillion or 46%.⁷

⁶ Conversely, the developing countries are less likely to agree to participate if the Annex I countries have not already taken serious action.

⁷ For purposes of this comparison, we assume that if developing countries do participate, there will be full global trading.

Even if the Annex I countries choose an aggressive path of reducing emissions 10% below 1990 levels by 2010 (and stay at that level thereafter), the effect is to reduce global concentrations only 7 % below BAU levels in the year 2100. This is less than a third of the reductions achieved when the developing countries participate [22%; conversation 8/28] This result illustrates the problem of free riding. The estimate does not include an allowance for "leakage" of carbon savings from participating to non-participating countries (e.g., reduced oil demand in the former, via a lower world price of oil, raises oil consumption in the latter). Once leakage effects are added to the free-riding problem, the difficulty of accomplishing meaningful reductions without the help of developing countries are even greater. The savings is only 5 percent in this case. In other words, of the 22 percent reductions achieved when the developing countries participate, 15 percentage points are lost to free-riding, and another 2 points to carbon leakage. [conversation 8/29.]

[The difference for concentrations can be crudely translated into an estimate of the effect on temperature in 2050 or 2100 by means of simple interpolation of IPCC estimates...]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:00:09.00

SUBJECT: summary table of some of MERGE outputs

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
02:59 PM -----

Joseph E. Aldy
09/05/97 03:20:03 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: summary table of some of MERGE outputs

These outputs are from the faxes and phone conversations with Richels.

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D16]MAIL441345842.216 to ASCII,
The following is a HEX DUMP:

Clinton Presidential Records Automated Records Management System [EMAIL]

This is not a presidential record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

Hex Dump file is not in a recognizable format, has been incorrectly decoded or is damaged.

File Name: p_14854314_cea_html_1.xls

Attachment Number: [ATTACH.D16]MAIL441345842.216

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:04:12.00

SUBJECT: DOE 5 labs study

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
03:03 PM -----

Joseph E. Aldy
09/04/97 09:26:24 PM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: Read before you talk to Mark Mazur: DOE 5 labs study

Jeff,

I thought about the 5 labs study during my jog, and I have changed my mind. I really don't think we should have them include energy savings in the report (the renaming of benefits I mentioned in my earlier email). I think their numbers are absolute trash, and we should make that very clear. I don't think we want to be fighting these numbers once they get out. Mark may ask you why we have such serious problems with their estimates -- although we highlight many failings in our August 22 memo. Here are some key points:

Benefits/Energy Savings

--> The energy savings calculations do not incorporate behavioral responses that would lead to an increase in energy use. If air conditioners use less energy per output, people run them more often. If cars are more fuel efficient, people will drive more.

--> The energy savings calculations do not incorporate the price decline associated with reduced demand for energy. Energy consumption in the high efficiency case declines 12% relative to BAU -- while Mark claimed to me that this is "just a second order effect", I think 12% appears substantial.

--> The energy savings calculations for buildings use average cost, not marginal cost, of electricity, and therefore overestimate energy savings.

--> The economics literature has found that actual energy savings do not

compare to engineers' dreams of energy savings because real people live in real houses and work in real firms, not in ideal model houses and ideal model firms (Metcalf and Hassett 6/97 NBER paper).

Costs

--> The government cost estimates are "made up" according to Mark. Our estimate indicates that the cost to government could be tens of billions of dollars per year. Further, they do not assess the costs of standards (e.g., CAFE, national building codes, appliance standards) which account for half of all emission reductions.

--> The industry sector analysis ignores the costs of accelerating capital retirement.

--> Without any empirical or theoretical justification, the transportation sector analysis assumes that a whole set of technologies will come into play and will achieve 100% penetration in 20 years at NO NET COST. This is the "luck" that is required by the analysis.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 15:02:33.00

SUBJECT: chart

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet

This (and perhaps some of these other things I am forwarding to you) had already been given to you and George in hard-copy form.

JF

----- Forwarded by Jeffrey A. Frankel/CEA/EOP on 09/06/97
03:01 PM -----

Joseph E. Aldy

09/05/97 11:08:53 AM

Record Type: Record

To: Jeffrey A. Frankel/CEA/EOP

cc:

Subject: chart

I made a modification to the description of the temperature and concentration model used in our results. Insert the following file (not the one I sent last night), into the paper.

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D20]MAIL42234584B.216 to ASCII,
The following is a HEX DUMP:

Table 4

Climate and Economic Variables under Alternative Emissions Paths *

		<u>Concentration Level (ppmv)</u>		Year at Which Concentration Reaches 2x Pre-Industrial Level **	<u>Change in Temperature from 1990 Level (Celsius)</u>	
Year		<u>2050</u>	<u>2100</u>		<u>2050</u>	<u>2100</u>
Business As Usual (BAU)		502	711	2064	1.06	2.36
<i>Deviation from BAU:</i>						
Annex I Participation Only	1990 -10% beginning in 2010	-21	-58	+10	-0.09	-0.25
	1990 beginning in 2010	-17	-53	+8	-0.07	-0.20
	peak in 2015, 1990 in 2040	-13	-52	+7	-0.06	-0.19
	1990 +10% beginning in 2010	-14	-47	+7	-0.07	-0.18

		<u>Carbon Permit Price (\$ per ton)</u>				Consumption *** (billions of \$)
		<u>Domestic Trading</u>		<u>Annex I Trading</u>		
		<u>2010</u>	<u>2050</u>	<u>2010</u>	<u>2050</u>	
Business As Usual (BAU)		0.00		0.00		121,650
<i>Deviation from BAU:</i>						
Annex I Participation Only	1990 -10% beginning in 2010	+175	+924	+91	+238	-980
	1990 beginning in 2010	+110	+582	+42	+149	-670
	peak in 2015, 1990 in 2040	+12	+563	+11	+153	-270
	1990 +10% beginning in 2010	+60	+310	+17	+113	-460

Summary description

A plan to return carbon emissions to their 1990 levels by 2010 postpones by 8 years the date at which CO₂ concentrations reach twice pre-industrial levels. Global warming would be reduced by 0.20 degrees by the year 2100 versus an estimated 2.36 degrees under BAU. Under this emissions path the value of the estimated foregone consumption is \$670 billion.

A less ambitious path -- "eliminate emissions growth by 2010-2020" -- would postpone the doubling date by 3 years less, and would lead to another 0.01 degrees of warming. But, the economics would become much easier: The value of foregone consumption would be only \$270 billion.

* Preliminary CEA projections. The origin of these preliminary numbers is described on the accompanying page.

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

*** Assumes domestic trading only. Annex I or worldwide trading may substantially reduce these costs.

Deviations are foregone consumption assuming a 5% discount rate for the time horizon 2000-2050.

September 4, 1997

Sources and Explanations

Sources

Business As Usual (BAU) emissions projections are based on the assumptions employed in the IAT process. These projections incorporate the Annual Energy Outlook and International Energy Outlook projections, and closely mirror the IPCC IS92a emissions profiles with modifications made for the economic decline in the Former Soviet Union and Eastern Europe. BAU concentration and temperature projections are from the MAGICC model. Carbon permit price estimates and foregone consumption figures are from the SGM model. All these results were provided by Jae Edmonds, Marshall Wise, and Chris MacCracken at Battelle, Washington, DC.

Participation Cases

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

Targets and Timetables

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

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

Trading Scenarios

Domestic Trading: Trading only within each country.

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

Price Assumptions

Carbon: U.S. permit prices for the four policy options are from SGM, which assumes that all revenues are returned to the economy through a lump-sum redistribution.

Consumption: Deviations are present discounted value of foregone consumption differences for United States in billions of dollars between BAU and scenarios. The present discounted value assumes a discount rate of 5% and a time horizon of 2000-2050.

Withdrawal/Redaction Marker

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
001. email	Janet L. Yellen to Records Management at 14:11:34.00. Subject: Official USSS WAVES Request - Records Management Document. (partial) (1 page)	09/06/1997	b(6)

COLLECTION:

Clinton Presidential Records
Automated Records Management System [Email]
CEA ([Yellen])
OA/Box Number: 950000

FOLDER TITLE:

[08/12/1997 - 09/16/1997]

2013-0723-F
ab1272

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

Freedom of Information Act - [5 U.S.C. 552(b)]

P1 National Security Classified Information [(a)(1) of the PRA]
P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P3 Release would violate a Federal statute [(a)(3) of the PRA]
P4 Release would disclose trade secrets or confidential commercial or
financial information [(a)(4) of the PRA]
P5 Release would disclose confidential advice between the President
and his advisors, or between such advisors [(a)(5) of the PRA]
P6 Release would constitute a clearly unwarranted invasion of
personal privacy [(a)(6) of the PRA]

b(1) National security classified information [(b)(1) of the FOIA]
b(2) Release would disclose internal personnel rules and practices of
an agency [(b)(2) of the FOIA]
b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
b(4) Release would disclose trade secrets or confidential or financial
information [(b)(4) of the FOIA]
b(6) Release would constitute a clearly unwarranted invasion of
personal privacy [(b)(6) of the FOIA]
b(7) Release would disclose information compiled for law enforcement
purposes [(b)(7) of the FOIA]
b(8) Release would disclose information concerning the regulation of
financial institutions [(b)(8) of the FOIA]
b(9) Release would disclose geological or geophysical information
concerning wells [(b)(9) of the FOIA]

C. Closed in accordance with restrictions contained in donor's deed
of gift.
PRM. Personal record misfile defined in accordance with 44 U.S.C.
2201(3).
RR. Document will be reviewed upon request.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 6-SEP-1997 14:11:34.00

SUBJECT: Official USSS WAVES Request - Records Management Document

TO: Records Management (Records Management @ EOP [UNKNOWN])

READ:UNKNOWN

TEXT:

Requestor: Yellen, Janet

Requestor Phone: 3955042

Requestor Pass Type: WHS

Appointment With: Yellen, Janet

Appointment Room: 314

Appointment Date: 9/6/97

Appointment Building: Old Executive Office Building

UNumber:

Comments:

Visitors

Time	Last Name	First Name	DOB
	Cit	COA	SSN
03:00:00 PM	AKERLOF	GEORGE	
	(b)(6)	Y	US (b)(6)
05:00:00 PM	AKERLOF	ROBERT	
	(b)(6)	Y	US (b)(6)

[001]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 7-SEP-1997 20:59:54.00

SUBJECT: Drafts of your speeches

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Attached are the drafts of your speeches on fast track and the economic outlook. I e-mailed a slightly earlier version of the fast track speech to Jon Haveman, per your request.

I revised the outlook speech (outlook1.doc) this weekend. It is essentially an updated version of one of your old speeches, though I added sections on the budget agreement and fast track. It needs a better title.

The fast track speech (trade1.doc) incorporates Jeff's and Michele's edits, with two exceptions:

1. It was suggested that "primary" be added to the first sentence on the fourth page, so that it would read "I would begin by first saying that one of the primary benefits of free trade is not...an improved current account..." To me, this suggests that trade liberalization improves the current account balance; the point of this section of the speech, however, is to counter the notion that trade is beneficial only inasmuch as net exports are positive (and also to emphasize that the current account is a macroeconomic phenomenon related to saving and investment flows). Perhaps I misunderstood the comment, though...

2. It was felt that the paragraph describing Jeff's paper with David Romer is confusing, and a suggestion was made that it be omitted. What do you think?

The principal source for the description of pending policies found in the fast track speech is the set of talking points I received from the NSC (you also have a copy of these talking points). Per your request, I expanded the section that describes planned future trade policy initiatives; the source for this is a set of talking points given to cabinet members for their consultations with Congress (Michele gave a copy to me). I assume that all of the initiatives described in the speech may be discussed in public...?

By the way, the new-trade/new-growth theory mavens that I had in mind as being future candidates for a Nobel prize are Paul Romer and Paul Krugman. Perhaps Gene Grossman is a dark horse candidate as well,

although he has a moustache, and I believe that virtually all recipients of the Nobel in Economics have been clean-shaven. Then again, Krugman has a beard, so perhaps a regime change is in the offing.

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D41]MAIL45866794B.216 to ASCII,

The following is a HEX DUMP:

The Continuing Importance of Trade Liberalization

<PRELIMINARY DRAFT: 7/ix/97>

Janet L. Yellen, Chair
Council of Economic Advisers
11 September 1997
Smith-Barney Washington Conference

The basic goals of the Clinton Administration's economic policies are simple and uncontroversial. First, to secure rising living standards now and in the future. And second, to ensure that the benefits of a rising standard of living are extended to all Americans. To attain these ends, the Administration's economic agenda has been based on three key policy initiatives: deficit reduction, investing in people through education and training, and opening markets worldwide to U.S. goods and services.

It is this third initiative--promoting free and fair trade--that I intend to discuss today. From his first days in office, President Clinton has advocated an outward-looking, "internationalist" trade policy. During the first four years of the Clinton Administration, over 200 trade agreements were ratified and implemented, some relatively large in scope--such as NAFTA and the Uruguay Round of GATT--others relatively small, but all vital to our nation's competitive future. President Clinton intends to extend and build upon this record during the Administration's next four years.

The single most important next step in the Administration's effort to open markets abroad and expand trade is for Congress to renew the President's authority to negotiate trade agreements on a "fast track" basis. Fast track authority allows the President to work out trade agreements with other countries, and then requires Congress to take an up or down vote on the *entire* agreement. In other words, Congress cannot in effect reopen negotiations by adding or deleting

individual provisions of a trade agreement by amendment during Congressional debate. Instead, Congress must vote on the agreement as a whole. Of course, the final decision as to whether a trade agreement--in its entirety--should be approved or disapproved remains in Congress's hands under fast track authority.

Every President since 1974 has received fast track authority from Congress. Why is it so important? The answer is that fast track lends credibility to trade negotiations--under fast track, the parties to a trade agreement know that any provisions that are agreed upon cannot later be renegotiated individually, nor can such renegotiation even be threatened. (In addition, I would add that fast track has another benefit--that of fostering bipartisanship between the President and Congress. Fast track authority has consistently been vouchsafed the President by a bipartisan Congressional majority--which is unsurprising inasmuch as the goal of freer and more open foreign markets is shared by both political parties.)

At present, what need is there for fast track authority? And what would the Administration use it for? One particularly important initiative that is currently on our agenda involves extending NAFTA to include Chile. Today, every major economy in this hemisphere--save the United States--has a preferential trade agreement with Chile. What this means in practice is that U.S. firms face tariffs in Chile that make their goods 11 percent more expensive than those of competing firms from other countries. This is a serious competitive disadvantage.

In addition, there now exist a number of other opportunities to reduce trade barriers in sectors where the United States is competitive. Some of the opportunities arise in connection with scheduled World Trade Organization negotiations covering such industries as agriculture and services. Others arise from new sectoral initiatives such as the Information Technology

Agreement, or ITA. The recently concluded ITA represents a \$5 billion tariff reduction for American products sold to other countries. In the fall, the Administration intends to launch a second such initiative, along with similar initiatives for other sectors.

The pace with which preferential trade agreements are being negotiated between and among countries around the world is so fast that the United States can easily be left behind through inaction. Since 1992, other countries have negotiated twenty preferential trade agreements in Latin America and Asia that exclude the United States. The European Union has begun a process that will culminate in a free trade agreement with Brazil, Argentina, and other MERCOSUR nations; President Chirac of France has even gone so far as to declare that the economic interests of Latin America "lie not with the United States, but with Europe." And within South America itself, the four MERCOSUR countries are attempting to extend their preferential trade arrangements to encompass the entire continent. Moreover, other countries are aggressively pursuing expanded foreign trade. For example, China has targetted a number of Latin American countries--including Chile, Mexico, and Brazil--for increased bilateral trade.

It is evident from all this that now, more than ever, continued engagement with the global economy will require an active effort on the part of the United States, and an extension of fast track authority must be an integral component of this effort. But a fair and important question to ask at this point is: why is free trade so important? Why should we be concentrating so much effort in pushing for more open foreign markets, and how does freer trade contribute to the Administration's goal of securing higher living standards for all Americans? In short, what are the benefits of free trade for the U.S. economy? I would like to use the remainder of my time to address this question--which, in fact, speaks to my own comparative advantage as an economist.

I would begin by first saying that one of the benefits of free trade is not, as is sometimes

supposed, an improved overall current account or trade balance. The Administration's policies do indeed affect the current account, but it is its budget, saving, and investment policies, not its trade liberalization policies, that do so. The current account is a macroeconomic phenomenon that reflects the gap between what we as a nation invest and what we save. The large budget deficits of the 1980s and early 1990s reduced the amount of saving that was available to cover the nation's investment in plant and equipment (investment was choked off too, but not by as much), and this shortfall had to be filled by importing goods from abroad. In an important sense, the nation was overconsuming in the 1980s, financing its consumption binge by borrowing output from foreigners. The result was a large and persistent trade deficit.

Today, we still face a trade deficit, but for a very different reason. Reducing the government's budget deficit has left more room for investment in plant and equipment by the private sector. And invest it has: since 1993, real business fixed investment has grown nearly nine percent per year on average, a much faster rate than that of the preceding ten years. This rate of investment is above the rate at which Americans save--even with the federal government dissaving less by virtue of its smaller budget deficit. So, once again the shortfall is made up for by borrowing output from abroad, with the result being a current account deficit. But there is a big difference between borrowing in order to invest--as the economy is doing now--and borrowing in order to consume, as we did in the 1980s. In fact, running a trade deficit in order to expand the nation's productive capacity is not new to American history--in the 1800s, we did much the same thing in order to build up the nation's infrastructure, most notably during the railroad construction boom a century ago.

So it is not the gap between imports and exports that is relevant as far as trade policy is concerned. But the level of trade--the "openness" of the U.S. economy--does matter. In recent

years, the United States has seen rapid growth in its degree of exposure to the world economy: real U.S. imports of goods and services grew at an average rate of 11 percent over the past four years, while real exports grew at an average rate of 10 percent per year. In the current recovery, export growth has been responsible for roughly a third of overall GDP growth. The United States now exports an amount equal to 13 percent of its GDP every year and imports an amount equal to 15 percent of GDP; to put these figures in perspective, the corresponding figures for the 1960s were four and five percent, respectively. The American economy is now more open than at any time in its history.

What are the benefits of an open economy? Economists generally recognize two broad classes of benefits, the first being static, the second dynamic. I would like to discuss each in turn.

Ever since the work of Adam Smith and David Ricardo, economists have recognized that trade helps an economy by allowing it to specialize in what it does best. Adam Smith argued that specialization--the division of labor--enhances productivity, but noted that the degree to which an individual or a nation could specialize depended critically on the extent of its market. We all know the story of Robinson Crusoe, who, alone and isolated, had to do everything for himself: farm, weave cloth, build shelter, and so on. But if a group of Robinson Crusoes can trade amongst themselves, each can specialize in the production of what he or she is best at doing--thus producing more than would be possible were their attentions divided among goods which they are less skilled at making--and then can trade with his or her neighbors for the goods which they in turn are good at producing.

It might even be the case that one individual (or country, to drop the Robinson Crusoe analogy) is better than anyone else at producing *every* good. Such an argument is often invoked in order to "prove" that the U.S. cannot benefit from trade with a country such as Mexico. But it

turns out that the argument in favor of free trade still carries the day. All that is required is for a country to be *relatively* less skilled than another in the production of some good in order for it to benefit from trade. This is, of course, the doctrine of comparative advantage--the fundamental (if perhaps counterintuitive) principle that underlies the theory of international trade.

This, in a nutshell, is the “classical” view of the benefits of free trade. It is important to note that the benefits from trade under the classical doctrine are primarily static in nature--that is, they affect the *level* of output. Moving from a situation in which there is less trade (or no trade) to one in which trade is freer raises output, but this is more along the lines of a one-time increase (even though it might take a number of years for the benefits from trade to be fully felt). This is not to dismiss the significance of these static benefits: for example, some economic historians have argued that most of the economic growth that occurred in the classical world was rooted in the expansion of markets that took place as a result of increased sea trade around the Mediterranean.

Recently, a new view of international trade has emerged which argues that increased trade actually raises an economy’s *rate of growth*. If this is in fact the case, it makes the case for trade liberalization an even more compelling one. Raising the growth rate of the nation’s economy, even by a few tenths of a percentage point per year, has vastly more significance for long-run living standards than even a relatively large one-off increase in the level of output; the reason, of course, is that a small increase in the economy’s rate of growth cumulates over time to yield large gains.

What is the rationale behind the new trade theory--in other words, what is the source of the “dynamic” benefits from trade? Well, we know that economic growth has two sources: either we can increase the amount of inputs (capital, labor, and raw materials) that we feed into the productive process, or we can make those inputs more productive, through innovations in

technology, better education and training, and so on. (In fact, this latter factor is necessary if the economy is to grow in per-capita terms in the long run, as sooner or later simply accumulating more inputs will run up against the law of diminishing returns.) The static benefits of trade represent a one-off increase in this latter factor: specialization lets us allocate labor and capital to the production of goods that we are relatively good at producing, making a given amount of labor and capital more productive in a manner that is not unlike an improvement in managerial technique.

The new view of international trade also focusses on this second factor, but argues that international trade can actually increase the rate of innovation and technological change. One economist has summarized the argument with the following catena:

- International trade leads to greater competition;
- Competition induces greater innovation; and,
- Innovation (*i.e.*, technological change) drives economic growth.

(It's a simple notion once you think about it--though it will probably win the economists who thought it out a Nobel prize some day.)

In a sense, the emphasis of the new trade theory on the dynamic benefits of international trade comes full circle to Adam Smith. Although Smith's contribution to trade theory is generally seen as providing an argument in favor of free trade that highlighted the role of specialization in raising productivity, he also pointed out that specialization, by acquainting workers with a specific productive process, could give them insight into how such processes might be improved--thus fostering innovation. New trade theory also incorporates elements of Joseph Schumpeter's theory of "creative destruction," in which the competition that is a fundamental feature of a capitalist economy serves as a motive force for the economy's progress.

The new view of international trade represents a valuable contribution to academic economics. But theory alone cannot provide an airtight argument in favor of trade liberalization. There is, however, a large body of empirical literature which attempts to determine what drives economic growth across countries. Unsurprisingly, investment in physical capital--plant and equipment--and investment in human capital--education, for instance--are two factors which have a profound influence on economic growth. But these same studies have also found that an economy's degree of openness--as proxied, say, by the amount that it imports and exports relative to its overall output--has an effect on its rate of growth.

Now, this empirical result--that more open economies grow faster--can be (and has been) criticized on the grounds that it does not truly reflect a causal relationship. Two of my colleagues at Berkeley--one of whom, Jeffrey Frankel, is now also at CEA--recently added to the literature on this topic with a paper that attempts to address this shortcoming. Interestingly, they determined that the effect of openness on economic growth is actually *larger* once the causal effects are clearly isolated.

In an ideal world--the world in which economists live--free trade unambiguously benefits the economy *taken as a whole*. This is true in the real world as well, although the ideal case masks the fact that some will gain from freer trade, but others may lose--even though on net the winners could compensate the losers and still have something left over. In practice, increased globalization will induce reallocations of labor and capital across sectors as the focus of American industry moves to the production of those goods and services which we are relatively good at producing. Because our economy is not frictionless, these adjustments sometimes involve lengthy periods of dislocation until the reallocation of labor and capital across industries is complete. Policymakers advocating freer trade must be aware of this fact, and the Clinton

Administration has realized from the beginning that it is the government's duty to minimize the impact of this dislocation by speeding up the adjustment process however it can. For example, one of the key provisions of NAFTA involved monitoring those industries that were in danger of being adversely affected by the free trade agreement, and the Administration committed itself early on to providing for dislocated workers through retraining programs. And, more generally, the Administration's commitment to investing in people through education and training serves as a strong complement to its policy of trade liberalization: since freer trade tends to benefit skilled workers most, the United States enjoys greater benefits from trade to the extent that more of its workers are highly skilled. In the end, though, those who would point to the short-term adverse effects of trade liberalization should not lose sight of an important point: Trade liberalization might adversely affect a small fraction of American workers in their role as producers, but it benefits all workers in their role as consumers.

I have outlined some compelling theoretical arguments and suggestive empirical results that together indicate that freer trade benefits an economy in a profound way. I would also like to suggest a further way in which the economy might benefit from increased globalization, one which has recently been on our minds more and more at CEA. This involves the effect of globalization on the NAIRU, or natural rate of unemployment. Recently, economists have seen some pretty strong evidence that the NAIRU has fallen over the past few years, implying that the unemployment rate can reach a lower level than previously thought without leading to a buildup in wage and price pressures and an eventual increase in inflation. The reasons for this decline in the NAIRU are not well understood--economists are only just coming to a consensus that it has in fact declined--but it seems plausible that the increasing competitiveness of labor and product markets that globalization fosters has been an important factor in restraining nominal wage pressures,

lowering producers' markups, and keeping the cost of raw materials down in the face of higher levels of domestic production. The result of a decline in the NAIRU is a sustainable, *long-run* increase in the level of GDP--which is another way of describing the static benefits of free trade.

In closing, I would note that I have said nothing of the benefits of trade that arise simply from the fact that it links the economic interests of nations more closely. John Maynard Keynes once argued that the greatest tragedy visited upon Europe by the First World War was the disruption of the system of international trade that was a hallmark of the European economy before 1914. The eventual breakdown in the world trading system and resulting deterioration of Europe's economy was a proximate cause of the Second World War, and kept living standards in Europe and the U.S. much lower for much longer than was necessary by prolonging the Great Depression. It is only in recent years that the scope of international trade has returned to the level seen before the Great War.

The United States is now more closely tied to the rest of the world by trade than at any other time in its history. How the U.S. economy performs relative to the economies of other nations will depend critically on how we promote our commercial interests abroad. Aggressive pursuit of trade liberalization, for which fast track authority is a prerequisite, is the best way to ensure that the U.S. maintains its position as the strongest and most innovative economy in the world.

The Clinton Administration's Economic Agenda: Progress and Possibilities

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Janet Yellen, Chair
Council of Economic Advisers
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I would like to use the opportunity that today's talk provides in order to summarize briefly the present state of the economy, and to give an indication of where I think the economy is headed today. I would also like to discuss some of the economic policy initiatives that the Administration is currently pursuing, and, in particular, consider how the recently forged budget agreement advances the President's economic agenda.

Economic growth over the past several years has been strong and sustainable; the economic expansion, which is now in its 78th month, has been marked by a healthy balance across the various components of demand. Unlike the expansion of the 1980s, private, not public, demand has been the driving force behind the economy's growth. The Administration's initiatives to bring down the deficit and to reinvent government have slowed the growth of government purchases and freed up savings to finance domestic investment. Real business investment and exports have soared over the past four years, growing at an average rate of nine and 10 percent per year, respectively. By augmenting the nation's capital stock, the recent boom in private-sector investment will promote growth and productivity for years to come.

As if that were not enough, we are also beginning to see gains in the opportunities and living standards for all Americans, especially those at the bottom of the income distribution. Between 1993 and 1995, the most recent year for which data are available, the poverty rate fell from 15.1 percent to 13.8 percent--the largest two-year drop in over 20 years. Poverty rates for

elderly and for black Americans reached their lowest levels since these data began to be collected in 1959. Not only have the incomes of *every* quintile of the income distribution increased, but the largest percentage increase has gone to the poorest members of American society. Our work at the Council of Economic Advisers suggests that these improvements are probably larger than can be accounted for by the normal cyclical behavior of the economy. The relentless increase in inequality that began two decades ago has been stalled, if not stopped, in the last few years.

With such a positive state of affairs it is only natural to ask how long the good times will last. In my assessment, as well as in the assessment of many observers, “none of the normal excesses or imbalances that usually appear by this time in the business expansion can be seen.” Although I believe that the very strong growth we have recently enjoyed should lead us to be cautious about the possibility that overheating will lead to a rise in inflation, I also believe that there is little or no justification for the belief that the expansion is likely to come to an end any time soon.

By almost any measure, inflation is lower today than it has been since the 1960s; insofar as we have seen inflationary pressures, they are certainly far milder than in previous periods when unemployment was this low. The reason for this is clear: the NAIRU (or natural rate of unemployment) has fallen. Unlike what we observed in the late 1980s, inflation no longer starts rising when the unemployment rate falls below 6 percent. Incomes are rising: real disposable personal income (that is, aftertax income) grew 2.7 percent over the past four quarters. Overall, the financial condition of households looks quite strong with net worth about five times disposable income--a 28-year high. Consumers are not only wealthier and earning more than in the past, but they are optimistic about the future as well: consumer confidence (as measured by both the University of Michigan and the Conference Board) has been hovering near record highs in recent

months. Taken as a whole, these factors provide the structural underpinnings for strong consumption growth in the near future. And, since consumption is two-thirds of overall demand, strong consumption growth is essential if the economy is to keep producing at its full potential.

Moreover, there are no signs of the kinds of fragilities in the financial sector that can magnify a minor economic shock into a systemic slowdown. The average ratio of net worth to assets in the banking sector is now above eight percent, up from 6½ percent in 1988. Although there has been some talk recently about record levels of credit card delinquencies, this needs to be put in perspective: much of the increase in delinquencies has resulted from companies' issuing credit cards to people whom they previously considered to be bad credit risks. As a better indicator of the ability of households to service their debt, consider the delinquency rate on residential mortgage loans, which account for about two-thirds of household debt: this rate has trended down in recent years, hitting ten-year lows. Finally, measures of business bankruptcies and failures remain relatively benign: the level of business bankruptcies remains well below its 1992 peak.

Overall, our analysis of the key sectors of the economy leads us to expect the expansion to continue. Inflation remains in check, real wage gains are in line with productivity, and the state of the household sector indicates that demand will continue to expand. Finally, the excellent health of the financial sector indicates that the economy is resilient enough to be able to absorb moderate shocks without entering a recession. Together, these factors create an economy in which individuals can better meet the inevitable economic surprises that life brings.

Considering the remarkable shape that the economy is in, one might expect that there is at present no significant role for government economic policy. Nothing could be further from the truth, however. While it is true that policies which promote the rapid expansion of demand have

no place in an economy that is producing at its potential or full-employment level, the government still has an important part to play in encouraging long-run economic growth.

From the beginning, this has been the challenge to which the Clinton Administration has risen. The basic goals of President Clinton's economic policies are simple and uncontroversial: first, to secure rising living standards now and in the future, and second, to ensure that the benefits of a rising living standard are extended to all Americans. To attain these ends, the Administration has pursued three broad policy initiatives: deficit reduction, investing in people through education and training, and opening markets at home and abroad. I would like to devote the remainder of my talk to a discussion of how the Administration has advanced these initiatives, paying particular attention to how the recent budget agreement embodies many of the Administration's economic policy goals, and brings us closer to their achievement.

Ever since President Clinton took office, deficit reduction has been a cornerstone of the Administration's economic policy. Over the past four years, we have made great strides towards balancing the budget. Since 1992, the budget deficit has been cut from its record level of \$290 billion to a projected \$37 billion in 1997. This means that, as a share of GDP, the deficit will fall from 4.7 percent of GDP in FY 1992 to 0.5 percent in 1997, which is the lowest the deficit has been since 1974. In 1992, the budget deficit in the United States was a larger share of the economy than in Japan or Germany; now it is one of the smallest in the industrialized world. The dramatic decline in the deficit over the past four years is the result of many factors, but by far the most important element is the sea change in fiscal policy that occurred with the adoption of the 1993 deficit reduction package, together with the stronger economic performance to which it contributed. These two factors account for fully *three-quarters* of the difference between the actual 1996 budget deficit (\$107 billion) and the deficit forecast before the 1993 package was

adopted (\$298 billion). Even uncompromising observers give President Clinton "a lot of credit" for deficit reduction, and no wonder: the 1993 deficit reduction package put the country solidly on the road to fiscal responsibility.

The budget agreement signed by the President in early August will finish the job. According to our projections, the budget will move into surplus in 2002. This will be the first balanced budget since 1969--and only the ninth since World War Two.

Although some observers have argued that the economy's performance has been the hero that vanquished the deficit, it is sobering to note that the budget would not have balanced without the budget agreement's having been passed. Absent the agreement, the deficit was projected to rise in 1998 and remain between \$50 and \$100 billion over the next five years--a far cry from the budget surplus that the nation will soon enjoy as a result of the agreement.

I should also note that deficit reduction has had a very important indirect effect: it has restored the confidence of Americans in their government's ability to keep its economic house in order. After 12 years of fiscal mismanagement on a grand scale, the government has finally shown that it can handle its own finances.

It is sometimes easy to forget that deficit reduction is not an end in itself, but is rather a means to an end. That end, as mentioned above, is sustainable long-term economic growth with higher living standards for all Americans. Deficit reduction helps us attain this end by providing room in the economy for investment in plant and equipment by the private sector. We are already enjoying this benefit of deficit reduction: since 1993, real business fixed investment has boomed, growing at a rate--roughly nine percent per year on average--which dwarfs that of the preceding ten years. The end result of all this: an expansion of the nation's productive capacity, which has the short-run benefit of relieving the potential bottlenecks that might arise as a result of the

economy's rapid pace of growth, and the long-run payoff of providing our children with workplaces that enable them to be productive and competitive.

The private sector does most of the nation's investing, but in a few key areas, carefully targetted government efforts can help. One is education and training, which is another focus of the Administration's economic policy.

As measured by the gap between the wages of more-skilled and less-skilled workers, the return to education has increased enormously in recent years. Each year of education increases annual earnings by close to 10 percent, and this return has increased sharply since the early 1980s. To a large extent, this reflects the fact that we now live in a high-tech world, where those who can use advanced technologies are rewarded by employers.

It is easy to see that education is extraordinarily important for the individual. But education is also a key determinant of economic growth. Empirical studies suggest that increases in education can account for about 20 percent of the growth of GDP over the last 30 years. This is hardly surprising considering that only a well-educated workforce can implement new ideas and innovations quickly.

The Administration has been careful to ensure that, by working to put the nation's fiscal house in order and thus encourage investment by the private sector, it does not eliminate the government's investments in people. The federal government can play an important role in advancing opportunity by helping to provide greater access to education and training programs in order to create a more uniformly high-skilled workforce. Between fiscal years 1993 and 1997, we have increased spending on education and training by 19 percent. To date, there have been large increases in funding for programs targetted at every stage of a person's life ranging from Head Start (up 43 percent) to the aforementioned training and employment programs.

Moreover, investments in education and training represent a key element of the new balanced budget plan. The budget agreement provides for a \$1,500 scholarship program and 20 percent tuition tax credit for higher education. Importantly, the latter provision applies not just to college-age Americans, but also to those returning to school in order to upgrade their skills. And funding for job training and employment services, including the Job Corps, will be increased by nearly \$580 million in fiscal year 1998. The rationale behind these programs is simple: in a world in which rapid technological change is a commonplace, learning and training must be lifelong activities.

A number of other components of the budget agreement are directed at investment in human capital, including the creation of tax-deferred savings accounts for educational purposes, an extension of Section 127 of the tax code which exempts certain forms of college educational expenses from workers' taxable income, deductions for interest paid on student loans, and a repeal of the cap on tax-exempt bond issuance by colleges and universities. Overall, the budget agreement provides for the largest increase in higher education spending since the G.I. Bill of 1945, and reflects the Administration's commitment toward extending the benefits of training and higher education to as many Americans as are willing to make use of them. Balancing the budget while keeping programs that promote education intact required an heroic effort by the Administration, but it is an effort that will yield high returns in the form of a better educated, more productive workforce and more equitable distribution of earnings across workers.

The third part of the Administration's economic agenda involves encouraging freer, more open markets both at home and abroad. At home, a key feature of the Administration's economic strategy has been an aggressive policy of reforming regulatory structures in important sectors of the economy, including telecommunications, electricity, and banking. On the environmental

front, the Administration has shown that regulatory policies which recognize the importance of market-based incentives can both be cheaper as well as more effective than traditional regulatory controls.

Abroad, the Administration has consistently promoted freer and fairer international trade. Since his first day in office, President Clinton has pursued an outward-looking, "internationalist" trade policy. During the first four years of the Clinton Administration, over 200 trade agreements were ratified and implemented, some relatively large in scope--such as NAFTA and the Uruguay Round of GATT--others relatively small, but all vital to our nation's competitive future.

We hope to extend and build upon this record during the Administration's next four years. What is the best way to do this? At present, I believe that the single most important next step in the Administration's effort to open markets abroad and expand trade is for Congress to renew the President's authority to negotiate trade agreements with other countries on a "fast track" basis. Fast track authority allows the President to work out trade agreements that must then be voted on *in their entirety* by the Congress. In other words, Congress cannot in effect reopen negotiations by adding or deleting individual provisions of a trade agreement, but is instead required to vote on the agreement as a whole. Of course, the final decision as to whether a trade agreement should be approved or disapproved remains in Congress's hands; fast track authority does not usurp Congress's prerogative.

Since 1974, every President has received fast track authority from Congress. Fast track lends credibility to trade negotiations--under fast track, the parties to a trade negotiation know that any provisions that are agreed upon cannot later be renegotiated individually, nor can such renegotiation even be threatened. I would also add that fast track has another important benefit--that of fostering bipartisanship between the President and Congress. Fast track authority

has consistently been vouchsafed the President by a bipartisan Congressional majority--which is unsurprising inasmuch as the goal of freer and more open foreign markets is shared by both political parties.

What would the Administration use fast track authority for? One particularly important initiative that is currently on our agenda involves extending NAFTA to include Chile. Today, every major economy in this hemisphere save the U.S. has a preferential trade agreement with Chile, placing U.S. firms at a serious competitive disadvantage. In general, the pace with which preferential trade agreements are being negotiated is so fast that the U.S. can easily be left behind through inaction. Since 1992, other countries have negotiated twenty preferential trade agreements in Latin America and Asia that exclude the United States. And the European Union has begun a process that will culminate in a free trade agreement with Brazil, Argentina, and other MERCOSUR nations. Now more than ever, continued engagement with the global economy will require an active effort on the part of the U.S., and extension of fast track authority must be an integral component of this effort.

Exploiting our comparative advantage promotes economic growth and yields higher income for the nation as a whole. Wages for jobs supported by goods exports tend to be 13 to 16 percent higher than the national average. But, in keeping with its basic principle that the promise of a higher standard of living should be extended to all Americans, the Administration has been careful to recognize that trade liberalization might not benefit all Americans equally. In an ideal world, free trade unambiguously benefits the economy *as a whole*. This is also true in the real world; however, increased globalization does induce reallocations of labor and capital across sectors of the economy as the focus of American industry moves to the production of those goods and services which we are relatively good at producing. Because our economy is not frictionless,

these adjustments sometimes involve lengthy periods of dislocation until the reallocation of labor and capital across industries is complete. The Clinton Administration has realized from the beginning that it is the government's duty to minimize the impact of this dislocation by speeding up the adjustment process however it can. For example, one of the key provisions of NAFTA involved monitoring those industries that were in danger of being adversely affected by the free trade agreement, and the Administration committed itself early on to providing for dislocated workers through retraining programs. And the Administration's more general commitment to investing in people through education and training serves as a strong complement to its policy of trade liberalization: since freer trade tends to benefit skilled workers most, the U.S. enjoys greater benefits from trade to the extent that more of its workers are highly skilled.

As I mentioned earlier, the Clinton Administration's economic policy goal--higher living standards for all Americans--is uncontroversial. And the ways in which it has attempted to reach this goal--deficit reduction, investing in people, and freer, more open markets at home and abroad--represent sensible, straightforward initiatives which have been vindicated by the economy's continued stellar performance. What has been atypical about the Clinton Administration's economic policy is the determination with which the Administration has pursued its agenda. I believe that this determination has been largely responsible for our success to date, and I have every reason to expect that this success will continue.

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Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: WAVES_CONF@OPUS.EOP.GOV (WAVES_CONF@OPUS.EOP.GOV [UNKNOWN])

CREATION DATE/TIME: 8-SEP-1997 01:41:50.00

SUBJECT: WAVES Confirmation

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

READ:UNKNOWN

TEXT:

ADDRESSEES: JANET_L_YELLEN

SUBJECT: CONFIRMATION: APPT. REQUEST FOR YELLEN, JANET

FROM: WAVES OPERATIONS CENTER - ACO: (b)(6),(b)(7)c,(b)(7)e,(b)(7)f

Date: 09-06-1997

Time: 14:17:09

This message serves as confirmation of an appointment for the visitors listed below.

Appointment With: YELLEN, JANET

Appointment Date: 9/6/97

Appointment Time: 5:00:00 PM

Appointment Room: 314

Appointment Building: OEOB

Appointment Requested by: YELLEN JANET

Phone Number of Requestor: 55042

WAVES APPOINTMENT NUMBER: U70764

If you have any questions regarding this appointment, please call the WAVES Center at 456-6742 and have the appointment number listed above available to the Access Control Officer answering your call.

TOTAL NUMBER OF NAMES SUBMITTED FOR ENTRY : 1

TOTAL NUMBER OF NAMES OF CLEARED FOR ENTRY: 1

AKERLOF, ROBERT

(b)(6)

[002]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 8-SEP-1997 22:33:31.00

SUBJECT: scenarios chart with Ray Squitieri

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet,

Ray Squitieri called me early this evening regarding our task to develop some charts from the model runs. I provided inputs for the charts over a lengthy phone call with Ray. We focused on the following options: 1990 in 2010, 1990 in 2020, Peak in 2015, and 1990 +10% in 2010. He was going to complete the charts and distribute them for comment.

I would like to stress to you that there is a serious comparability issue with many of these runs: all runs from EMF-12 assume that for 1990 level stabilization, the policy is assumed to begin in 1990 and achieve 1990 levels in 2000; 1990 -20% assumed the policy to begin in 1990 and achieve -20% levels in 2010 (Ray said he would include a footnote to this effect). The implicit carbon price estimates are AVERAGES over the period 2000-2020, not the permit price in 2010.

We do have several of the key charts from EMF-12 now, and I have left them for George to look over. We should have several more charts from EMF-14 tomorrow.

Joe

Withdrawal/Redaction Marker

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
003. email	WAVES_CONF to Janet L. Yellen at 01:41:52.00. Subject: WAVES Confirmation. (partial) (1 page)	09/08/1997	b(7)(C), b(7)(E), b(7)(F), b(6)

COLLECTION:

Clinton Presidential Records
Automated Records Management System [Email]
CEA ([Yellen])
OA/Box Number: 950000

FOLDER TITLE:

[08/12/1997 - 09/16/1997]

2013-0723-F

ab1272

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: WAVES_CONF@OPUS.EOP.GOV (WAVES_CONF@OPUS.EOP.GOV [UNKNOWN])

CREATION DATE/TIME: 8-SEP-1997 01:41:52.00

SUBJECT: WAVES Confirmation

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

READ:UNKNOWN

TEXT:

ADDRESSEES: JANET_L_YELLEN

SUBJECT: CONFIRMATION: APPT. REQUEST FOR YELLEN, JANET

FROM: WAVES OPERATIONS CENTER - ACO: ACO (b)(6) (b)(7)C (b)(7)E (b)(7)F

Date: 09-06-1997

Time: 14:18:51

This message serves as confirmation of an appointment for the visitors listed below.

Appointment With: YELLEN, JANET

Appointment Date: 9/6/97

Appointment Time: 3:00:00 PM

Appointment Room: 314

Appointment Building: OEOB

Appointment Requested by: YELLEN JANET

Phone Number of Requestor: 55042

WAVES APPOINTMENT NUMBER: U70765

If you have any questions regarding this appointment, please call the WAVES Center at 456-6742 and have the appointment number listed above available to the Access Control Officer answering your call.

TOTAL NUMBER OF NAMES SUBMITTED FOR ENTRY : 1

TOTAL NUMBER OF NAMES OF CLEARED FOR ENTRY: 1

AKERLOF, GEORGE

(b)(6)

[003]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 8-SEP-1997 19:38:24.00

SUBJECT: What is E/GDP?

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

I spoke with Robert Kaufmann, Boston University (tel. (617) 353-3940) about the E/GDP variable used in the Cristian-Quindi energy efficiency regressions. E is a measure of primary energy use; by "primary," what is meant is that it avoids double counting, e.g., coal used to produce electricity only enters the measure once, as coal, not as both coal and electricity. Specifically, E is the heat (energy) value of all petroleum, all coal, all natural gas, and electricity from hydro, nuclear, and wind generation. It is measured in either British Thermal Units (BTUs) or kilocalories. The source for the data is the "Annual and Monthly Energy Review."

GDP, meanwhile, is real GDP. The source is the ERP (!).

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 8-SEP-1997 10:49:03.00

SUBJECT: Jon Gruber and models

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet,

I just spoke with Gruber. I expressed our concern about becoming too reliant on one or two models. He said that he understands our concerns, but that right now, "models are our friends". Basically, his point is that the models illustrate that all the scenarios result in large economic costs and minimal climatic benefits (in terms of temperature change). He is afraid that if we don't use the models, this creates an information vacuum that helps the position of the greens to push for tight constraints.

Regarding the form of these papers on the scenarios/policy options, he said that is still up in the air. He said that the issue will be discussed at the 12:30 oversight meeting that you are attending (according to Jon).

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 8-SEP-1997 13:13:53.00

SUBJECT: 5 Labs Study

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Adele C. Morris (CN=Adele C. Morris/OU=OMB/O=EOP @ EOP [OMB])
READ:UNKNOWN

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TEXT:

I spoke with Mark Mazur. He said that he is not sure when the 5 Labs Study will be released, but probably sometime over the next 2-3 weeks. It is very doubtful that it will be released by the end of this week. In terms of the nature of the release, he said that it will be low-key -- they will probably try to get an article in the Post either on page 2 of the Business section or somewhere deep in the first section.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME: 9-SEP-1997 14:53:10.00

SUBJECT: President's AU speech, climate change, and 5 labs study reference

TO: Peter R. Orszag (CN=Peter R. Orszag/OU=OPD/O=EOP @ EOP [OPD])

READ:UNKNOWN

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

I read the section on climate change in the President's speech at American University today. Attached is the one-page excerpt of this section. Please note that the President states that the country could cut its carbon emissions by 20% with available technology tomorrow at no cost (the highlighted sentences). This appears to be a reference to the DOE Labs Study.

Joe

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D95]MAIL455595159.216 to ASCII,
The following is a HEX DUMP:

POTUS American University speech, 9/9/97

Excerpt on climate change

Next, we must meet a very large environmental challenge in the next three months. We will work toward a worldwide climate change treaty this December in Kyoto that protects the environment even as it promotes global growth by committing the nations that sign on to it to specific, clear guidelines in the reduction of greenhouse gas emissions into the atmosphere. We know -- (applause.) You can clap for that -- that's all right. (Applause.)

—

Now, there are students here from all over the world, students from all over our country. Many of you have witnessed -- and your families have witnessed -- in your own homes, significant changes in climatic patterns in the last decade, and more extreme climatic develops. It is becoming a part of the common parlance of America, all over the country, to talk about the 500-year flood we had along the Mississippi River. One member of Congress, who happened to be a member of the other party, said to me the other day -- he said, "Mr. President, we've had three 100-year floods in the last five years in my home state." He said, "Does that mean I get to wait 500 years before we have another bad flood?"

Many of you who are studying this issue know that a panel of over 2,500 scientists has concluded that the climate of the Earth is significantly warming in ways that will have not entirely predictable, but almost certainly destructive consequences unless we do something about it.

This is something that will affect people of all incomes, of all backgrounds, from all parts of our country, and, indeed, the whole world. We need the young people of America, particularly the university students who are in a position to study this issue, to make this a gripping national issue. And we also need people who have the confidence in our ability to break new technological and scientific barriers to stand up and say, ***you cannot make me believe that we can't reduce greenhouse gas emissions substantially and still grow the American economy. We could reduce them 20 percent tomorrow with technology that is already available at no cost if we just changed the way we do things.*** (emphasis added)

Now, this will be a very controversial debate. And there will be people who say, President Clinton has spent five years killing himself to revitalize the American economy and now he's going to take it down overnight by committing to reduce greenhouse gas emissions in America. That is not true. But if you let the sea level rise and we flood the southern coast of Florida and we flood the southern coast of Louisiana, and we otherwise disrupt what life in the United States is like over the next 50 years, then your children will pay the price for our neglect. We can grow this economy and do right by the environment. I think you believe that, and I need you to help me convince the American people that it can be done.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Adele C. Morris (CN=Adele C. Morris/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:10-SEP-1997 17:39:40.00

SUBJECT:

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet,

Please find attached a Lotus spreadsheet with historical energy use data, which we sent to Peter in response to his request. He asked me to be sure you got a copy.

The BAU case is computed by assuming that E/GDP declines by 1% each year after 1971.

Adele

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D63]MAIL40081135A.216 to ASCII,
The following is a HEX DUMP:

Clinton Presidential Records Automated Records Management System [EMAIL]

This is not a presidential record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

Hex Dump file is not in a recognizable format, has been incorrectly decoded or is damaged.

File Name: p_95311799_cea_html_1.xls

Attachment Number: [ATTACH.D63]MAIL40081135A.216

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:10-SEP-1997 23:35:10.00

SUBJECT: delaying 1990 until 2020

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TEXT:

The constraint appears to be more important than extending the timing by 10 years. The 1990 level still appears to be tight on the economy, even in 2020. The permit price is a little higher in 2020 under the 2020 case than the 2010 case in 3 models (ranging between \$100-\$200). Foregone consumption estimates between the two cases, without international trading, are fairly close (2020 ranges between \$10-\$100 billion less than 2010, over 50 and 100 year time horizons) regardless of discount rate. Why is this the case? Because, by 2020, 1990 levels would be nearly 30% below BAU emissions in that year.

As a crude approximation of emissions paths, I assumed that emissions paths would be symmetric about a peak with respect to 1990 and the target year (2010 and 2020, and 2040 for purposes of comparison) in the attached chart. Between 2000 and 2020, about 80% of the emission reductions under the 2010 case also occur under the 2020 case (this is roughly consistent with several model projections). Only a small fraction of these emissions occur under the Peak in 2015 case during this period. This provides a rough, back-of-the-envelope illustration that the economic characteristics of 2010 and 2020 are not that much different from one another, but that they do differ from Peak in 2015.

Note: Peter Orszag requested the 1990 in 2020 model runs output, so he is also familiar with these results.

===== ATTACHMENT 1 =====
ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D26]MAIL42755235Q.216 to ASCII,
The following is a HEX DUMP:

Clinton Presidential Records Automated Records Management System [EMAIL]

This is not a presidential record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

Hex Dump file is not in a recognizable format, has been incorrectly decoded or is damaged.

File Name: p_p5325571_cea_html_1.xls

Attachment Number: [ATTACH.D26]MAIL42755235Q.216

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Michele Jolin (CN=Michele Jolin/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:10-SEP-1997 17:43:19.00

SUBJECT: Fast-track speech

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Attached.===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D18]MAIL46002135T.216 to ASCII,
The following is a HEX DUMP:

The Continuing Importance of Trade Liberalization

Janet L. Yellen, Chair
Council of Economic Advisers
11 September 1997
Smith-Barney Washington Conference

The basic goals of the Clinton Administration's economic policies are simple and uncontroversial. First, to secure rising living standards now and in the future. And second, to ensure that the benefits of a rising standard of living are extended to all Americans. To attain these ends, the Administration's economic agenda has been based on three key policy initiatives: deficit reduction, investing in people through education and training, and opening markets worldwide to U.S. goods and services.

It is this third initiative--promoting free and fair trade--that I will focus on today. From his first days in office, President Clinton has advocated an outward-looking, "internationalist" trade policy. During the first four years of the Clinton Administration, over 200 trade agreements were ratified and implemented, some relatively large in scope--such as NAFTA and the Uruguay Round of GATT--others relatively small, but all vital to our nation's competitive future. President Clinton intends to extend and build upon this record during the Administration's next four years.

The single most important next step in the Administration's effort to open markets abroad and expand trade is for Congress to renew the President's authority to negotiate trade agreements on a "fast track" basis. This so-called "fast-track authority" allows the President to negotiate trade agreements with other countries, and then requires Congress to take an up or down vote on

the *entire* agreement. In other words, Congress cannot in effect reopen negotiations by adding or deleting individual provisions of a trade agreement by amendment during Congressional debate. Instead, Congress must vote on the agreement as a whole. Of course, the final decision as to whether the trade agreement--in its entirety--is approved or disapproved is still in the hand's of Congress. Fast-track authority simply allows the President to seek approval or disapproval for the agreement as a whole.

Every President since 1974 has gotten fast-track authority from Congress. Why is it so important? The answer is that fast track lends credibility to trade negotiations. Under fast track, the parties to a trade agreement know that any provisions that are agreed upon cannot later be renegotiated individually, nor can such renegotiation be threatened.

History tells us that fast-track negotiating authority is critical: in the early 1970s, Congress failed to ratify the Kennedy Round GATT agreement in its entirety, and, as a result the Europeans refused to negotiate further trade agreements with the United States. For this reason, in 1974, Congress developed and passed legislation providing the President with fast track negotiating authority, and giving the President the credibility he needs to negotiate international trade agreements.

So, why do we need fast track authority today? And, what would the Administration use it for? The Clinton Administration would focus on three key areas for its use.

The first use for fast-track negotiating authority would be to complete the agenda that was established in the Uruguay Round of GATT negotiations. At the end of the Uruguay Round

negotiations, the United States, along with other countries, pushed for a timetable at which negotiations in different areas would resume. We did that, as did Europe and other countries, because we wanted more out of the Uruguay Round than we got. This year, we begin again the negotiations on government procurement; next year, we will begin intellectual property rights discussions; then we will begin talks on agriculture; then on services. Government procurement is a trillion-dollar market for the United States in Asia alone over the next decade; agriculture, a \$600-billion market globally; services, \$1.2 trillion market. The United States wants better access to those markets. And, we must have fast track authority before beginning discussions in these areas, otherwise countries will not put meaningful offers for market access on the table.

The second major use for fast-track authority is to extend the information technology agreement or ITA. The recently concluded ITA will reduce to zero tariffs on a range of information technology products: semiconductors, computers, telecommunications equipment, faxes, phones, integrated circuits -- a huge array of products in which U.S. firms tend to be highly competitive. The U.S. tariff barriers in those areas are either very low or zero. Asia's tariffs in these areas averaged 30 percent. With the ITA, the United States agreed -- with 43 other countries -- that tariffs on information technology products should be brought to zero across the board in all countries, by roughly the year 2000. We already have agreement among our trading partners for an ITA-2 -- which would expand the scope of the products encompassed by this extremely ambitious initiative. And, fast-track authority would be needed to expand that arrangement.

We are also considering seeking similar kinds of agreements in a number of other

individual sectors where the United States is very competitive but global barriers tend to be high -- areas such as environmental equipment and services, medical equipment and technology, and transportation equipment. In all of these areas, it would be necessary to have fast track authority to negotiate a reduction of trade barriers.

Finally, the third area that fast-track will be used is for more comprehensive market access agreements with individual countries. Thus far, Chile has been identified as the first and most likely country for this kind of arrangement. Today, every major economy in this hemisphere--save the United States--has a preferential trade agreement with Chile. In practice, this means that U.S. firms face tariffs in Chile that make their goods 11 percent more expensive than those of competing firms from other countries. This is a serious competitive disadvantage.

The pace with which preferential trade agreements are being negotiated between and among countries around the world is fast. The United States could easily be left behind through inaction. Since 1992, other countries have negotiated 20 preferential trade agreements in Latin America and Asia that exclude the United States. The European Union has begun a process that will culminate in a free trade agreement with Brazil, Argentina, and other MERCOSUR nations; President Chirac of France has even gone so far as to declare that the economic interests of Latin America "lie not with the United States, but with Europe." And within South America itself, the four MERCOSUR countries are attempting to extend their preferential trade arrangements to encompass the entire continent. Moreover, other countries are aggressively pursuing expanded foreign trade. For example, China has targetted a number of Latin American countries--including Chile, Mexico, and Brazil--for increased bilateral trade.

It is clear: now, more than ever, continued engagement with the global economy will require an active effort on the part of the United States. And, an extension of fast track authority must be an integral component of this effort. But, let's go back to a fundamental and important question: why is free trade so important? Why should we be concentrating so much effort in pushing for more open foreign markets, and how does freer trade contribute to the Administration's goal of securing higher living standards for all Americans? In short, what are the benefits of free trade for the U.S. economy? I will use the remainder of my time to address this question--which, in fact, speaks to my own comparative advantage as an economist.

I would begin by first saying that one of the benefits of free trade is not, as is sometimes supposed, an improved overall current account or trade balance. The Administration's policies do indeed affect the current account, but it is its budget, saving, and investment policies, not its trade liberalization policies, that do so. The current account is a macroeconomic phenomenon that reflects the gap between what we as a nation invest and what we save. The large budget deficits of the 1980s and early 1990s reduced the amount of saving that was available to cover the nation's investment in plant and equipment (investment was choked off too, but not by as much), and this shortfall had to be filled by importing goods from abroad. In an important sense, the nation was overconsuming in the 1980s, financing its consumption binge by borrowing output from foreigners. The result was a large and persistent trade deficit.

Today, we still face a trade deficit, but for a very different reason. Reducing the government's budget deficit has left more room for investment in plant and equipment by the

private sector. And invest it has: since 1993, real business fixed investment has grown nearly nine percent per year on average, a much faster rate than that of the preceding ten years. This rate of investment is above the rate at which Americans save--even with the federal government dissaving less by virtue of its smaller budget deficit. So, once again the shortfall is made up for by borrowing output from abroad, with the result being a current account deficit. But there is a big difference between borrowing in order to invest--as the economy is doing now--and borrowing in order to consume, as we did in the 1980s. In fact, running a trade deficit in order to expand the nation's productive capacity is not new to American history--in the 1800s, we did much the same thing in order to build up the nation's infrastructure, most notably during the railroad construction boom a century ago.

So, it is not the gap between imports and exports that is relevant as far as trade policy is concerned. But the level of trade--the "openness" of the U.S. economy--does matter. In recent years, the United States has seen rapid growth in its degree of exposure to the world economy: real U.S. imports of goods and services grew at an average rate of 11 percent over the past four years, while real exports grew at an average rate of 10 percent per year. In the current recovery, export growth has been responsible for roughly a third of overall GDP growth. The United States now exports an amount equal to 13 percent of its GDP every year and imports an amount equal to 15 percent of GDP; to put these figures in perspective, the corresponding figures for the 1960s were four and five percent, respectively. The American economy is now more open than at any time in its history.

What are the benefits of an open economy? Economists generally recognize two broad

classes of benefits, the first being static, the second dynamic. I would like to discuss each in turn.

Ever since the work of Adam Smith and David Ricardo, economists have recognized that trade helps an economy by allowing it to specialize in what it does best. Adam Smith argued that specialization--the division of labor--enhances productivity, but noted that the degree to which an individual or a nation could specialize depended critically on the extent of its market. We all know the story of Robinson Crusoe, who, alone and isolated, had to do everything for himself: farm, weave cloth, build shelter, and so on. But if a group of Robinson Crusoes can trade amongst themselves, each can specialize in the production of what he or she is best at doing--thus producing more than would be possible were their attentions divided among goods which they are less skilled at making--and then can trade with his or her neighbors for the goods which they in turn are good at producing.

It might even be the case that one individual (or country, to drop the Robinson Crusoe analogy) is better than anyone else at producing *every* good. Such an argument is often invoked in order to “prove” that the U.S. cannot benefit from trade with a country such as Mexico. But it turns out that the argument in favor of free trade still carries the day. All that is required is for a country to be *relatively* less skilled than another in the production of some good in order for it to benefit from trade. This is, of course, the doctrine of comparative advantage--the fundamental (if perhaps counterintuitive) principle that underlies the theory of international trade.

This, in a nutshell, is the “classical” view of the benefits of free trade. It is important to

note that the benefits from trade under the classical doctrine are primarily static in nature--that is, they affect the *level* of output. Moving from a situation in which there is less trade (or no trade) to one in which trade is freer raises output, but this is more along the lines of a one-time increase (even though it might take a number of years for the benefits from trade to be fully felt). This is not to dismiss the significance of these static benefits: for example, some economic historians have argued that most of the economic growth that occurred in the classical world was rooted in the expansion of markets that took place as a result of increased sea trade around the Mediterranean.

Recently, a new view of international trade has emerged which argues that increased trade actually raises an economy's *rate of growth*. If this is in fact the case, it makes the case for trade liberalization an even more compelling one. Raising the growth rate of the nation's economy, even by a few tenths of a percentage point per year, has vastly more significance for long-run living standards than even a relatively large one-off increase in the level of output; the reason, of course, is that a small increase in the economy's rate of growth cumulates over time to yield large gains.

What is the rationale behind the new trade theory--in other words, what is the source of the "dynamic" benefits from trade? Well, we know that economic growth has two sources: either we can increase the amount of inputs (capital, labor, and raw materials) that we feed into the productive process, or we can make those inputs more productive, through innovations in technology, better education and training, and so on. (In fact, this latter factor is necessary if the economy is to grow in per-capita terms in the long run, as sooner or later simply accumulating more inputs will run up against the law of diminishing returns.) The static benefits of trade

represent a one-off increase in this latter factor: specialization lets us allocate labor and capital to the production of goods that we are relatively good at producing, making a given amount of labor and capital more productive in a manner that is not unlike an improvement in managerial technique.

The new view of international trade also focusses on this second factor, but argues that international trade can actually increase the rate of innovation and technological change. One economist has summarized the argument with the following catena:

- International trade leads to greater competition;
- Competition induces greater innovation; and,
- Innovation (*i.e.*, technological change) drives economic growth.

(It's a simple notion once you think about it--though it will probably win the economists who thought it out a Nobel prize some day.)

In a sense, the emphasis of the new trade theory on the dynamic benefits of international trade comes full circle to Adam Smith. Although Smith's contribution to trade theory is generally seen as providing an argument in favor of free trade that highlighted the role of specialization in raising productivity, he also pointed out that specialization, by acquainting workers with a specific productive process, could give them insight into how such processes might be improved--thus fostering innovation. New trade theory also incorporates elements of Joseph Schumpeter's theory of "creative destruction," in which the competition that is a fundamental feature of a capitalist economy serves as a motive force for the economy's progress.

The new view of international trade represents a valuable contribution to academic economics. But theory alone cannot provide an airtight argument in favor of trade liberalization. There is, however, a large body of empirical literature which attempts to determine what drives economic growth across countries. Unsurprisingly, investment in physical capital--plant and equipment--and investment in human capital--education, for instance--are two factors which have a profound influence on economic growth. But these same studies have also found that an economy's degree of openness--as proxied, say, by the amount that it imports and exports relative to its overall output--has an effect on its rate of growth.

In an ideal world--the world in which economists live--free trade unambiguously benefits the economy *taken as a whole*. This is true in the real world as well, although the ideal case masks the fact that some will gain from freer trade, but others may lose--even though on net the winners could compensate the losers and still have something left over. In practice, increased globalization will induce reallocations of labor and capital across sectors as the focus of American industry moves to the production of those goods and services which we are relatively good at producing. Because our economy is not frictionless, these adjustments sometimes involve lengthy periods of dislocation until the reallocation of labor and capital across industries is complete.

Policymakers advocating freer trade must be aware of this fact, and the Clinton Administration has realized from the beginning that it is the government's duty to minimize the impact of this dislocation by speeding up the adjustment process however it can. For example,

one of the key provisions of NAFTA involved monitoring those industries that were in danger of being adversely affected by the free trade agreement, and the Administration committed itself early on to providing for dislocated workers through retraining programs. And, more generally, the Administration's commitment to investing in people through education and training serves as a strong complement to its policy of trade liberalization: since freer trade tends to benefit skilled workers most, the United States enjoys greater benefits from trade to the extent that more of its workers are highly skilled. In the end, though, those who would point to the short-term adverse effects of trade liberalization should not lose sight of an important point: Trade liberalization might adversely affect a small fraction of American workers in their role as producers, but it benefits all workers in their role as consumers.

Bottom line is: the benefits of increased openness and increased international trade are wide ranging -- more efficient utilization of resources, faster productivity growth, higher quality goods, and lower prices, all of which raise living standards.

[[JANET-- I DON'T THINK THIS NEXT PARAGRAPH FITS VERY WELL. I WOULD RECOMMEND CUTTING IT. MICHELE. I have outlined some compelling theoretical arguments and suggestive empirical results that together indicate that freer trade benefits an economy in a profound way. I would also like to suggest a further way in which the economy might benefit from increased globalization, one which has recently been on our minds more and more at CEA. This involves the effect of globalization on the NAIRU, or natural rate of unemployment. Recently, economists have seen some pretty strong evidence that the NAIRU has fallen over the past few years, implying that the unemployment rate can reach a lower level than previously thought without leading to a buildup in wage and price pressures and an eventual

increase in inflation. The reasons for this decline in the NAIRU are not well understood--economists are only just coming to a consensus that it has in fact declined--but it seems plausible that the increasing competitiveness of labor and product markets that globalization fosters has been an important factor in restraining nominal wage pressures, lowering producers' markups, and keeping the cost of raw materials down in the face of higher levels of domestic production. The result of a decline in the NAIRU is a sustainable, *long-run* increase in the level of GDP--which is another way of describing the static benefits of free trade.]]

Finally, in closing, I would note that I have said nothing of the benefits of trade that arise simply from the fact that it links the economic interests of nations more closely. John Maynard Keynes once argued that the greatest tragedy visited upon Europe by the First World War was the disruption of the system of international trade that was a hallmark of the European economy before 1914. The eventual breakdown in the world trading system and resulting deterioration of Europe's economy was a proximate cause of the Second World War, and kept living standards in Europe and the U.S. much lower for much longer than was necessary by prolonging the Great Depression. It is only in recent years that the scope of international trade has returned to the level seen before the Great War.

The United States is now more closely tied to the rest of the world by trade than at any other time in its history. How the U.S. economy performs relative to the economies of other nations will depend critically on how we promote our commercial interests abroad. Aggressive pursuit of trade liberalization, for which fast track authority is a prerequisite, is the best way to ensure that the U.S. maintains its position as the strongest and most innovative economy in the

world.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:10-SEP-1997 22:10:25.00

SUBJECT: 1997 carbon emissions

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

1990 emissions: 1340

1997 emissions: 1480

1997 emissions are 10% greater than 1990 emissions.

source: DOE 5 Labs Study

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:11-SEP-1997 19:16:59.00

SUBJECT: eastern Europe and former Soviet Union emissions

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet,

I apologize for giving you misinformation today about Eastern Europe and former Soviet Union (EEFSU) emissions. I said that present emissions are about 5-7% below 1990 levels -- I was wrong -- 2015 BAU emissions for EEFSU are 7% below 1990 levels (2015 is the latest year projected in the table I have from EIA). Present EEFSU emissions are 33% below 1990 levels. Below is a table presenting EEFSU emissions, western Europe emissions, and then total Europe emissions. The bottom line is this: Europe (total) emissions are not projected to achieve 1990 levels until the year 2009.

Region	1990	1995
(delta90)	2010 (delta90)	
Western Europe	1,016	1,014 (-0.2%) 1,208
(+18.9%)		
EEFSU	1,339	893
(-33.3%)	1,178 (-12.1%)	
Europe (total)	2,355	1,907
(-19.1%)	2,386 (+1.3%)	
United States	1,337	1,445
(+8.1%)	1,721 (+28.7%)	
	US 1996:	1,496

sources: International Energy Outlook 1997, Energy Information Administration, p. 124 (Table A9); and Arthur Rypinksi, EIA, personal communication, 9/11/97 (Arthur provided me with U.S. 1995 revised number and U.S. 1996 preliminary number)

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:11-SEP-1997 13:42:10.00

SUBJECT: Today's GCC meeting, Gruber wants me to pass along

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Janet,

I spoke with Jon Gruber a little while ago. He asked me to pass along to you two "very important" points that he thinks you should make at today's meeting:

1) Scenarios 1 and 3 have basically the same welfare losses (in terms of PDV of foregone consumption).

2) Scenario 2 has about 1/3 the welfare losses relative to the other two scenarios.

Jon said that welfare losses/foregone consumption will not likely be discussed by anyone else, so it "very important" that you make these points.

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:12-SEP-1997 12:23:50.00

SUBJECT: modeling climate effects

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

CC: Adele C. Morris (CN=Adele C. Morris/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

CC: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TEXT:

Janet,

After our discussion this morning about needing to do a better job of selling our peaking in 2010-2020 case, I realized that our concern about relying on one economic model could easily apply to the issue of relying on only one climatic response model. So far, we have had the folks at Battelle run Tom Wigley's MAGICC model for concentration and temperature effects. Wigley has a good name in the field (he has been very active in IPCC, and apparently has a good publishing record). However, we will do some research on his model to see if we can find something analagous to the EMF studies to show how Wigley's model compares with other models.

Joe

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:13-SEP-1997 19:26:41.00

SUBJECT: Very rough draft of a targets and timetable paper and the scenarios notes

TO: Peter R. Orszag (CN=Peter R. Orszag/OU=OPD/O=EOP @ EOP [OPD])

READ:UNKNOWN

TEXT:

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D44]MAIL41020755B.216 to ASCII,
The following is a HEX DUMP:

Targets and Timetables

The Framework Convention on Climate Change signed at the 1992 earth summit in Rio de Janeiro called for carbon dioxide emissions in 2000 at 1990 levels. Given the likely failure of most countries, including the United States, to achieve these emission reductions, most quantitative proposals that have been advanced in the runup to Kyoto focus on variants of the target and timetable agreed to at Rio. Such proposals thus represent the deferred fulfillment of a previously negotiated goal. Consequently, a proposal to "stabilize CO₂ emissions at 1990 levels by 2010" (and variants thereof, including a more stringent proposal by the EU to stabilize at 10% below 1990 levels by 2010) has received considerable attention.

This memo provides a preliminary evaluation of the likely economic consequences for the United States of a program to attain 1990 CO₂ emissions levels by 2010. It compares the costs and benefits of this baseline proposal with those associated with alternative targets and timetables that entail a less rapid initial reduction in CO₂ emission levels. The conclusions described here rely on the substantial body of economic analysis that has been conducted by researchers worldwide, including the Intergovernmental Panel on Climate Change (IPCC), and Administration economists.

Summary of Conclusions:

- **The economic consequences of a "1990 by 2010" program:** A program to attain 1990 greenhouse gas emission levels by 2010 *through domestic emissions reductions alone* entails a reduction in CO₂ emissions of about 22% relative to projected 2010 emissions in the absence of policy intervention.
 - To meet a timetable of 1990 emissions by 2010 it would likely be necessary to replace prematurely a significant fraction of the existing capital stock, and especially of coal-fired power plants. Premature obsolescence represents a significant cost of such a program. Moreover, early replacement of plants entails the use of currently available technologies rather than the new technologies that are likely to be developed in response to the incentives of the program.
 - The implied increase in the price of energy needed to reach 1990 emissions levels by 2010 would entail a significant inflationary shock with an associated rise in the CPI and decline in real wages, as in the oil shocks of the 1970s. Unless effective measures can be designed to offset the impact of the energy price hikes on labor's real income, it is likely that efforts by workers to recoup lost income and by the Federal Reserve to restrain inflation could cause a period of significantly higher unemployment.
- **The timing of emissions reductions in a cost-effective program.** A cost effective program to stabilize atmospheric concentrations of greenhouse gases entails emissions reductions on a far less aggressive timetable than the "1990 by 2010" program. The "1990

by 2010" program is *inefficient* in the sense that it imposes burdens well in excess of those required to achieve the Framework Convention's ultimate goal, which is to "achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

- For example, a timetable designed to ultimately stabilize atmospheric concentrations at 550 ppmv whereby OECD emissions would *peak* by 2020, reach 1990 levels by 2030, and continue to decline even further is estimated to result in costs that are only one tenth to one third those of a program that attains the same goal along a path in which domestic emissions reach 1990 levels by 2010.
- Cost effective emission reductions strategies normally involve an initial phase in which actual emissions approximate the baseline or business-as-usual (BAU) path. (That period is longer the higher the ultimate concentration goal.) This more extended timetable for emissions reductions mitigates the costs associated with premature capital stock obsolescence and provides time for research and development to yield new, superior energy-savings technologies and low cost fossil-fuel substitutes. In addition, postponed costs are lower costs because, with a positive return on investment, fewer resources need to be set aside today to meet future costs.
- Cost-effective emissions strategies often entail serious policy actions from the outset. Although such strategies could be criticized as initially unaggressive from the standpoint of emissions, they need not be initially unaggressive from the standpoint of policy. In order to create appropriate incentives for emission reductions over time and the development and adoption of appropriate technologies, the price of carbon emissions must be increased at the outset of such a program. Gradual emissions price increases are also necessary over time. In comparison with the "1990 by 2010" program, however, the initial carbon emissions prices is apt to be substantially lower.
- The incremental benefit, measured in terms of average global temperature change, of an aggressive program to stabilize emissions at 1990 levels by 2010 is tiny in comparison with a program that approaches the same target more gradually. The difference in world temperatures is about .03 degrees Celsius.
- **International trading.** The carbon price increases required for the United States to attain any agreed upon target and timetable, along with the overall economic cost, would be substantially reduced through effective international emissions trading programs. The satisfaction of treaty obligations in this way would result, however, in substantial international transfers.
 - From a worldwide standpoint, a cost-efficient program to reduce GHG emissions would implement abatement programs in those countries and sectors where they

can be accomplished at least cost. As in the EPA's acid rain "cap and trade" system, high cost emitters could pay lower cost emitters to fulfill their own obligations. It is expected that developing countries that are rapidly increasing their capital stocks, especially for generation of electricity, can be induced to use low-carbon techniques at far lower expense than would be entailed by the replacement of current US capital stock by new capital stocks with low-carbon emissions. Among Annex I countries, the former Soviet Union and other Eastern European countries are thought to be high cost emitters.

- According to the results of the Administration modelling team, trading among Annex I countries would reduce the implied carbon permit price needed to achieve "1990 by 2010" by about 50%; and fully effective joint implementation with Non Annex I countries could lower the "price" by a further 50%.

1990 by 2010: The Scope of the Task

To appreciate the ambitiousness of a program to curb U.S. emissions levels to 1990 by 2010 it is necessary to recognize that such a target involves a cutback of about 28 percent in energy use in 2010 relative to baseline. Carbon emissions are now 12 percent above 1990 levels. Real growth in the economy over the next decade would further raise carbon emissions. Even under an optimistic assumption concerning the pace of improvement of energy efficiency (.9 percent per year) under constant relative energy prices, there would be further increases in carbon emissions by 2010 of 15 to 17 percent if we continue business as usual. The net required reductions to meet for 1990 emissions in 2010 would be 27 to 29 percent.

Cutbacks in energy use (relative to GDP) of this magnitude are at least comparable and arguably greater than those achieved in the decade of the two oil shocks--a period in which aggregate energy prices more than doubled. Between 1972 and 1982 energy use was essentially unchanged in absolute terms while GDP grew in real terms at about 2 percent per year. So we would need to accomplish a larger reduction in energy use than we witnessed over a decade in which energy prices more than doubled. The experience of the oil shock period suggests that the responsiveness of energy use to the changes in the price of energy over periods as short as a decade are quite low--the elasticity is no higher than 0.2. (With a price elasticity of demand of, say, 0.2 over a decade, energy prices would have to rise by around 140 percent.

The kind of logic just outlined is what is embodied in greater detail in the various models that have been used to assess the impact of the 1990 by 2010 plan. Those models differ a bit about the response of carbon emissions to price changes and technological trends, but a broad range of models place the carbon permit price in the range of \$70 and \$140 per ton with a gas price hike between 18¢ and 30¢ and a coal price increase between 150 percent and 300 percent. Relative to the BTU tax proposed by the Administration in 1993 this is 8 to 24 times as large. As these numbers suggest, an intervention of very large magnitude in the economy is required with substantial negative economic consequences. The typical family's spending on energy would rise by about \$1000 per year.

Why are the costs of early emissions reductions so high?

The previous section argued that large costs would be involved in meeting a "1990 by 2010" target. This section shows that the 1990 by 2010 program is actually so aggressive as to be inefficient in the sense of raising substantially the total projected cost of reaching a given environmental goal. Economists have tried to demonstrate this point by looking at how the total costs of achieving a fixed environmental goal vary with the aggressiveness of the initial reductions. There are five reasons why a slower takeoff in curtailing emissions reduces overall costs:: (1) it allows time for the capital stock to turn over, (2) it reduces short-term macroeconomic shock, (3) it provides more lead time to develop and implement new technologies, (4) it allows for the resolution of uncertainty, (5) it makes use of the time-value of money (resources not spent on emission reductions early on can be invested at a positive return which could purchase more emission reductions later).

The role of turnover of the capital stock. The most clear cut and easily quantifiable reason for the high price tag associated with rapid emissions reductions relates to the need for premature replacement of plant and equipment in response to large increases in the price of carbon emissions. A longer window in which to reduce carbon emissions would allow time for the capital stock to turn over. It would be very expensive to scrap the entire capital stock, to replace it with more carbon-free plant and equipment, while it is still in the prime of its useful life. But 20 to 40 years out into the future, much of our existing plant and equipment will be ready for replacement anyway, whether because the plant and equipment have depreciated gradually or because they have more suddenly come to the end of their useful life.

The intuition behind the large costs of very rapid reductions in carbon emissions can be illustrated by considering reductions in electrical power generation. The case of electrical generation is important in its own right since electrical generation is responsible for more than one third of all energy consumption in the United States, but the same principles apply universally to all other uses of energy. As reduced energy use in electrical generation entails the accelerated scrapping of power plants, reduced energy in residences entails the accelerated retrofitting of housing, in transportation the premature scrapping of vehicles, and in energy-intensive industry the premature scrapping of plant and equipment.

Figure 1 shows the effects of an accelerated replacement schedule for all of the 7,900 electric power plants built during the last 50 years. Imagine, to take an extreme case, that all power plants had to be shut down within ten years (by 2007), and replaced with less-polluting technology. This would imply replacing 6,330 plants before the end of their normal lifespan, or 80 per cent of the total. Now imagine that all power plants had to be replaced in 20 years. This would constitute an accelerated replacement of 4,600 plants, or 58 per cent of the total. If one could wait 30 years, the complete replacement would mean an accelerated replacement of 2,000 plants, 26 per cent of the total. If one waited fifty years, under the stylized assumption of a 50-year life there would be no additional cost to replacing them.^{1,2}

¹ [We have truncated the distribution at 50 years, the average lifespan of existing electric power plants. There are other plants that are still in use 60, 70, or even 90 years after they were built. But their numbers are small, and by the end of 50 years the cost of shutting them down would in any case be much-reduced.]

²The same exercise can be done for coal-fired power plants. This is the class of generators that produce the most carbon and that would thus have to be replaced even under a moderate plan to address climate change. If a complete change-over of coal plants were to be accomplished in 10 years, 799 of the 1,122 coal-fired plants (71 per cent) would have to be replaced before the end of their expected lifespan. If replacement occurs over 20 years, 488 plants would be affected, or 43 percent of the total. If one could wait 30 years, 227 plants would be closed prematurely, or 20 per cent of the total. Figure 2b repeats the exercise on the basis of coal plant capacity. Since newer plants tend to have larger capacity, the effects of a rapid replacement schedule are magnified. Closing all plants within 10 years implies that 289 million KW of capacity would be prematurely shut down, or 90 per cent of the total. If one could wait 20 years, 235 million KW of capacity would be affected, or 73 per cent. For 30 years, the capacity

that would have to be replaced falls to 116 million KW, or 36 per cent of the total.

[Automated Records Management System Hex-Dump Conversion]

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

Analogy with the oil shocks of the 1970s. From a macroeconomic perspective, an energy price increase is a supply shock and a shock of this magnitude constitutes a substantial stagflationary shock. Its impact will be to raise inflation, to lower real wages and to raise unemployment, as in the period following the two oil shocks. Unemployment in the four years after the first oil shock averaged 7.2 percent in comparison to 5.0 percent in the four years prior and unemployment rose further to an average of 8.7 percent in the four-year aftermath of the second. There remains debate about how much of this was due directly to the oil shock, because there was a simultaneous decline in productivity growth and transfers of real income to OPEC producers. Nevertheless, we should expect that the efforts of the Federal Reserve to contain inflation, coupled with likely efforts on the part of workers to recoup real wage losses will lead to a period of higher unemployment.

Furthermore, it is important to note that the potential macroeconomic impacts are not included in the costs computed by the large scale long-term models, which assume that resources are fully employed. These models cannot assess the increases in unemployment that would result from large-scale changes in relative energy prices.

Technology. Another important reason for a fairly slow short-term but an aggressive medium-term policy for curbing greenhouse gases is that it will take considerable time before emerging carbon-free or carbon-lean technologies are developed. In many cases it is useful to wait until the new technologies are available before making expensive emissions-saving investments.

There is considerable disagreement about your advisers about the emissions-saving investments that will be undertaken in the absence of price increases. Some of your advisers believe that there are significant energy saving (and therefore emissions saving) investments that can be undertaken with very high current returns, and that these investments will be undertaken even in the absence of any significant increase in the implicit price of carbon emission. How much can we reasonably expect of technological advances without the spur of a sharp price increase? Your economic advisers tend to stress the importance of market incentives for technological advances: they argue that technology will clearly be one of the conduits for meeting an emissions reduction target, but that significant energy price increases are necessary to induce the requisite technological advances. They believe that emissions reductions with existing technologies will require significant price increases. They estimate quite a low price elasticity of demand for energy and therefore find it hard to believe that significant energy reductions beyond the long-term historical trend of 0.5 to 1.0 percent per year will be forthcoming in the absence of very large cost savings. As one indication of the reasons for such pessimism, the relatively small differences in energy use per dollar of GDP in the US and Europe despite the very large differences in energy prices suggests a *long run* elasticity of demand for energy that is fairly low. The *short run* elasticity will be an order of magnitude lower.

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

The degree of disagreement should not, however, be exaggerated. Even the study mentioned above--which is considered extremely optimistic about the role of technology--concludes that it is not possible to reach a target of 1990 emissions levels by 2010 without a \$50 per ton increase in the price of carbon. As already discussed, this increase in price is roughly consistent--depending on whether international trading is allowed--with what economists believe is necessary to achieve the same goal. In summary, despite ongoing debates about the incentives needed to trigger the use and development of emissions-saving technology there is no debate that *a significant price signal is crucial to achieving emissions reductions* of the sort being considered in international fora. It is impossible to achieve 1990 emissions levels by 2010 without an increase in carbon prices substantial enough for people to notice. All your advisers are in further agreement that there is a great need for an increase in funds for research and development of emissions-saving technologies.

Quantifying the Costs of Slow versus Fast Take-off

The relative costs of slow versus fast takeoff in curbing CO₂ can also be analyzed by large-scale long-term energy models. All such models must make many approximations to cover a topic that is global in nature and also more than a century in scope. Therefore it is useful to interpret the results of the models qualitatively, not quantitatively, and also to view the outcomes of the simulations as giving a range of estimates rather than any single number. To enable such comparison of results, the Stanford Energy Modeling Forum ran different models with common benchmark assumptions. The Energy Modeling Forum ran alternative models with common assumptions about benchmark parameters in describing the technology, resource availability, and the rate of discount. They compared the cost of two different paths for reducing carbon emissions from Business as Usual to an eventual stabilization of atmospheric CO₂ at double the pre industrial level--550 ppmv. The first of these paths was first suggested by the Working Group I of the Intergovernmental Panel on Climate Change, who proposed a set of paths that would stabilize atmospheric carbon at different levels in the year 2100; all of the Working Group I paths have quite early take-off in emission abatement. For example, on the 550-ppmv stabilization path reductions in OECD carbon emissions were 25 percent below Business as Usual in 2100. In contrast, Wigle, Reilly and Edmonds have suggested an alternative set of emission paths for reaching the corresponding long-term goal of stabilizing atmospheric carbon at different levels in

2100. They argued that their paths, with attenuated reductions in emissions, would have much lower costs than the original Working Group 1 paths. The appropriate economic measure of losses is the discounted value of losses in future consumption relative to Business as Usual.

Tables 1 and 2 show two robust conclusions from comparison of the fast take-off Working Group 1 (WG 1) 550-stabilization path and its Wigle-Reilly-Edmonds path (WRE) counterpart. Fast takeoff in emission reduction greatly increases the costs. A viable system of international permit trading would very much reduce costs. Table 1 shows the discounted value of consumption loss for the two paths--both with and without international trading of permits. In 11 out of 12 simulations--for six different models with and without permit trading--the costs on the slow-takeoff WRE path is less than a third of the cost on the corresponding fast take-off path. The average ratio of relative costs for the 12 comparisons was less than .3. Table 2 presents a permutation of the same cost estimates in order to assess the benefits from international permit trading. With one exception, all the ratios--of costs with permit trading relative to costs without--are considerably less than one; two thirds of the ratios are less than one half. The average ratio for the twelve simulation outcomes is .41.

For interpretation of the absolute level of the costs, it is important to note that these models assume the full utilization of resources and do not at all assess the costs from lost output and employment of such large changes in energy prices. Any losses resulting from less than a full utilization of resources must be added to obtain the full cost of emissions abatement. These qualifications notwithstanding, abatement costs are acutely sensitive in these simulations to the rate at which abatement begins.

It is also important to note what is probably the most important assumption in these simulation exercises--the assumption about the targets and timetables for developing countries. **Source: Manne and Richels. Contradicted by Holdren in Talk.** By the end of the next century--by 2100-- on the Business as Usual path--non Annex 1 countries will have more than 90 percent of CO₂ emissions. Developing country participation is absolutely necessary to any stabilization scheme. **CHECK: In the Energy Model Forum simulations developing countries follow business as usual until 2030. After 2050 they conform to emission target that are allocated globally on a per capita basis. Between 2030 and 2050 they are adjusting to these per capita targets.**

Timetable of Least-Cost and Low-Cost Paths

If reaching 1990 emissions by 2010 is unnecessarily costly, what paths of emission targets will be relatively efficient? What will those paths look like? Do they peak early? Do they peak late? Are they close or far from attaining 1990 by 2010 emissions?

The WRE paths give some indication what low-cost stabilization paths might look like. In contrast with the WG 1 paths for some period of time they have continue to have rising emissions, in the beginning departing relatively little from business as usual. The OECD emissions path with 550 ppmv stabilization, for example, peak 20 years after the implementation of an abatement program of abatement, reach approximate parity with the initial levels 40 years

later, and then descend considerably more rapidly than the Working Group I paths. This gives some approximation of what a low-cost abatement path should look like.

Since neither the WG I nor the WRE paths are optimal--the WRE paths being only conjectured preferable alternatives, it is envisage an optimal target path would look like. Manne and Richels have computed the least cost path with 550-stabilization in 2100. Such paths are similar to WRE, but not quite the same. The Manne-Richels least-cost path would peak between 2020 and 2030 and then gradually decline. Recahing 1990 emissions so comparatively late does not involve doing nothing now. On the contrary because of projected trend groth in GNP, it entails departing from Business as Usual at an accelerating rate. In order to attain these emissions levels it will returning to 1990 emissions only after 2050. Meeting such targets does not imply doing

Benefits of slow versus fast takeoff

While the excess cost of fast takeoff compared to gradual takeoff in the restriction of carbon emissions has been projected to be large, the differences in projected global temperatures between the fast and the slow paths are, in fact, quite small--small both in absolute amount and relative to temperature changes expected from global warming. **CHECK: While global warming is expected to increase by 1.15 degrees Celsius by 2050 and 2.45 degrees Celsius by 2100 with business as usual, the differences in temperature between the WG 1 path and low cost paths--either WRE or the least-cost path--is less than .05 degrees.**

The limited climatological impact of even an extremely aggressive emissions reductions program measured in terms of temperature impacts during the next century results from extremely long lags involved in the underlying physical processes, and the dependence of temperature on the total stock of carbon dioxide in the atmosphere, rather than the flow of emissions at a given time. Emissions reductions do matter to temperature, but over an extremely long horizon. The cumulative nature of the process points to a payoff from early action, but also suggests that there is little effect on global temperature from a slow rather than from a fast abatement takeoff. The addition to the total stock of carbon from a slow rather than from a fast start to abatement contributes a very small addition relative to total atmospheric CO₂ in 2100 for four separate reasons: the difference in carbon emissions between slow and a fast start over the initial decades of abatement is only a small fraction of total emissions in that period; the stock of CO₂ in the atmosphere is itself the result of many decades of emissions; some of the CO₂ emissions of the early decades will have been re-absorbed; and the most serious build-up in CO₂ under Business as Usual occurs late in the next century, at that time being mainly the result of emissions from newly developed non-Annex 1 countries so that Annex 1 emissions will not dominate that build-up.

Other Considerations and Their Effects on the Timetable

Even the presence of major factors that have not been explicitly considered in our analysis, will not affect the basic trade-offs between the high costs of fast vs slow takeoff. These factors do however add, perhaps greatly, to the urgency of moderate long-term targets for greenhouse gases. They include:

- The possibility of a discontinuously-large catastrophe, such as the melting of the West Antarctic ice sheet, a runaway greenhouse effect (e.g., from release of trapped methane with the melting of the permafrost), or structural changes in ocean currents such as the Gulf Stream.
- The considerable uncertainty about parameter values in three dimensions: relative to economic effects, climate effects, and the discount rate. the two.

On the other hand, our analysis of the economic costs and benefits of a fast vs a slow takeoff does not take account of the effects of a fast takeoff on our ability to lock in other governments, especially from developing countries, into long-term agreements about future emissions.

International Trading of Permits

As has already been seen, the costs of limiting carbon emissions depends upon whether or not there is international trading of emission permits. Allowing emissions sources to contract with each other to implement required emissions reductions can substantially reduce the costs of achieving any over-all abatement target. With a system in which permits can be purchased or sold, either domestically or internationally, a facility that could reduce emissions at great cost can compensate another facility with expensive abatement to make the cuts for it. For example international joint implementation of CO₂ emission reductions would allow a utility in Pennsylvania to be credited with an emissions reduction if a corresponding factory in the Ukraine installed more fuel efficient furnaces. Since CO₂ has the same effect on climate wherever it is released, finding the lowest-cost abatement possibilities is cost-effective. Making such trades voluntary would insure both parties to the transaction gain from it.

An international plan for the eventual stabilization of atmospheric carbon eventually must entail limiting emissions from developing countries. The projected growth of these countries is greater than that of Annex 1 countries (OECD plus the former Soviet Bloc) and in addition these countries have much greater population and population growth than Annex 1. The IPCC IS92a Business-as-Usual scenario projects that these countries will produce more than 90 percent of world carbon emissions in 2100. The common assumption of the low cost paths was that non-Annex 1 countries will agree now to a target for emissions. This target will be Business as Usual until 2030, at which point countries must begin to limit their emissions, with a transition to equal per capita emission rights by 2050. It is important that developing countries agree now to future emissions abatement.

While the effectiveness of carbon emissions targets is extremely dependent on eventual developing country participation, such agreement will have virtually no effect on the current cost to Annex 1 countries of current carbon abatement schemes. To consider the possibility that developing countries might decline to participate, or decide to participate only to a lesser degree than the least cost burden-sharing formula, we ask what would be the effects of developing countries nonparticipation on the economic costs of emission abatement to Annex 1 countries. **JLY has different number.** The increased discounted cost according to Manne and Richels would be \$25 billion. [This is the WRE path? Or the least-cost path?] Even this estimate is an

upper bound since the model fails to take account of the migration of energy intensive industries to developing countries with no carbon taxes .Of course such trade effects will also make the abatement program correspondingly less effective.

Recycling of Revenues

The cost of emission abatement depends upon the use of the revenues from carbon taxes.. If the revenues from the taxes levied are used to replace the most inefficient existing taxes there will be welfare gains that will offset microefficiency losses from energy curtailment. According to Jorgenson and Wilcoxon GNP would actually increase if the revenues were used to reduce taxes on capital. Elsewhere Jorgenson and Yun have estimated the efficiency loss from an extra dollar of tax revenue at 38 cents. Nordhaus' simulations give carbon taxes of about \$5 when recirculation of revenues have no incentive effects. However if the revenues are used to replace other taxes with an efficiency loss of 50 cents, the growth rate of the optimal carbon tax is extraordinarily large and within 10 years of an abatement program the implicit price of carbon is almost \$60. The simple lesson is that the costs of emission abatement are greatly reduced if the revenues from the taxes levied can be put to good use.

So far we have approached the recycling of revenues from the standpoint of microeconomic efficiency. There is also the potential for using the revenues to prevent a macroeconomic shock. Conceivably revenues from the sale of emission permits or from taxes on the emission of CO₂ could be used to reduce the size of the macroeconomic shock. The oil shock is believed by many economists to have resulted in increased unemployment because workers saw their real wages fall as energy prices increased. Their increased wage demands added inflationary pressures to the economy that could only be suppressed with tightening of fiscal and/or monetary policy. Some would argue that the effects of the real wage shock could be diminished by reduced tax payments to offset workers' losses of real wages.

But there is also reason for pessimism regarding the potential success of such an attempt to allay the macroeconomic consequences of the rising energy costs by such recycling. An experiment of this sort was carried out in the late 1970's with no success. In 1979 Margaret Thatcher increased the VAT tax and simultaneously decreased the income tax. The two changes should have had offsetting effects on real incomes, and therefore might be expected to have had no effect on inflation. However, the increase in the VAT tax resulted in an immediately noticeable increase in the CPI. A wage-price spiral ensued as workers attempted to maintain their *pre-tax* real wages.

5. Escape clauses and other flexibility provisions

In addition to the question of the stringency of targets and timetables, there are a number of other important determinants of the economic costs of a program encompassed in the term "flexibility". The U.S. has proposed both "when flexibility" and "where flexibility."

Examples of "when flexibility" are our proposals for targets that are multi-year averages, for multiple target periods, and for banking and borrowing. An example of "where flexibility" is international trading, especially with the participation of developing countries. All of these

proposals could substantially reduce the cost of a given level of emissions, and are crucial elements of our ability to attain moderate targets, let alone more ambitious targets. Costs would be far higher without them.

Another possibility that has recently received attention in the inter-agency process is to add one or more escape clauses. The main idea is to safeguard against unexpectedly large economic costs of emissions reductions. These are costs that could turn out to be unexpectedly large if the economic growth rate turned out higher than expected, or if unrealistic estimates regarding the ease of reducing emissions were built into treaty targets. One possible escape clause would focus on the price of energy per ton of carbon.

Nordhaus (1997) and McKibbin and Wilcoxon (1997) have proposed plans under which there is a cap on how much the price of carbon can rise. The proposal is that above a certain level, governments (or perhaps a supranational authority) could make available an indefinite quantity of emission permits at the predetermined price. While the academic proposals tend to call for common policies and measures to be negotiated worldwide, the idea could usefully be integrated into the U.S. proposal for targets and timetables regarding emission quantities, in the form of a conditional escape clause. The effect would be to convert the quantity limit into a price instrument under circumstances when the burden would otherwise be too burdensome.

Escape clauses could also serve other purposes as well. Possibilities include:

- An escape clause that would be triggered in the future if continued **scientific research** determined that the dangers from GHG concentrations and climate change were much less than previously feared. Presumably the treaty would be renegotiated in such a case anyway. But the arguments for putting this language in now are three: (1) to facilitate the change, should this come to pass, (2) so that we don't look foolish in the eyes of history if this should come to pass, and most importantly, (3) to help allay the fears of today's skeptics.
- An escape clause that would be triggered in the future if **developing country accession** turned out to be less than we expect after Kyoto.
- An escape clause that would be triggered by other Annex I countries' **failure to abide** by their commitments.

Each of these proposals, might be useful in avoiding economic costs that otherwise might be incurred needlessly.

GAA: my addition
An alternative Option

What might be a compromise position on abatement? A compromise solution might be the enactment of a significant tax on the use of carbon that would be rising over time. This would be a good faith effort of the United States to begin an abatement program. At the same time it would not have the large scale macroeconomic consequences that would be

expected from a policy of 1990 by 2010.

The IAT report has estimated that with international permit trading the necessary increase in the implicit price of carbon necessary to meet a goal of 1990 emissions by 2010 would be \$50 per ton of carbon. This estimate is likely to be overoptimistic since the models used to obtain this estimate do not adequately capture the short-term inertia in energy saving. Also the system of international permit trading is unlikely to work, as assumed, in ideal fashion. Nevertheless this estimate could be used to justify a US position of an initial carbon tax of \$25 per ton beginning in the year 2000, increasing at the rate of 8 percent per year, reaching \$50 in the year 2010. A \$25 initial permit price for emitting carbon would increase energy prices by 25 percent. It would increase the price of natural gas by @@@ percent; the price of a barrel of oil by \$5.50, and the price of gasoline by about 6 ¢ per gallon. The price of coal would be seriously affected. Coal would increase in price by @@@ percent. This could be defended as a serious attempt to begin a United States program of carbon abatement.

The macroeconomic cost of this program might be significant, but it would be much smaller than that of the combined oil shocks of the 1970's. CHECK: The two oil shocks involved an increase of 160 percent in the producer price index of energy. A \$25 tax would involve an increase of 25 percent. Therefore the maximum negative impact of such a strategy would be 1/6 of the effect of the oil shock. In the ten years aftermath of the first oil shock, which are inclusive of the second oil shock and its aftermath, unemployment was 2.7 percentage points higher than pre-shock levels. If all of the increase was due to the oil shocks, the increase in unemployment from such a carbon tax of \$25 would be less than .5 percent. If 1/3 of the change was due to the oil shock and 2/3 due to simultaneous change in trend productivity, then the expected unemployment increase would be in the range of .1 to .2 percent. Some significant fraction of the revenues from the tax would have to be used to help displaced coal miners who will of necessity be very seriously affected by any effective abatement program. Other revenues could be used to solve other long-term problems such as the inadequacy of the Social Security Trust Fund.

Talking Points on Climate Change Scenarios

Scenario 1:

The economic consequences of 1990 by 2010:

- The attempt to achieve 1990 emission levels by 2010 through reductions in U.S. emissions involves an extraordinarily large cutback in energy use. Carbon emissions are now 10% above 1990 levels. Real growth in the economy over the next decade would further raise carbon emissions. Even under an optimistic assumption concerning the pace of improvement of energy efficiency (1%) under constant relative energy prices, there would be a further increase in carbon emissions by 2010 of 12-15% if we continue with business as usual. So 1990 by 2010 calls for dramatic changes in how we do business: a cutback of about 25% in energy use by 2010 relative to baseline.
- Cutbacks in energy use (relative to GDP) of this magnitude are at least comparable to and arguably greater than those achieved in the decade of the two oil shocks--a period in which aggregate energy prices roughly doubled. Between 1973 and 1984 energy use was essentially unchanged in absolute terms while GDP grew in real terms at about 2% per year. So we would need to accomplish a larger reduction in energy use than we witnessed over a decade in which energy prices roughly doubled. The experience of the oil shock period suggests that the responsiveness of energy use to changes in the price of energy over periods as short as a decade are quite low--the elasticity is on the order of 0.2 (With a price elasticity of demand of 0.2 over a decade, energy prices would have to rise by around 125%).
- The kind of logic that I just outlined is what is embodied in greater detail in the various models that have been used to assess the impact of the 1990 by 2010 plan. Those models differ a bit about the response of carbon emissions to price changes and technological trends, but a broad range of models place the carbon permit price required to achieve 1990 by 2010 in the range of \$70 and \$200 per ton with a gas price hike between 18 and 50% and a coal price increase between x and y %. Relative to the BTU tax proposed by the Administration in 1993 this is 8 to 24 times as large. As these numbers suggest, an intervention of very large magnitude in the economy is required with substantial negative economic consequences. The typical family's spending on energy would rise by about \$x per year.
- From a macroeconomic perspective, an energy price increase is a supply shock and a shock of this magnitude constitutes a substantial stagflationary shock. Its impact will be to raise inflation, to lower real wages and to raise unemployment, as in the period following the two oil shocks. Unemployment in the four years after the first oil shock averaged 7.2% in comparison with 5.0% in the four years prior and unemployment rose further to an average of 8.7% in the four year aftermath of the second. There remains debate about how much of this was due directly to the oil shock, because there was a simultaneous decline in productivity growth and transfers of real income to OPEC producers. Nevertheless, we

should expect that the efforts of the Federal Reserve to contain inflation, coupled with likely efforts on the part of workers to recoup real wage losses will lead to a period of higher unemployment.

- In order to achieve carbon emission reductions of the magnitude required to meet a 1990 by 2010 target, it would be necessary to reduce the use of coal by electric utilities and, over a short time span of a decade, this would entail premature obsolescence of a large number of plants. Coal plants typically have a useful life of around 50 years. It will be extremely expensive to scrap these plants before the end of their normal lifespan. However, in 20-40 years they will largely be ready for replacement. (If we had to shut down all 1,122 coal fired plants by 2010, to take an extreme case, we would be replacing 88% of them before the end of their normal lifespan.) In addition, replacing them now means replacing them with currently available technologies rather than the superior technologies that would become available over time.
- Premature scrapping of plant and equipment and the premature replacement of these plants with the technology available now rather than the better technology that will become available later implies that a 1990 by 2010 program is extremely **inefficient**. It entails an unnecessarily costly adjustment for the economy. In fact, as I will elaborate when we come to Scenario 2, this choice of time path is so inefficient in comparison with a path that would permit the same adjustment to be accomplished over a longer time, that the overall cost of achieving a given environmental goal with such a rapid takeoff rises by a factor between 3 and 10. This calculation ignores the macroeconomic adjustment costs that I mentioned earlier.
- Indeed, not only does the 1990 by 2010 path impose unnecessary costs; it also results in no significant environmental gains relative to a path that allows emissions to be contained less rapidly, as in Scenario 2. Under business as usual, temperatures are expected to rise by about 2.36 degrees by 2100. Stabilization at 1990 levels beginning in 2010 would reduce the temperature rise to 2.16 degrees--a .20 degree Celsius payoff. In contrast a path that peaks in 2015 and returns to 1990 levels by 2040 has a payoff of 0.19 degrees. So the payoff to the extra speed is .01 degrees. The limited climatological impact of even an extremely aggressive emissions reductions program measured in terms of temperature impacts during the next century results from extremely long lags involved in the underlying physical processes, and the dependence of temperature on the total stock of carbon dioxide in the atmosphere, rather than the flow of emissions at a given time. Emissions reductions do matter to temperature, but over an extremely long horizon. The cumulative nature of the process suggests that there is little loss in starting slowly. The addition to the total stock of carbon from a slow rather than from a fast start to abatement will be very small fraction of total atmospheric carbon: the difference in carbon emissions over the decades of this takeoff period is only a small fraction of total emissions, and the stock of carbon in the atmosphere is itself the result of many prior decades of emissions.
- If the price of energy increases by the amount contemplated under a 1990 by 2010 scenario there will be serious sectoral effects--industries like coal and electric utilities as well as energy intensive industries and their workers would be quite seriously affected. There

would also be significant regional effects.

- Finally, there is the issue of carbon leakage. Even if the failure to include developing countries in the proposal does not lead U.S. firms to move operations resulting in the kind of adverse competitive effects that businesses fear, carbon emission reductions in the U.S. could be offset partially by increased emissions abroad through a number of channels including international shifts in the location of production (lower oil prices; the expansion of energy intensive output abroad can result in significant leakage if foreign industries are less energy efficient than those in the United States.) Estimates of carbon leakage range from 3.5% to 70%.

Impact of Annex I trading:

- Annex I trading--assuming that it can be effectively implemented (which is questionable unless all Annex I countries adopt tradeable permit systems)--would permit the United to satisfy a portion of its emission reduction requirements by purchasing permits from other countries that can reduce emissions at lower costs and are willing to sell us permits. As indicated in the handout, the permit price and other price impacts needed to satisfy 1990 by 2010 would be roughly halved.
- Such trading will result in substantial international transfers. It is likely that we would purchase permits from the FSU and Eastern European countries resulting in substantial international transfers--on the order of \$5 billion by 2010 according to IAT simulations.
- The choice of 1990 as a baseline for emissions reduction rather than a later year is inequitable for the United States vis a vis Europe because we are currently x% above 1990 levels whereas Europe is y% above 1990 levels.

Scenario 2. Under Scenario 2 the U.S. would commit to eliminate emissions growth within ten to 15 years after the treaty is implemented. There would be a later negotiation to determine appropriate next steps including longer term emissions reductions. This plan could be achieved through an auction permit system or through a carbon tax.

- Again assuming that to implement this plan it is necessary to achieve all emissions reductions domestically: elimination of domestic emissions growth could probably be achieved with an increase in the price of carbon emissions in the range of \$5-25 in 2010. It would be necessary to take steps at the outset to raise the price of carbon emissions, but the price increase would initially be small and would have to rise somewhat over time. As indicated, gas prices would rise by roughly 1-3 cents initially.
- The effect on families would be noticeable (\$50 per year from increased energy costs) but substantially less than under the first scenario.
- This plan sets a goal that can be obtained with a defensible and prudent level of intervention in the economy.

- This plan sacrifices virtually nothing on the environmental front and it results in an enormous decline in costs relative to the first plan. This is true for the reason I mentioned earlier--**the 1990 by 2010 program is so aggressive as to be inefficient**. Economists have tried to demonstrate this point by looking at how the total costs of achieving a fixed environmental goal vary with the aggressiveness of the initial reductions. To be specific, suppose that we were committed to attain the ambitious goal set out in the Framework Convention, which calls for policies to “achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” We would recognize that what matters to global temperature and to the environment ultimately is concentration levels, and not emission levels at a given time or short span of time. Roughly, what matters is aggregate emissions over very long time spans. Suppose further that we had decided that it is important to stabilize concentrations at 550 ppmv--roughly a doubling from preindustrial levels.
- Research shows that a timetable designed ultimately to stabilize atmospheric concentrations at 550 ppmv whereby US emissions would *peak* around 2010-2020, reach 1990 levels by 2030, and continue to decline even further would reduce costs by from 50 to 85% in comparison with the costs of a program that attains the same goal along a path in which domestic emissions reach 1990 levels by 2010. To give a sense of magnitudes, a number of models place the cost to the OECD of stabilizing concentrations at 550 ppmv along a path that begins by “1990 by 2010” at around 6 trillion dollars with no trade. (This is the present value of lost consumption) whereas a path that peaks around 2010 and declines gradually thereafter costs only under \$2 trillion in most models.
- Cost effective emission reductions strategies normally involve an initial phase in which actual emissions approximate the baseline or business-as-usual (BAU) path. (That period is longer the higher the ultimate concentration goal.) This more extended timetable for emissions reductions mitigates the costs associated with premature capital stock obsolescence and provides time for research and development to yield new, superior energy-savings technologies and low cost fossil-fuel substitutes. In addition, postponed costs are lower costs because, with a positive return on investment, fewer resources need to be set aside today to meet future costs. 1990 by 2010 is like trying to ask an ocean liner to change course abruptly. It is virtually impossible because it has too much momentum. It is capable of changing course, but it can’t turn on a dime.
- Cost-effective emissions strategies do entail policy actions from the outset, however. So, although such strategies could be criticized as initially unaggressive from the standpoint of emissions, they entail meaningful policy action. In order to create appropriate incentives for emission reductions over time and the development and adoption of appropriate technologies, the price of carbon emissions must be increased at the outset of such a program. Gradual emissions price increases are also necessary over time. In comparison with the “1990 by 2010” program, however, the initial carbon emissions prices is apt to be

substantially lower.

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CREATOR: William J. Antholis (CN=William J. Antholis/OU=OPD/O=EOP [OPD])

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SUBJECT: draft conference agenda for 3:30 mtg

TO: Rahm I. Emanuel (CN=Rahm I. Emanuel/OU=WHO/O=EOP @ EOP [WHO])

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TO: Sidney Blumenthal (CN=Sidney Blumenthal/OU=WHO/O=EOP @ EOP [WHO])

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===== ATTACHMENT 1 =====

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The following is a HEX DUMP:

**White House Conference on
Global Warming and Climate Change
Draft Agenda**

- 10:00 - 10:05** **Vice President Gore:** *Welcome attendees; Introduces President Clinton*
- 10:05 - 10:20** **President Clinton:** *Opening Remarks:* Importance of Global Warming and Climate Change for the American People.
- 10:20 – 11:20** **Science Panel Discussion:**
- Presenter:** John Holdren, Harvard University:
- 11:30 – 12:30** **Emission Reduction Technology and Policy Roundtable**
- Presenter:** Robert Rubin, Secretary of the Treasury
- 12:30 – 2:00** **Lunch:** Remarks by First Lady Hillary Rodham Clinton
- 2:00 – 3:00** **Kyoto Conference and U.S. National Interests Roundtable**
- Presenter:** Madeleine Albright, Secretary of State
- 3:15 – 4:15** **Breakout Sessions**
- 4:30 – 5:00** **Vice President Gore:** *Closing remarks:* The Road Ahead
- 5:30 – 6:30** **White House Reception**

10:00 – 10:05: *Welcome*

The Vice President will welcome attendees to the conference and introduce the President.

10:05 – 10:20: *Opening Remarks:*

The President's opening remarks will be his opportunity to speak to the American people in a substantive way about global

warming and climate change. His remarks should foreshadow the day's events, endorsing the scientific consensus behind climate change, asserting the importance of this issue to the American people, outlining that action will need to be taken, and embracing the broad outlines of the U.S. negotiating position going into Kyoto.

10:20 – 11:20: Science presentation:

Goal: To concisely describe what global warming and climate change are, and to present conclusively the scientific case that they are occurring, that they have real consequences for the American people, and that action is needed to limit greenhouse gas emissions.

Physical science and impacts of global warming and climate change:

10:20 - 10:35: *John Holdren, Professor of Physics at Harvard University*, will deliver a 15 minute lecture, using slide and video graphics to display three central aspects of global warming science: the physical processes that are underway, the impacts they may have on the United States and the rest of the world, and the level of certainty within the scientific community about the future impacts of global warming.

- **What is global warming? What is climate change? What are greenhouse gases?** An overview of the sources of greenhouse gas emissions; emission trends and projections; temperature and climate trends and projections.
- **What are the global impacts?** A catalogue of consequences: increased storm activity; global sea rise; changes in arctic and tropical regions; changing soil, plant and water ecosystems; shifting diseases vectors; surprises.
- **How conclusive is scientific evidence for global warming?** Description of the IPCC report; certainties and uncertainties of human fingerprint and of future projections of temperature, changing weather patterns, sea level rise, etc.

Discussion: Using Holdren's remarks as a point of departure, the President will then lead a conversation with a panel of three/four other scientists covering these issues in more detail.

10:35 - 10:45: **Are there any indications that climate change may already be occurring?**

Tom Karl, Senior Scientist, NOAA: Dr. Karl will discuss the extensive anecdotal evidence that something serious is starting occur. The presentation could include photographs or graphics about extreme events. Follow-up questions could probe how much any one of these incidents might be attributed to global warming, as well as to the probability that this many extreme incidents might happen within so short a time period.

10:45 - 10:55: **What do most scientists say about skeptics arguments?** Some say that the upper atmosphere is cooling rather than getting warmer: which measurements are we supposed to believe? Some people say the relevant warming has all happened before 1940, and that we may be entering a cyclical trough period: how can we tell that temperatures will continue to rise?

Robert Watson, Chair of the Intergovernmental Panel on Climate Change. Dr. Watson will discuss the nature of the scientific consensus, describe the history and composition of the IPCC, and review the certainty which exists across the range of climate change issues. Follow-up: Some question the accuracy of the computer models upon which most climate projections are based. Can we trust them?

10:55 - 11:05: **What does this mean for the United States?** What are the likely or possible regional impacts within the U.S.?

Diana Liverman, Professor of XXX, University of Arizona. Dr. Liverman will review the range of impacts on different regions of the country, describing region-by-region what might be expected to occur in the next twenty to thirty years. She might also discuss health impacts that we might be expected to see.

Don Wilhite, Dir., National Drought Mitigation Center. Dr. Wilhite will review recent droughts and floods and suggest future impacts if trends continue.

Follow up: Will different regions differ in the amount to which they will be effected? How much certainty do we have about impacts as specific as on any one region?

11:05 - 11:15: **Why we need to act now:** What will be the difference if we take steps now or twenty years from now? What kind of action should we take, considering we won't know for another twenty years whether our actions today have had any ameliorative effect? Won't our emissions reductions be dwarfed by the vast emissions that will come from the developing world later this century?

John Holdren. Dr. Holdren could discuss time lags, broad certainties and uncertainties about different climate scenarios, risk of "climate surprises," difficulties of making decisions amidst uncertainty, need for flexibility and creativity in policy.

11:15 - 11:20: **Wrap-up:** President would summarize: Overwhelming scientific evidence points to a discernable human impact on the climate, with real effects on the American people and on our children. Action is needed to address this. Demanding absolute scientific certainty is asking for more than we have had in previous efforts to protect the environment. The key question is: how big a risk are we taking by not acting?

11:30 – 12:30: Emission Reduction Policy Panel

Goal: To discuss policy options that allow us to reduce emissions without hurting our economy.

Opening presentation: The key elements of a national policy to reduce emissions.

11:30 - 11:35: *Robert Rubin, Secretary of the Treasury.* Secretary Rubin would establish that we will adopt binding emissions targets, explain where emissions come from domestically, and outline what a national strategy to reduce emissions might look like. The presentation would include:

- **National targets:** US will adopt a nation-wide binding emissions target.
- **Where emissions come from:** 95% of US emissions come from heavy industry, broad utility energy supply to homes and businesses, and transportation.
- **How to reduce emissions:** (a) Discouraging the use of carbon: Command regulation, market oriented trading system of emission permits (possibly including international trading and joint implementation), revenue-neutral auction or carbon tax; (b) climate-friendly technology, including carbon-efficient uses of fossil fuels; development of alternative fuel sources (solar, wind, biomass, nuclear); dissemination of existing energy efficiency technologies.
- **Experience in regulating emissions:** Past regulatory efforts display a range of available options for limiting emissions:.

Discussion: The President would then lead a discussion exploring (a) possible policy tools, such as emission reduction technologies and trading mechanisms, and (b) the likely impact on our economy of limiting carbon emissions.

11:35 - 11:45: **Regulation and Trading:** We have had extensive experience in trying to regulate pollution in this country. What kind of system did we set up to limit acid rain? Did it work? Is it analogous for our climate efforts, in scope and scale? If permits are applied "upstream," could such a system be combined with other measures to discourage fossil fuel use by downstream users

Richard Sandor, Chicago Board of Trade: Sandor could discuss how the sulphur dioxide trading system was designed, what the initial estimates were for permit costs, how those costs dropped as a result of fuel substitution and other factors. POTUS follow-up: Would establishing a carbon trading scheme be more difficult in scope and scale?

Linn Draper, AEP: Draper could talk about experiences of coal-burning utilities in adjusting to acid rain; efficiency and trading steps (including joint implementation) that it might take under a permit system.

He could also talk about efforts being considered to be more carbon-efficient in burning coal. Follow-up: What affect might energy restructuring have on adjusting to this kind of system?

11:45 - 12:00: **Technology:** What are the most promising technologies in reducing the emissions from fossil fuels, particularly in the different emissions sources we heard about: power generation for industry; power use in homes and offices, fuel for transportation? How about shifting to renewable sources? How much can we expect to reduce emissions by increasing our energy efficiency?

Ken Lay, Enron: Lay could address the ability to shift to alternative fuels, such as natural gas and renewable energy sources. He might also talk about the capacity for exporting such technologies overseas, and about the growth capacity for this aspect of the energy industry. Follow-up: Is solar power ready for prime-time? How about wind? How quickly can we bring them fully into the market?

Michael Porter, Harvard Business School: Porter could discuss, from firms' perspective, why responding early to impending environmental/energy regulation is distinctly in the interest of businesses. Follow-up: Do government R&D programs help advance these technologies, or is regulation or a price signal the most effective way to spur investment? How quickly can we see gains from efficiency and other technologies?

Rich Richels, Energy Policy Research Institute: Richels could realistically assess the possibilities of these technologies in achieving our emission reduction goals. Follow-up: How quickly can we see gains from efficiency and other technologies?

Possible additional participants:

Fred Buckman, PacifiCorp: Buckman could talk about the ability of a large utility to adapt to low emissions standards, particularly based on his experience in the Oregon program. Follow-up: Would you pursue these investments if you did not need to reduce emissions? Would you pursue them without government help?

Fred Krupp, EDF: Krupp could talk about the gains to the environment from a trading system, including how national budgets would work, and how it would need to be adapted to address different emissions sources. Follow-up: How difficult will it be to ensure that we're monitoring all the emissions? How do we ensure that citizens are adequately rewarded for steps that they take on their own?

Robert Shapiro, Monsanto/Pete Correl, Georgia Pacific: Shapiro or Correl could address the ability for agribusiness not only to adapt to a new carbon regime, but to take advantage of many agricultural

solutions to greenhouse gases, such as biomass or carbon sequestration. Follow-up: What is biomass, exactly? Are government R&D programs helpful in advancing these technologies?

Maxine Savitz, Allied Signal: Savitz could talk about the number of different efficiency technologies available, and about the potential scope of this market. Follow-up: Would companies such as yours be subject for credit for these gains in a trading system? How would we measure such gains?

Jack Welch, General Electric: Welch could talk about broad innovations in energy production and consumption, ranging from fuel efficient lighting and heating to the role that nuclear and hydro-energy could play in a carbon-free future. Follow-up: How important is nuclear energy in the strategy of other developed or developing countries for reducing emissions?

ATT/Hewlett Packard/IBM: Panelist would talk about the critical role that information technologies can play in developing, adapting, and/or disseminating energy efficiency techniques and/or alternative fuel sources. Would discuss any current projects underway with utilities or industries, and would assess the prospects for further development of these. Follow up: Does the U.S. have a comparative advantage in adapting these technologies to environmental ends?

12:00 - 12:25: **Economy:** Can we do this in a way that won't hurt the economy? Which industries are likely to face challenges? Which are likely to reap benefits?

Robert Repetto, WRI: Repetto would lay out the case that you can bring existing technologies on line quickly and cost-effectively to reduce our emissions, and that these introductions ultimately would have a positive effect on our economy. Could also address the economic costs of not doing anything. Follow-up: If these technologies are so efficient, why have companies not yet adopted them? What is the difference, from an environmental standpoint, if we bring these technologies on sooner rather than later? Can we put our finger on quantifiable environmental damage that will occur if From a technology development standpoint, how important is a rapid time line?

John Sweeney, AFL-CIO: Broad overview of organized labor's position: that labor supports efforts that can be shown to help the environment, that won't hurt American competitiveness or move U.S. jobs overseas, or that won't send shockwaves through the American economy. Follow-up: What has labor's experience been with past emissions regulation?

Economist A; "Do it smart": [Alan Blinder?] A co-author of economists' letter on climate change; would argue that, depending on policies, mitigation does not necessarily have to have a negative impact on the economy. While not endorsing a particular target date, could say that "smart" approaches could bring

sufficiently early reductions to make a middle-term date cost effective. Follow-up: How uniform are economists in their views about the best way to address the issue?

Economist B; "Go slow": Would argue that attempts to mitigate climate change can be done without significant adverse consequences, but the most economically effective approach is to stretch out implementation over the longest time frame available. Follow-up: From an economists' standpoint, will it be more difficult on the economy to take action if we allow current trends to continue? Is there value to helping key industries?

[Other possible speakers: Student leader discusses local action in addressing climate change. Governor or Utilities Commissioner of Oregon discusses state program to address these issues, and the coalition of government, businesses and environmental groups that brought it about.]

12:30 - 2:00: Lunch:

First Lady Hillary Rodham Clinton: October 6 happens to be Children's Health Day, and the First Lady has expressed interest in the health effects on children from climate change. She could address this topic in remarks at the conference luncheon.

2:00 – 3:00: International Negotiations Panel

Goal: To communicate the global nature of the problem; to identify the key issues outstanding in the negotiations; and to build support for the U.S. negotiating position.

Opening Presentation: Introduce the international component of the climate change debate, with a focus on the Kyoto negotiation.

2:00 - 2:05: *Secretary of State Madeleine Albright:* Secretary Albright would provide a brief background on the Rio Climate Treaty, the Berlin Mandate, and the Geneva Declaration as setting the scene for the ongoing negotiations. After describing the U.S. position, she would summarize the positions of key countries or country groupings (i.e., the EU, China, and the G-77). She also should discuss:

- **Importance of American leadership:** Climate change is a major foreign policy challenge in a post-Cold War world and U.S. leadership is vital to solving it.
- **Developed v. Developing Country Emissions:** breakdown of current and projected emissions from the OECD vs. the developing world.
- **Timing of emission reductions:** While underscoring the importance of reducing developing country emissions, make clear that such emissions must peak at a later date than ours, that this is a precedent used

successfully in other global agreements (i.e. ozone), and that this still will allow for environmental protection.

Discussion: The Vice President would then lead a discussion, keying off the following questions:

2:05 - 2:10: **Where developed countries stand:** The EU proposes reducing emissions 15% below 1990 levels by 2010. How do they expect to do it? Is this target possible for us? How important are our proposals on flexibility for implementing the agreement, including joint projects with developing countries, and trading. How would a trading system work?

Dan Esty, Yale University Law School and School of Forestry: Esty could describe the origin and state of the Kyoto negotiations, discussing why developed countries have taken the lead, why the EU has staked out its position, and how this relates to future discussions. Follow-up: How involved have European businesses been in developing or adapting to Europe's policies? Where do other industrialized countries stand in the negotiations? What comes after Kyoto?

2:10 - 2:30: **Developing country commitments:** Environmentally, what kind of emissions path do developing countries need to follow? What are the economic and environmental implications of having their emissions peak at a later date? What are realistic obligations for developing countries to adopt in Kyoto with respect to their current and future emissions? How can the U.S. help these nations achieve reductions?

Jonathan Lash, WRI: Lash can discuss the emissions paths developing countries can legitimately adopt, and the impact it may have on their economies. He could also speak to the potential environmental advantages of JI in introducing technologies into the developing world. Follow-up: What effect would our adopting a later timetable have on the likelihood of getting developing countries to adopt binding targets?

Advocate of Ambitious Developing Country Commitments: A second panelist would make a broad-based case for the environmental, economic, and political need for developing country commitments. Follow-up: How significant is the timing of developing country commitments?

John Adams, NRDC: Adams can discuss how efforts to mitigate climate change in the developing world can help make important contributions on other critical environmental issues, such as saving forests and reducing smog and airborne pollution. He might also usefully touch on the difficult irony that while developing countries have contributed the least to current emission concentrations, they are most adversely effected by the consequences of climate change. Follow-up: What is an acceptable level of emissions growth for developing countries?

2:30 - 2:40: **Flexibility:** The U.S. domestic experience has shown that flexible, market oriented techniques have allowed

businesses to adapt to environmental regulation in a cost-effective manner. What are the international prospects for establishing such market-oriented approaches, such as trading and joint implementation?

John Browne, BP: Browne could lay out why international businesses would benefit by getting ahead of the game, but why flexible implementation strategies are critical. Follow-up: Where do you see the greatest potentials for progress with developing countries in reducing emissions? Does JI achieve reductions that would not otherwise have occurred?

Roger Sant, AES/Michael Bonsignore, Honeywell: Sant/Bonsignore could lay out the international possibilities for existing climate-friendly technologies, including carbon sequestration, and could outline the opportunities for export of these to the developing world, particularly if joint implementation were allowed. Follow-up: Are emissions reduction strategies underway in the developing world? What do you make of the argument that U.S. industries would only help with, and profit from, making the cheapest reductions, such as converting power plants from coal to natural gas?

Gus Speth, Director UNDP/Joseph Stiglitz, World Bank: Can speak to multilateral efforts being taken, and to the possible nature of an international emissions trading system. Follow-up: Will supervising a trading system create a new international bureaucracy? Will the U.S. sacrifice its sovereignty if it signs onto this treaty?

2:40 - 2:55: **National Security:** Is there a national security dimension to climate change?

Jessica Matthews, Carnegie Foundation: Can discuss preventing future loss of cropland, desertification, flooding, etc. Can also discuss competitiveness benefits from making our economy more energy efficient. Follow-up: Is it possible to fully protect ourselves from these consequences? Why are these developments our responsibility? How do they affect us?

Daniel Yergin, Cambridge Energy Research Associates: Can discuss nature of our reliance on foreign oil, how it has increased over the last two decades, and the structure of defense and alliances we have built to protect our access to oil. Follow-up: Were we to be completely self-sufficient for our energy needs, wouldn't we still need to care about conflict in the Persian Gulf or Caspian Sea?

Frank Wisner, Former US Ambassador to India: Wisner can speak to the energy development issues faced in developing countries, particularly those that see their energy needs expanding by as much as 7% per year. He also can discuss steps developing countries already are taking on the environment. Follow-up: How do developing countries view joint implementation? What more can we do to help them both meet their energy

needs while protecting the environment?

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:14-SEP-1997 13:18:45.00

SUBJECT: Dept. of Commerce Affirmative Action Credits

TO: Sanders D. Korenman (CN=Sanders D. Korenman/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

I received a call from Sylvia Mathews today asking me to pay special attention to the procedures being proposed by the Dept. of Commerce with respect to determining whether firms' hiring shows evidence of discrimination. I don't understand the details but am assuming that this is the matter I referred to you earlier in the summer. There will be a meeting on this during the week and I think you and I should both go. I would appreciate it if you could brief me beforehand. This topic is considered highly sensitive and very important. Sylvia asked me to be sure that we pay special attention to this.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Peter R. Orszag (CN=Peter R. Orszag/OU=OPD/O=EOP [OPD])

CREATION DATE/TIME:14-SEP-1997 13:25:26.00

SUBJECT: Draft of memo -- please send me comments or call 65358

TO: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

TEXT:

Unable to convert ARMS_EXT:[ATTACH.D84]MAIL477294654.216 to ASCII,
The following is a HEX DUMP:

DRAFT #2

September 14, 1997

MEMORANDUM FOR THE PRESIDENT

FROM: GENE SPERLING
KATIE McGINTY
DANIEL TARULLO

SUBJECT: Climate change scenarios

I. INTRODUCTION

This memorandum is the first of several that we will be submitting to you over the next several weeks on the substance of climate change issues. As you know, this issue provides an opportunity for you to address what many consider to be the premier environmental challenge of the next century. As the world's largest emitter of greenhouse gasses, our country's actions will send a key signal to the rest of the world that steps can be taken to reduce emissions over the long term without undue adverse effects on economic growth. But the issue is particularly difficult -- both analytically and politically -- because the environmental and economic consequences are potentially momentous and yet highly uncertain.

The purpose of this memorandum is to frame the decision-making process by presenting three scenarios illustrating possible strategies for the Kyoto negotiations in December and beyond. Subsequent decision memoranda will discuss various aspects of our negotiating position in more detail.

II. AREAS OF DISAGREEMENT

Before considering the three scenarios, however, we want to highlight several key issues upon which there is significant disagreement among your advisers:

- How to implement a carbon emissions reduction scheme;
- How much we can reasonably expect from technological advances without a significant price signal;
- How effective joint implementation will prove; and

- How the environmental effects *differ* from policy actions within the range being considered.

We will undoubtedly discuss these critical issues in more detail over the coming weeks; our purpose here is merely to summarize some of the different views to inform your evaluation of the scenarios examined below.

A. Domestic implementation

Under the system to be negotiated in Kyoto, each participating country would be able to choose its own method for ensuring emissions reductions. The potential “domestic implementation” methods differ markedly in terms of their economic efficiency and political feasibility. Market-based structures for domestic enforcement fall into two categories: (1) tradeable permits and (2) a carbon emissions tax. Our focus here is on the first approach.

Tradeable Permits

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

1. An auction-based approach

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

- First, it would ensure that permits are placed directly into the hands of those who value them most highly.
- Second, it would raise revenue that could be used to reduce other taxes (e.g., to offset the regressivity of the emissions reduction scheme), raise national saving, or fund adjustment programs. Depending on the stringency of the control regime and other factors, the auction revenue could amount to relatively small amounts of money or as much as \$150 billion per year. If those funds were used to reduce extant distortionary taxes, the so-called double dividend may result: improved environmental protection *and* less distortionary overall taxation. The main disadvantage to an auction approach is the effect it would have on corporate support and on the likelihood

that the program is characterized as a “tax”:

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

2. An administrative allocation approach

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

This approach has significant political advantages over an auction:

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

This significant advantage brings with it several disadvantages, however.

- An administrative system would confer a substantial amount of wealth on those to whom the permits are awarded. Such an approach would reward those who were biggest polluters in the past.
- The value of the permits would attract many claimants. Deciding which claimants deserve the permits and avoiding double-counting at different levels of the energy system (miners, refiners, utilities, end-users, etc.) could prove very difficult. Treasury and CEA have grave concerns that the rent-seeking behavior inherent in attempts to capture the permit wealth will make the entire system grossly inefficient. For example, there may be pressure to issue the permits downstream (e.g., to auto manufacturers, washing-machine manufacturers, and air-conditioner manufacturers) even though it would be significantly more efficient to issue them further upstream (e.g., to oil refiners and coal processors).

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

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

B. The role of technology

Your advisers also have sharp disagreements about how much we can reasonably expect of technological advances without the spur of a price increase.

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

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

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

C. Joint implementation

Another source of disagreement among your advisers is the role of joint implementation (JI). JI is a mechanism by which a private entity in the United States could invest in greenhouse gas mitigation projects in developing countries without emissions budgets. In

exchange, the investor (and the U.S.) would receive credit towards its emission budget. Some of your advisers believe that JI is crucial to reducing the cost of reaching a given target and timetable, and for building corporate support. Others are concerned that the program has been oversold -- and in particular, that it does not guarantee that our overall efforts will succeed in reducing global emissions.

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

The JI issue is just one aspect of the role of developing countries in worldwide efforts to reduce greenhouse gas emissions. There is a vast gulf between the dialogue abroad (where previous U.S. proposals on developing country participation are almost uniformly considered too aggressive) and at home (where Senator Byrd's resolution, calling for even tougher demands on developing countries than previous U.S. proposals, passed the Senate 95-0). *[[Your advisers have decided to adopt a much tougher line on developing countries, even if that necessitates a two-step approach to the international negotiations: reach agreement among the developed countries, but do not submit the agreement for domestic ratification until key developing countries commit to binding targets.]]*

D. Environmental effects

A final source of uncertainty and disagreement is over the size of the environmental effects from different government policies. Our best models suggest that under business-as-usual (BAU), concentration levels of carbon are expected to rise from approximately 360 parts per million by volume (ppmv) today to over 500 ppmv in 2050 and over 700 ppmv by 2100 -- the highest in more than 50 million years. Pre-industrial concentrations were approximately 250 ppmv, and concentrations are expected to reach twice these pre-industrial levels in about 2060. The increase in carbon concentrations is expected to produce an increase in mean global temperature of between 2 and 6.5 degrees Fahrenheit.

The relevant question in evaluating our policy choices, however, is not the baseline. Rather, we must compare the likely environmental costs averted under one set of our actions to the

likely costs averted under some other set of actions.

- Some of your advisers believe that although there is substantial uncertainty involved, the best models available suggest that differences in the targets and timetables of the type discussed in this memo have relatively little effect on the ultimate concentration of carbon and therefore on climate change. For example, models predict that the difference between the most aggressive and least aggressive paths discussed below produce differences in temperature increases by 2100 of less than 0.1 degrees Fahrenheit. In other words, they argue that by changing the shape of the emissions path to a given ultimate concentration, it is possible to achieve the same environmental benefit at a much lower economic cost.
- Others believe that such comparisons are fundamentally misleading because they assume that our actions have little influence on developing country behavior, and do not account for the (admittedly small) probability that the different emissions paths will interact with potential non-linearities in the climate system. They thus argue that the environmental differences among the scenarios (particularly Scenario 1 and Scenario 2) are potentially momentous.

III. THREE SCENARIOS

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

The three scenarios we consider are:

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

It is crucial to emphasize that the scenarios are meant to be illustrative, to provide a way of thinking about our policy proposals. Similarly, the economic figures presented along with each scenario are highly uncertain. They reflect educated guesses based on economic models. The issues of disagreement discussed above, along with many others, could have a substantial effect on the precise outcomes.

SCENARIO 1
ADOPT POLICIES CURRENTLY ACCEPTABLE IN INTERNATIONAL SPHERE

Overall strategy

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

Components

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

Energy price effects

The cutbacks in energy use (relative to GDP) required to meet this target are at least comparable to -- and arguably greater -- than those achieved in the decade of the two oil shocks, a period in which aggregate energy prices roughly doubled. Not surprisingly, therefore, the implied increase in energy prices needed to reach 1990 emissions levels by 2010 would entail a significant inflationary shock, with an associated rise in the CPI and decline in real wages.

With Annex I (developed economy) trading

- Permit price. Carbon prices in 2010 up between \$50 and \$90 per ton.
- Gas prices. Gas prices in 2010 would rise by between 10 and 25 cents.
- Coal prices. Coal prices in 2010 would rise by between \$30 and \$70 per ton, relative to the current price of about \$20 per ton.

- BTU-equivalent. In terms of coal prices, the energy price increase is equivalent to a tax of between \$1.50 and \$3 per million BTUs in 2010. (In 1993, the Administration proposed a tax of \$0.26 per million BTUs plus a \$0.34 per million BTUs tax on oil.)
- Effects on families. Some critics might charge that the average family would either have to reduce consumption or pay as much as \$500 to \$1,000 more in 2010 from the increase in energy prices. The increase in expenditures as a percentage of income for the lowest decile is approximately six times the percentage increase for the highest decile.
- International transfers. There is substantial uncertainty over the size and even the direction of net international transfers. However, under some scenarios, purchases of permits from other countries in 2010 could amount to \$5-\$10 billion.

No Annex I trading

- Permit price. A carbon price increase of between \$80 and \$140 per ton in 2010.
- Gas prices. Prices in 2010 would rise by between 20 and 30 cents per gallon.
- Coal prices. Coal prices in 2010 would rise by between \$50 and \$100 per ton, relative to a current price of \$20 per ton.
- BTU-equivalent. In terms of coal prices, the energy price increase is equivalent to a tax of between \$2 and \$4 per million BTUs in 2010.
- Effects on families. Some critics might charge that higher expenditures of as much as \$900 to \$1,500 more in 2010 from the increase in energy prices.

International reaction

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

Domestic reaction

- Hill. Kyoto agreement *extremely* unlikely to be ratified (Byrd resolution); attacked as massive energy tax hike. Even without ratification vote, Congressional anger could manifest itself in many ways.
- Corporations. Major concerns over costs imposed on the economy, as well as developing country stance. Firms in energy-intensive industries will argue (regardless of the evidence) that their operations will flee the United States for other countries. Strong support from renewable energy and energy-efficiency firms.

- Environmental groups. Many environmental groups will support a 1990 by 2010 target, but would prefer a more aggressive path.
- Labor. Strong opposition, driven particularly by coal workers
- Elite media. Likely to support Administration for tackling critical issue
- Outside critics. Many economists who have studied climate change are likely to be extremely critical of the 1990 by 2010 target, as will be discussed under Scenario 2.

SCENARIO 2

DEVISE MORE ECONOMICALLY EFFICIENT DOMESTIC POLICY

Overall strategy

- Devise more economically efficient domestic policy with same ultimate carbon concentration as Scenario 1.
- Allow more time for capital stock to turn over naturally, while providing signal for technological development and dissemination.
- Since this scenario will not be remotely acceptable in the international sphere, it is provided more as a benchmark than a true scenario.

Components

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

Energy price effects

The overall cost of this approach is approximately 1/10 to 1/3 as expensive as under Scenario 1, even for a given ultimate concentration of carbon.

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

current price of about \$20 per ton.

- BTU-equivalent. In terms of coal prices, the energy price increase is equivalent to a tax of about \$0.05 to \$0.30 per million BTUs.
- Effects on families. Some critics might charge that the average family would either have to reduce consumption or pay as much as \$10 to \$100 more in 2010 from the increase in energy prices.

International reaction

- Kyoto agreement impossible.
- The U.S. will be blamed for undermining the current round of international negotiations (Rio II).

Domestic reaction

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

SCENARIO 3: TRYING TO BRIDGE THE GAP

Overall strategy

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

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

- Delaying the 1990 base year;
- Delaying the 2010 year; and
- Softening the 1990 by 2010 commitment by building in an escape clause likely to be triggered

These directions should not be taken as mutually exclusive; they may be used separately or in combination in finding the common ground between the first two scenarios. In each case, we take as our reference point Scenario 1, with a target and timetable of 1990 emissions levels by 2010.

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

Approach A: Moving the Target Base Year (1990)

- The first approach to bridging the gap would maintain the 2010 deadline, but change the base year from 1990 to some later year. Possibilities include the year of ratification or 2000.
- The target year 1990 is a particularly disadvantageous one from the perspective of the United States. Between 1990 and 1995, our emissions grew xxx% while those in ... grew by only yyy%. projections of 2000.... Thus, the choice of 1990 instead of a later year essentially amounts to a large transfer from the U.S. to the rest of the world, a transfer made explicit in the case of Annex I trading. As a result, we could greatly mitigate the costs to

the U.S. economy by moving the target from 1990 to a later year.

- Alternatively, the 1990 base year could be maintained, but the target could be set above 1990 levels -- for example, we could commit to reaching 1990 emissions levels plus 15 or 20 percent by 2010. This commitment would be roughly equivalent, in terms of domestic emissions, to a 2000 by 2010 commitment.

Economic Effects

- The advantage of this approach is that it would greatly mitigate the economic effects. With developed country trading, reaching 1990 levels plus 15 to 20 percent by 2010 implies a permit price in 2010 of about \$10, rather than the \$50 price implied by trying to reach 1990 levels by 2010. Without developed country trading, the permit price would be between \$15 and \$25 -- relative to \$80 to \$140 under the 1990 by 2010 commitment.

Environmental and International Political Ramifications

- The disadvantage of this approach is that there is much negotiating history invested in the 1990 target. A move off of that target by the U.S. would be criticized internationally, since there would be relatively little gain for any country other than the U.S., and even some loss in countries such as Germany and Russia. There would probably be less international censure for an increase in the 1990 target, even at the same economic cost to the U.S.
- Either approach would be met with some disappointment from the environmental community -- but we would receive some credit for taking a concrete step over a relatively short horizon.

Approach B: Moving the Timetable (1990 by some year later than 2010)

- Alternatively, 1990 could be maintained as a base year, and the timetable could be lengthened from 2010. Under Scenario 2, it was lengthened indefinitely to approximately 2040. Alternatives could be to lengthen it more modestly, say to 2025.
- Concerns about appearing insufficiently attentive to the problem could be addressed by taking action immediately upon ratification: for example, raising the price on carbon by \$10 or \$15 per ton, either through a tax or a tradeable permit scheme.
- Another twist on this scheme would be that it could combined with the approach above: for example, we could commit to 1990 levels by 2025, *and* 2000 levels by 2010. Such an approach would also help to address the charge that our proposal was too backloaded.

Economic Effects

- This would once again mitigate the economic costs of the program. But it requires a substantial lengthening of the timetable to induce substantial reductions in costs. For example, a target and timetable of 1990 by 2020 still forces us to bear 90 percent of the economic costs of a 1990 by 2010 commitment. Because of the slow turnover of the capital stock, economic costs are not dramatically reduced without an even longer lengthening of the timetable.

Environmental and International Political Ramifications

- This approach would also be met by increased dissatisfaction from the environmental community, since we would be seen as pushing our commitment off sufficiently far that we have no intention of meeting it. It is unclear how successful any initial carbon price increase would be in mollifying these concerns.
- The international community would similarly be worried about our long run commitment, and it is once again unclear whether these concerns could be reduced by an initial carbon price in this range. In particular, many of your advisers worry that the delays embodied in this approach would undermine U.S. leadership on a critical issue, and make it even more difficult for us to convince developing countries to participate.

Approach C: Adopt 1990 by 2010, with “escape clause” to minimize domestic costs

- This approach bridges the gap by adopting a 1990 by 2010 target and timetable, but insisting on an “escape clause”: the U.S. government would stand ready to sell unlimited permits at \$10 to \$20 per ton.
- The approach allows technology optimists to believe that we will meet the 1990 by 2010 target and timetable, but provides an upper bound on the economic costs imposed (even if that means the target and timetable is not met).
- The economic cost is capped -- if the cap binds, it’s functionally equivalent to a tax of that amount per ton. Revenue neutral, but still “tax cut” if funds from selling permits are used to reduce other taxes.

Economic effects

- Some environmentalists and technology optimists believe that it is possible to reduce emissions to 1990 levels by 2010 with a relatively low permit price -- low enough so that the escape clause is irrelevant. But the economic models generally suggest that the escape clause will be triggered -- so that the permit price would be as set in the escape clause (\$10 to \$20), not the higher amount that would be necessary to succeed in fully reducing emissions to their 1990 levels by 2010.
- In essence, this provides a guarantee. If our projections are too pessimistic, and we can

achieve the target and timetable with a permit price in the \$10 to \$20 range, then there will be no need to invoke the escape clause. But if the costs turn out to be much higher, they will be capped and the economic exposure of the nation limited.

Environmental and International Political Ramifications

- The escape clause is likely to be criticized by other countries, who may argue that it makes it extremely unlikely that we will meet our ostensible target and timetable. Such criticism could damage our credibility worse than either of the other two approaches, since we will not be viewed as taking the process sufficiently seriously. Nonetheless, even if the escape clause is triggered and we fail to meet the target and timetable, we will still have made an important first step: a \$10 to \$20 charge per ton of carbon.
- Domestic environmental constituencies may exert pressure to retain the target and timetable, but remove the escape clause. If the escape clause is stripped away during the debate, the economic costs skyrocket.
- The approach does, however, have the important advantage of taking seriously the claims of the technology “optimists”: if the promised benefits of technology do emerge, then this may be a credible plan for meeting our goal.

Withdrawal/Redaction Marker

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
004. email	Janet L. Yellen to Jeremy B. Rudd at 13:05:40.00. Subject: [Redacted]. (1 page)	09/14/1997	b(6)

COLLECTION:

Clinton Presidential Records
Automated Records Management System [Email]
CEA ([Yellen])
OA/Box Number: 950000

FOLDER TITLE:

[08/12/1997 - 09/16/1997]

2013-0723-F
ab1272

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:14-SEP-1997 13:21:23.00

SUBJECT: MTO Program

TO: Maria J. Hanratty (CN=Maria J. Hanratty/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

Many thanks for all of the excellent background material that you prepared for me. It is extraordinarily helpful. It now appears that our Tuesday WEB briefing will be bumped in order to schedule a Climate Change meeting with the President--although nothing is ever truly certain until it happens. But the work is certainly not in vain because I will definitely talk to him about it the next time we do have a WEB briefing. Thanks again for all the help and for the excellent article.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeffrey A. Frankel (CN=Jeffrey A. Frankel/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:15-SEP-1997 17:33:13.00

SUBJECT: ongoing GCC developments

TO: Adele C. Morris (CN=Adele C. Morris/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Joseph E. Aldy (CN=Joseph E. Aldy/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Randall W. Lutter (CN=Randall W. Lutter/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

* At 12:45 Monday, POTUS met with major environmental leaders. Unsurprisingly, they pushed for early aggressive action. They also presented rather absurd poll results purporting to show that the American public favored their position.

A highlight was the President saying (when they asked him how they could help) that perhaps the environmentalists would like to advocate publically a new kind of tax reform, a switch from favoring bad energy sources to good; more specifically: a fuel tax with revenue-neutral redistribution. At the end of the (enviro-dominated) meeting, Summers echoed this point (there wasn't much else he could say, though Gene injected one note of caution).

* Steering Committee went over draft of memo to go up tonight, in advance of tomorrow's 9:15 meeting with POTUS.

JF

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Peter R. Orszag (CN=Peter R. Orszag/OU=OPD/O=EOP [OPD])

CREATION DATE/TIME:15-SEP-1997 19:14:48.00

SUBJECT: Typo in memo

TO: JONATHAN.GRUBER (JONATHAN.GRUBER @ MS01.DO.treas.sprint.com @ INET @ LNGTWY [UNKNOWN])
READ:UNKNOWN

TO: Russell W. Horwitz (CN=Russell W. Horwitz/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TO: David B Sandalow (CN=David B Sandalow/OU=CEQ/O=EOP @ EOP [CEQ])
READ:UNKNOWN

TO: Daniel K. Tarullo (CN=Daniel K. Tarullo/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])
READ:UNKNOWN

TO: Melissa Green (CN=Melissa Green/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TO: Kathleen A. McGinty (CN=Kathleen A. McGinty/OU=CEQ/O=EOP @ EOP [CEQ])
READ:UNKNOWN

TO: Gene B. Sperling (CN=Gene B. Sperling/OU=OPD/O=EOP @ EOP [OPD])
READ:UNKNOWN

TEXT:

There is (at least) one typo in the memo on climate change: On page 11, the text under "Economic effects" reads that "the intermediate target of reaching 15 percent above 1990 levels by 2010 implies a permit price of about \$15 to \$30 in 2010..." It should read that "the intermediate target of 2000 by 2010 implies a permit price of about \$15 to \$30 in 2010..." (2000 levels are expected to be about 15 percent above 1990 levels, so the price effects are expected to be about the same also...)

Withdrawal/Redaction Marker

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
005. email	Jeremy B. Rudd to Janet L. Yellen at 14:00:12.00. Subject: [Redacted] (1 page)	09/15/1997	b(6)

COLLECTION:

Clinton Presidential Records
Automated Records Management System [Email]
CEA ([Yellen])
OA/Box Number: 950000

FOLDER TITLE:

[08/12/1997 - 09/16/1997]

2013-0723-F
ab1272

RESTRICTION CODES

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C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

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RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:15-SEP-1997 14:16:16.00

SUBJECT: Thank-you letter to Roger Kramer, Dept. of Labor

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Steven N. Braun (CN=Steven N. Braun/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

I would like to send a thank-you letter to Roger Kramer at the DoL, who gave me an incredible amount of help with my preparation for the EDRC meeting. Steve pointed out that a letter from you would represent the highest praise, and I in turn suggested that sending a c.c. of the letter to Alexis Herman might be a good idea as well.

Roger really did an amazing job in getting us up to speed on the immigration chapter, and we would have been in serious trouble without his help. He also spent a huge amount of time tutoring a very slow student (me), and gave us an extensive set of comments on the OECD draft (all this without being able to rely on staffers--I understand that his section has been cut back over the past year or so).

Steve and I drafted a letter for you to consider; I gave a copy to Sandy to give to you when you return. I would really like to do something nice for Roger, and agree with Steve that this would be a good gesture. Please let me know whether you think it appropriate.

Thanks very much.

- Jeremy

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Bob J. Nash (CN=Bob J. Nash/OU=WHO/O=EOP [WHO])

CREATION DATE/TIME:15-SEP-1997 11:56:16.00

SUBJECT: CEA/Ms. Rebecca Blank

TO: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

CC: Patsy L. Thomasson (CN=Patsy L. Thomasson/OU=WHO/O=EOP @ EOP [WHO])

READ:UNKNOWN

CC: Peter C. Erichsen (CN=Peter C. Erichsen/OU=WHO/O=EOP @ EOP [WHO])

READ:UNKNOWN

TEXT:

I checked with Chuck Ruff's office regarding the status of the name check and tax check for Ms. Rebecca Blank. The Counsel's office said her paperwork went to the FBI and IRS on August 18, 1997.

They anticipate receiving the approval from the FBI and IRS on or before Sept. 18. This means we should have time to do an intent before Oct. 1, 1997. I want to confirm the fact that name and tax checks take two to four weeks depending upon the complexity of the person's background.

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Janet L. Yellen (CN=Janet L. Yellen/OU=CEA/O=EOP [CEA])

CREATION DATE/TIME:16-SEP-1997 08:03:25.00

SUBJECT: Re: Thank-you letter to Roger Kramer, Dept. of Labor

TO: Jeremy B. Rudd (CN=Jeremy B. Rudd/OU=CEA/O=EOP @ EOP [CEA])

READ:UNKNOWN

TEXT:

It's absolutely appropriate. I will be happy to follow your suggestion.