

Todd's
Book

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MEMORANDUM

COUNCIL OF ECONOMIC ADVISERS

CEA

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August 15, 1997

To: Todd Stern

From: Jeff Frankel JF

This revised version of the table should be more informative than the draft that Michele Jolin brought over earlier today.

		Concentration Level (ppmv)		Year at Which Concentration Reaches 2x Pre-Industrial Level **	Change in Temperature from 1990 Level (Celsius)		Carbon Permit Price (\$ per ton) ***	Oil Price *** (\$ per barrel)	Gasoline Price *** (\$ per gallon)	Coal Price *** (\$ per ton)
Year		2050	2100		2050	2100	2010	2010	2010	2010
Business As Usual (BAU)		522.1	729.8	2058	1.15	2.45	0.00	21.24	1.31	13.76
<i>Deviation from BAU:</i>										
Annex I Participation Only	1990 -10% beginning in 2010	-30.3	-95.0	+15	-0.13	-0.36	+200	+23	+0.54	+108
	1990 beginning in 2010	-24.8	-83.4	+12	-0.10	-0.31	+95	+11	+0.26	+51
	peak in 2015, 1990 in 2040	-17.6	-77.6	+9	-0.06	-0.28	+12	+1	+0.03	+7
Worldwide Participation	1990 -10% beginning in 2010	-82.2	-248.6	over 40	-0.43	-1.10				
	1990 beginning in 2010	-74.6	-233.8	over 40	-0.40	-1.02				
	peak in 2015, 1990 in 2040	-56.4	-220.2	over 40	-0.28	-0.93				

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.

The estimated increase in the price of carbon that would be necessary under this plan would raise gasoline prices by 26 cents a gallon and coal prices by 273 % in 2010.

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 price of gasoline in 2010 need go up only 3 cents and coal prices by only 53 %.

* Preliminary CEA projections. Revisions due by early next week. 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 International Trading may substantially reduce these costs.

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 provided to CEA 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.

Price Assumptions

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

Oil, Gasoline, and Coal: U.S. price increases of fuels were calculated based on the permit price and the fuels' carbon content.

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CEA Papers

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**Deviations from BAU for Concentration, Doubling Date, and Temperature Level
(CEA Tabulations Based on MiniCAM Model Results)**

		Concentration Level (ppmv)		Year at Which Concentration Reaches 2x Pre-Industrial Level *	Change in Temperature from 1990 Level (Celsius)	
		2050	2100		2050	2100
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Climate and Economic Variables under Alternative Emissions Paths *

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